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# **Blockchain & data justice**

## *The political culture of technology*

Doctoral dissertation by

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## ***Abstract***

Blockchain is a distributed ledger technology arising from the world of Bitcoin and cryptocurrencies, which has been advocated as a disruptive and revolutionary innovation. Because of the peculiarity of its architectural technicalities, in fact, blockchain technology has seen a growth of its social applications in recent years and has gained the attention of a large variety of actors, interested in its potentiality for entering the social domain and enabling the creation of decentralized, horizontal and peer-to-peer networks.

This thesis aims at studying the visions of the world surrounding the implementation of blockchain technology, by analyzing narratives and discourses emerging among those who create and use it. Based on a critical understanding of algorithms and technology as non-neutral and as subject to bias and pitfalls, this work focuses on the sociological and political significance of imagining a technology for the social and public good, posing a particular attention to developers and digital entrepreneurs' understanding of sociality.

Drawing on a one-year multi-sited fieldwork in Milan, London, Tallinn and the online sphere, this work combines a theoretical analysis with ethnographical insights that arise from participant observation and a number of interviews with individuals from the blockchain scene. By relying on a qualitative study that aims at researching the values and aspirations that are encoded in technology, I argue that blockchain social imaginary is embedded in neoliberal, technocratic visions of the world and that blockchainers' understanding of society and social relations becomes tokenized and subject to mathematical simplifications.

My argument develops in three phases: firstly, I show how blockchain works as a floating signifier and thus could be interpreted as a populist buzzword; secondly, I argue that blockchain is surrounded by regimes of truth regarding its disruptive potential that overlooks social dynamics complexity; thirdly, I show that blockchainers' understanding of social good is based on metrics and competition, thereby reinforcing a number of neoliberal myths associated with the Californian Ideology.

By showing the importance of integrating more sociological perspectives to the study of digital technology's potential, this work exits the financial and informatics domain, merging previous studies on blockchain with a human rights-based approach that ground its roots on social justice theory.

*“The crisis consists precisely in the fact that the old is dying and the new cannot be born;  
in this interregnum a great variety of morbid symptoms appear.”*  
*(Antonio Gramsci)*



## *Introduction*

2020 has been a disruptive year, which has triggered multiple crisis in the already wobbly Western societies. During the past year, we have seen the exacerbation of an economic, political and social crisis, which has created even more polarization and dissatisfaction among citizens who already showed a strong disinterest and distrust of political institutions. The crisis we live has accelerated a number of debates on the sustainability of societies and future scenarios. Among these, the crisis also re-opened the debate on the centrality of digital technologies and digital data in supporting social infrastructures, and in fact technology has been proved a useful and necessary tool to ensure that local and regional governments continue to provide essential public services during the COVID-19 crisis. From digital education to contact tracing, from public health to the maintenance of social relations at large, technology has proved its centrality in keeping human beings and societies connected in an era of crisis and social isolation.

That digital data increasingly plays a central role in contemporary Western politics and public life is already widely accepted among social sciences, but online data is becoming also a central political topic. Considering how digital technologies influence everyday life, social relations, government, commerce, the economy and the production and dissemination of knowledge, it is recognized that we have stepped into the 'digital society' (Lupton, 2014; Marres, 2017), where digital technologies are not only characterized by ubiquity and pervasiveness in organizing social relations, but they actually intervene in the shaping of our knowledge of the world: in other words, how we learn about the world nowadays is digitally mediated (Lupton, 2014).

Technological innovation is often advocated as a solution to solve social problems, and in recent years we have in fact seen an overgrowth of startups and platforms which try to address social challenges by means of technology (e.g. health apps or 'sharing economy' platforms). The arrival of the Internet, from its very origins, has brought a number of hopes regarding the future of our societies which promise to provide a better future for humanity. Indeed, Internet has always been embedded with imaginaries around its potential for creating more democratization and horizontality (Bory, 2020), and technology has been extensively advocated as an important means for social change and individuals' empowerment (see Castells, 2015; Benkler, 2006).

However, the way in which the Internet looks today does not resemble the original idea of its pioneers, who saw the web as a space for constructing distributed, peer-to-peer relationships. The Internet, in fact, is a deeply centralized and hierarchic space, colonized by economic and political

actors who own the means for producing, collecting and analyzing digital data, which today are popularly considered as the ‘the new gold’ or the ‘oil of this century’ (The Economist, 2017).<sup>1</sup> In this sense, the incorporation of digital technologies in our societies has also seen the growth of imbalances, inequalities and social discrimination. The Internet of today is characterized by a strong presence of digital platforms, which monopolized the ownership of digital data for commercial purposes and created a great set of political imbalances and ethical concerns, especially regarding practices of ‘surveillance capitalism’ and its implications (Zuboff, 2019).

Moreover, digital technologies have also been responsible for the massification of violence and discrimination, as issues like online hate in social networks or the use of discriminating algorithms largely show (Peña Gangadharan, 2019). Data and algorithms may indeed intersect with already existing forms of discrimination and reproduce biases which may embed already existing prejudices and stereotypes, sharpening their adverse effects on minorities and already marginalized groups (Taylor, 2017). In this sense, digital platforms and code developers should be considered as powerful actors who decide on online visibility and representation, and the fact that many platforms have grown surprisingly influential before opening a debate on public values and common goods, should be addressed more seriously (Van Dijck, 2018).

In recent years, the arrival of a new particular technology, namely blockchain, revived the aspirations for democratizing the web and strengthened the hopes in innovation as a means for solving social inequalities. Blockchain surged to prominence in 2008, when a hacker writing under the pseudonym of Satoshi Nakamoto published a paper that explained the invention of ‘digital money that lets you exchange unique digital objects on the Internet’ (Gerard, 2017), which later was called Bitcoin. In it, he makes reference to the infrastructure running this digital money: the blockchain. Since its arrival, blockchain has gained the interest of scholars because of its particular technological affordances, which consist in distributed encrypted ledger systems where the information is stored not in a single, centralized database, contrary to the actual Web. The concept of distributed ledger is advocated to be a new kind of technology that ensures horizontal, safe and transparent transactions, because Blockchain makes possible a tamper-evident public ledger of transactions, without the need of any central authority, and allows multiple actors in a network to record, verify or share data on a

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<sup>1</sup> However, this popular concept has been widely criticized in sociological literature (see for example Couldry and Mejias, 2019), and more recently, data have also been framed as ‘fictitious commodities’ (Grabber and Konig (2020).

peer-to-peer basis (Polvora et al., 2020). In this sense, the possibility for decentralizing every transaction on the web makes blockchain a novel technology advocated as disruptive.

The diffusion of blockchain attracted substantial interest from the startup world, where a plethora of conferences, events and symposia has been held on the subject, leading to the emergence of a 'blockchain scene' populated by tech entrepreneurs, experts and other stakeholders, all interested in the understanding of the 'disruptive' potential of this new technology. Blockchain has been portrayed in this context as a pseudo-revolutionary technology, destined to impactfully intervene within a number of societal domains (Tapscott and Tapscott, 2016). While largely dominated by commercial and finance use cases, the conversations around blockchain in the startup world quickly extended to the assessment of its potential application in a variety of contexts beyond currency transactions – what is often referred to as 'Blockchain 2.0' (Swan, 2015, Scott, 2015; Hosp, 2019). It is claimed, in fact, that blockchain technology has a potentiality to be applied in the social sphere, e.g., governance, art and music, healthcare, education.

The development of blockchain grows together with different international initiatives, such as the EU Blockchain Observatory and Forum (Courcelas, Lyons and Timsit, 2020) or the OECD Global Blockchain Policy Forum (OECD, 2019), and nowadays, more and more organizations are interested in harnessing blockchain affordances to address social and public good issues (Polvora et al., 2020). A known example of blockchain in the social sphere is E-Estonia ([e-estonia.com](http://e-estonia.com)), that by the issuance of the first e-ID cards and making digital signatures possible for every citizen, had the effect of extending a wide range of political activities to the digital, such as online voting, selecting services and finding housing. The observation of such applications has led some to hypothesize that Blockchain might be able to drive new kinds of social impact, essentially changing the infrastructure of social transactions (Galen et al., 2018). In other words, for some, Blockchain represents a disruptive technology that could facilitate a shift to a decentralized networked information economy (O'Dair and Beaven, 2017). Blockchain enthusiasts also envisage that its implementation across various sectors of society will give individuals more control of their data and online transactions, thus offering a technological fix to issues of datafication and algorithmic-based power imbalances (Tapscott and Tapscott, 2016).

However, blockchain like every technology is not neutral. Every technology is indeed embedded with visions of the world, values and interpretations, meaning that machines cannot be separated from the ideological position of their programmer (Marres, 2017). For this reason, focusing critically on the imaginary that surround blockchain technology is a particularly important task to

undertake in order to understand the extent to which blockchain is envisaged to be applied in the social sphere.

Blockchain grounds its roots in the hacker community, i.e., groups of individuals that consider software technologies as important conditions for taking social and cultural action (Jordan, 2004). In this sense, some scholars have criticized the extreme *hype* around blockchain technology, upholding the view that blockchain is embedded with anarcho-libertarian values (see Golumbia, 2016; Ippolita, 2017) and thus should be observed as a very political tool. Golumbia (2016) describes the anarcho-libertarian ideology as an inherent feature of hacker culture, which in its most extreme form believes that governments should exist only to ensure dominant private power over economy and citizens, and that citizens should make massively use of encryption as a means of individual freedom. This vision represents a point of contact with the so-called Californian Ideology (Barbrook, 1996) that characterizes the Silicon Valley tech culture and the developers of platform technologies, which is now seeing blockchain technology as the “Next big thing” (Tapscott and Tapscott, 2016). According to this Californian Ideology, which is rooted in neoliberalism, “*information technologies empower the individual, enhance personal freedom, and radically reduce the power of the nation-state*’ hence through technology “*each member of the ‘virtual class’ is promised the opportunity to become a successful hi-tech entrepreneur*” (Barbrook, 1996: 53).

However, Blockchain has also been discussed within a more ‘commonist’ hacker sphere (Peyrouzet García-Siñeriz, 2018) and advocated as a means to redistribute power on the Internet and promote solidarity networks based on commons (Arvidsson, 2020). Contrary to anarcho-libertarian views, some scholars have considered these alternative political orientations as innovative and argued that Blockchain can be seen as enabling a new system of value that will better support the dynamics in social sharing (O’Dair and Beaven, 2017; Pazaitis et al., 2017). In this sense, the debate on which kind of visions of the world blockchain may embed is still very open, showing that blockchain technology collects a number of different political views regarding the potentiality of its affordances. This contradiction became even more visible as Blockchain started to gain attention from a variety of different sectors (ICOs, banks, institutions, start-ups, or even platforms like Facebook<sup>2</sup>).

Considering that there is a diversity of actors participating in the scene, there may also be a diversity of interpretations regarding blockchain affordances. For this reason, it is important to investigate what unites different political approaches under the same belief that blockchain will

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<sup>2</sup> Kuchler and Cornish (2018). Available at: <https://www.ft.com/content/90a9f280-57d4-11e8-b8b2-d6ceb45fa9d0> (last accessed 29/11/2020)

disrupt ‘for good’ society and social relations at large. Given the non-neutral nature of every technology, more questions should indeed be asked about the underlying values that drive the implementation and use of blockchain. To do so, it is necessary to understand who is implicated in the scene, what these actors think about blockchain and which kind of world do they dream of. In this regard, the main question underlying this work is which kind of sociotechnical imaginaries (Jasanoff and Kim, 2015) and visions of the world inhabit the blockchain scene, when blockchain is advocated to be ‘for the social’.

So far, blockchain imaginaries have been studied mostly looking at its innovative and disruptive potential for restructuring financial and economic systems (e.g., Swan, 2015; Tapscott and Tapscott, 2016) or, more sociologically, as ‘post-political imaginaries’ (Husein, 2020), intended as emerging from a context of depoliticization of politico-economic processes. However, research still lacks on the meaning of imaginaries on blockchain ‘for the social’, thus deepening our understanding in the field becomes a relevant task to undertake. Since blockchain was indeed born together with Bitcoin, it is important to understand to what extent it is possible to separate blockchain from Bitcoin and cryptocurrencies and focus more on its ‘social’ ambitions. Given the evident interrelation with the financial and economic field, this work focuses on the ways in which a technology like the blockchain is imagined as social and aims at filling a gap in the literature by looking at blockchain imaginaries through the theoretical lens of data justice literature (see for example Dencik et al., 2016; Taylor, 2017; Peña Gangadharan, 2019).

This research delves into the study of blockchain technology looking at its imagined futures and considering it as a cultural phenomenon. Focusing on blockchain imaginaries as an object of study ultimately recognizes that technology mobilizes a series of values that articulate certain visions of the world. Thus, studying the social imaginary becomes the source of a theory of ideology (Mountian, 2009) in which discourses and narratives around technology become useful to research on social reflections, recognitions and misrecognitions. This task is essential in order to contextualize blockchain in the debate for enhancing more data justice, going beyond a pure techno-determinist approach and adopting instead a human rights approach to data and technology. Moreover, a study on socio-technological imaginaries that focuses on blockchain in the social sphere is also relevant for public debates on the role of developers, digital platforms and data as part of the infrastructure of Western societies. The fact that technology brings along imaginaries regarding the future of society deserves attention, particularly considering that data, algorithms and platforms may be responsible for (re)producing inequalities and discrimination. In the case of blockchain, it also means looking at

who may ultimately benefit from the implementation of this technology and who may instead be disenfranchised. For this reason, this work aims at understanding the extent to which blockchain would 'create the underpinning of a safer, fairer more prosperous society', as it is stated in the 'Blockchain for Good' manifesto (2018), and which interpretations of social good are provided inside the blockchain scene. The ultimate goal is delving into the changes that blockchain experts, developers and entrepreneurs want to see in the world and critically understand the ways and the implications by which technology becomes a means to make a change in society.

To do so, I have entered the blockchain scene through an ethnography that combines online and offline strategies. During fieldwork, I conducted several interviews with blockchainers, participated in events and meetings dedicated to the discussion of blockchain in the social sphere and studied emerging discourses in different social contexts: Milan, London, Tallinn and the online domain. The initial hypothesis guiding this work is that blockchainers may understand social relations in terms of tokenisation and social good in neoliberal terms. In this way, they may reduce their social interpretations to the logics of a neoliberal, datafied social system where interactions become subjects of metrics and their success consequently depend upon it, with the risk to reproduce a set of power imbalances and social inequalities. The origin of this supposition lies on previous studies on the imaginary of the start-up culture, which underline its strong relation with technocratic, neoliberal social imaginaries (Arvidsson, 2019; Luise, 2018), as well as previous studies on blockchain social applications which suggest that blockchain implementations might be possibly influenced by neoliberal pressures that influence digital economy at large (Magaudda, 2019).

The present thesis is structured in five chapters that aim at dealing with different narratives and perspectives around blockchain.

First of all, I will begin my dissertation with a literature review chapter, in which I will provide a general panoramic on the power on the Internet, building on the assumption that technology is never neutral. By discussing digital technologies as embedded with values and visions of the world, I will be able to introduce some reflections on data inequalities and contextualize the origins of my case study, i.e. blockchain imaginaries. To do so, I will take into account previous literature on algorithmic culture and data justice, arguing that we should look at blockchain as a social phenomenon and focus on discourses and interpretations around it.

In the second chapter, I will discuss the methodological techniques adopted for studying blockchain imaginaries in depth. I will present the main aims and extensively explain the research design based on a multi-sited ethnography (Marcus, 1995). In this chapter, I will contextualize the

importance of looking both at the online and the offline as expressions of the same sub-culture and the relevance of qualitative methods to access narratives and imaginary.

Once set the theoretical framework and the methodology of this thesis, I will present the main results of my work in three empirical chapters that aim at unpacking blockchain imaginary and understand better its promises 'for the social'.

I will begin by delving into the interpretations of blockchain as applied to the social sphere offered by a diverse pool of blockchainers, in the third chapter. Through the analysis of online discourses, interviews and participant observation, I will argue that blockchain works as a floating signifier (Laclau, 2005), meaning that the definition of blockchain works as a container of multiple imaginaries that are often contradictory and, thus, make it a powerful concept to be exploited in public imagination.

In chapter four, the discussion on blockchain as a floating signifier will be followed by a deeper observation of blockchain discourses aiming at designating a common ground between apparently very different political approaches to the blockchain. I will look at encoded assumptions of blockchain affordances and argue that blockchain is surrounded by certain regimes of truth (Foucault, 1980) such as the distributed myth, the trustless myth and the changemaking ethos. In doing so, I will contend that blockchain imaginary tend to offer a limited analysis of societal mechanisms together with a generally shared optimism towards the transformative nature of digital technology emphasized by the concept of decentralization.

The fifth chapter looks at the ways in which these regimes of truth are put into practice. To do so, I will focus on interviews and a specific case of application of blockchain in education, namely Growbit. In this final part of the analysis, I will argue that blockchain imaginary around 'social good' is embedded with a meritocratic theory of justice, which grounds its roots in the neoliberal ethos. In this sense, I will also discuss the idea that the implementation of digital technology urges for more specific definitions of social good and social justice, by relying not only on distribution, but also on recognition and representation.

I will end my dissertation discussing the main results of the thesis and present some final remarks, reflecting on future paths of research for contributing to the debate on the role of technology for ensuring data justice and limitations of this study.

I highlight that this work can only contextualize Blockchain sociotechnical imaginaries as related to the Western societies. If we agree with Bory (2020) when he writes that there exist multiple Internet histories and multiple Internet imaginaries, because they are based on different narratives

both of the past and the future of the techno-cultural environment, we have to assume that there might be differences in Blockchain imaginaries when analyzing other socio-economic contexts, e.g., Asia or Latin America. In this regard, I will refer to a dominant narrative present in Western societies, and more specifically, European countries.

Finally, discussing the technical or financial efficacy of the blockchain is out of the scope of this thesis, as I will focus on narratives and imaginaries in order to understand what happens when ethics and politics are actualized by means of technological innovation.



## **1. Literature review**

### *1.1. Introduction*

Most commonly known as the infrastructure that underpins the functioning of the Bitcoin cryptocurrency, blockchain is an encrypted technology which is gaining growing mainstream interest. In recent years, not only has blockchain attracted the attention of the startup and entrepreneurial scene, but also of a diverse range of actors; including technologists, governments, banks, coders, hackers and international organizations, who have turned to blockchain as a potentially revolutionary tool in contemporary societies, thereby contributing to amplify the ‘hype’ surrounding it.

The main promises that accompany the rise of interest in blockchain technology regard its potential to decentralize every social relation in the Internet and to overcome a number of problems that are arising from the so-called datafication of society (Van Dijk, 2014). The process of incorporating data technologies to almost every sphere of human life, in fact, is generating certain concerns regarding the amplification of existing inequalities that go from privacy scandals, such as Cambridge Analytica (Cadwalladr and Graham-Harrison, 2018), to huge power imbalances caused by the monopolies of digital platforms and algorithmic discrimination reproduced and amplified by machines. Concomitantly, blockchain has emerged as a potential solution to such issues promising to provide better data ownership, transparency and trust thanks to its particular distributed and encrypted architecture.

So far blockchain has been studied mostly as a technical phenomenon and, more recently, as a financial one, especially considering that nowadays Bitcoin is still the most known application of this technology (Yli-Huumo et al, 2016). However, since there has been a recent growth in interest in blockchain applications for the social field, even pushing some institutions to promote research and experimentation on blockchain ‘for social good’ (Polvora et al., 2020), it seems quite relevant to dig more into these promises of social change and analyze in which ways a technology may become ‘social’.

Building on the idea that technology can never be neutral (Marres, 2017), the goal of this work is understanding who are the key actors that revolve around blockchain technology, which values drive its technological implementation and which visions of the world underpin the work of those who inhabit its ‘scene’.

These are questions that should be addressed in order to expand our knowledge on the role of technology in (re)producing social inequalities and discrimination. To do so, I will begin by providing an overview on the current state of art of data imbalances, harms and threat, following with a discussion of blockchain as an object which is deeply entrenched with techno-political visions of the digital society. These visions are strongly attached to a sub-culture of the hacker community, the cryptoculture, which puts individual freedom and anarchy at the center of its discourse, with significant implications for the research on blockchain's potential for the social good.

### *1.2. Technology and power: the neutrality myth*

Nowadays, the way in which we learn about the world, today, is largely digitally-mediated (Lupton 2014). Focusing on digital data today means highlighting that not only data are changing the way we understand societies, but that they have also come to change and integrate our social infrastructure (Couldry and Mejias 2019; Van Dijck, 2013; Chadwick, 2013). This process is also known as 'datafication' (Van Dijck et al., 2018), a concept that highlights the ability of networked platforms to transform into data many aspects of the world that have never been quantified before (Mayer-Schönberger and Cukier, 2013). The datafication of society has been argued to be at the core of the human activities of the present century as it results from a deluge of digital data and of devices that generate them (Van Dijck, 2018). The premise is that through the massive collection of data allowed by contemporary technologies - also known as Big Data (Gandini and Caliendo, 2016)- it is possible to identify patterns, outline possible behavior and predict risk (Mayer-Schönberger and Cukier, 2013). This idea that sees data collection as a legitimate means to access, understand and monitor people's behavior is becoming a leading principle, not just amongst techno-adepts and developers, but also amongst scholars, "who see datafication as a revolutionary research opportunity to investigate human conduct" (Van Dijck, 2013:198). However, the so-called 'critical data studies' (Kitchin and Lauriault, 2014; Iliadis and Russo, 2016; Dalton, Taylor and Thatcher, 2016) encourage to approach the study of data and their social value by considering that data are always shaped by human visions or goals, therefore criticizing the underlying discourse around Big Data that see data as inherently capable of generating a new and better form of social knowledge (cfr. Couldry, 2014, 2018; Kitchin, 2014).

More importantly, we should not understand digital data just as automatically created objects of digital technologies, but as products of human action (Lupton, 2014). In fact, human judgements

are omnipresent at each stage of the production of data: “in deciding what constitutes data; what data are important to collect and aggregate; how they should be classified and organized into hierarchies; whether they are ‘clean’ or ‘dirty’ and so on” (Lupton, 2014:8). To avoid overestimating the representativeness of big data and avoid the “fallacies in the big data enthusiasm” (Kitchin, 2014; Couldry, 2014; Gitelman, 2013; boyd and Crawford 2011; Pasquale, 2015), therefore, we should always consider that data are embedded with human visions of the world. This relates, for example, to the crucial feature of data, which is that, by definition, they are traceable, calculable and manipulable for profit (Marres, 2017). Since data are the nucleus of the functioning of technology, their understanding as non-neutral and as bearer of certain visions of the world is essential.

This approach can be actually expanded to the whole understanding of technology. According to Marres (2017), in fact, it is always possible to identify ‘the implementation of sociological ideas in digital architecture’ (2017:66), meaning that machines cannot be separated from the ideological position of their programmer. Many scholars stress the idea that technology is always political, and both expresses and reproduces specific patterns of social organization and cultural interaction (Marres, 2017; Castells, 2009; Jordan, 2016; Beer; 2017).

The idea of technology as deeply embedded in power has also been studied by specific literature on algorithmic infrastructures. Algorithms are what lies behind every technological implementation and are described as sequences of computer code commands that tells a computer how to proceed through a series of instructions to arrive at a specified endpoint (Lupton, 2014; Bucher, 2013). In social science, the interest towards algorithms has less to do with the mechanical nature of those instructions, and more with the ways in which ‘software conditions our very existence’ (Kitchin and Dodge 2011: ix). Computer algorithms facilitate the ways in which digital technologies collect and sort data about users, and they are also used to generate predictions about users’ future behavior (Lupton, 2014). In this sense, algorithms are seen as the decision-making parts of codes that have a potential role in social processes (Beer, 2017; Kitchin, 2014; Manovich, 2013).

Social scientists are becoming increasingly interested in how algorithms might be implicated in shaping power relationships, hence questioning the conception of algorithms as neutral objects. So far, research on algorithms has focused its attention not only on the increasing important role played by these types of computer codes in digital society, but also on their cultural and political dimensions (Beer, 2017; Seaver, 2017; Striphas, 2015; Gillespie, 2014; Rieder, 2017). Some scholars, for example, have pointed to the importance of algorithms in understanding society, elaborating concepts such as ‘algorithmic culture’ (Striphas, 2015); ‘algorithmic life’ (Amoore and Piotukh 2015; Bucher, 2013);

'algorithmic identity' (Cheney-Lippold, 2011); and 'algorithmic imaginaries' (Bucher, 2013), which is the idea that algorithms have emerged as a social and cultural imaginary of sorts.

Drawing on the idea of algorithmic imaginaries, Aradou and Blanke (2015) argue that the problem that arises with algorithms is the belief in their 'epistemic capabilities', referring to a set of assumptions that consider algorithms as objective and capable of good decision-making, as well as data as representative of people. In this sense, a particularly worrying use of algorithms is the one that assumes that there is a self-evident relationship between data and people, subsequently interpreting aggregated data to predict individual and collective behavior (Van Dijk, 2014). Essentially, the problem lies in the "algorithmic neutrality myth" (Airoldi and Gambetta; 2018; Pasquale, 2016) that does not consider that algorithms are inevitably modelled on visions of the social world and that they are conceived with certain outcomes in mind themselves, influenced by commercial or other interests and agendas (Beer, 2016).

Bucher (2013) argues that algorithms are political especially in the sense that they help to make the world appear in certain ways rather than others, through ranking, classifying, sorting, predicting, and processing data. The faith in the neutrality and infallibility of the predictive algorithm has shed the light on a series of problems that concern the idea that if human behavior becomes metric, citizenship can become predictable. This idea has been resumed by Beer (2016) in the concept of 'metric power', an idea that highlights that metrics have had an ordering role in the social world for quite some time. Metric power is in fact defined as a "concept that intends to focus on the relation between measurement, circulation and possibility" (Beer, 2016:171), and points to the idea that the real power of algorithms lies in their ability to make choices and to decide what matters or what should be visible. These systems of measurement have escalated and intensified over recent years, especially with the rise of new data collection methods and their integration into societal infrastructures. Through measurement, individuals are categorized into groups in which "metric power is used to authenticate people, actions, systems and practices" (Beer, 2016:177).

According to Beer (2017) and Seaver (2017) who build on Foucault's theory on knowledge and power, algorithms are deemed to reproduce dominant social discourses through metrics and categorization, and concurrently they themselves become discursive objects, embedded in data imaginaries that are attached to power mechanisms and institution. Foucault wrote extensively about how power operates through observational knowledge and measurement (Foucault, 2008), but metric power is also extremely potent because of the 'regimes of truth' (Foucault, 1977) that surround data and measurement, for example the idea that they are more reliable, impartial and

efficient than anything offered by human intuition, agency or judgement. Since math is associated with objectivity, metric power can therefore also justify decisions influenced by numerical calculations because “it can be used to mark out what is allowed” (Beer, 2016:177), with certain worrying social consequences.

### *1.3. Inequalities and power imbalances in the digital society*

#### 1.3.1. The role of digital platforms

As we stepped into what Van Dijck called ‘the platform society’ (2018), a term that emphasizes how nowadays digital platforms are an integral part of society, the role of algorithms has become even more central. Gillespie (2014) has defined as “algorithms of public relevance” those that are used by platforms and services to filter contents and personalize users’ experience. In fact, the process of classification of data is a practice that is vitally important to the way in which the content of digital platforms and devices is organized, accessed and circulated (Beer and Burrows 2013, in Lupton, 2014).

According to Van Dijck (2018), speaking of a platform society poses a focus on the development of a society in which social and economic relations are increasingly mediated by (corporate) global online platforms, which are driven by algorithms and fueled by data. More specifically, digital platforms capture every form of user interaction as data and actually shape the way we live and how society is organized (Gehl 2011; Van Dijck, 2018). Therefore, platforms cannot be studied in isolation, apart from social and political structures, because they do not only provide services but also have penetrated the heart of societies, forcing governments and states to adjust their legal and democratic structures (Chadwick 2013; Van Dijck 2018). Digital platforms are nowadays powerful actors, and many platforms have grown surprisingly influential before a real debate about public values and common goods could even get started. The platform datafication (Van Dijck, 2014) allows performance measurement as well as the tracking of users’ personal information, sentiments, interests, and opinions in many spheres of life, for commercial purposes. This is relevant because while the platform’s ecosystem often seems egalitarian, public value-oriented and neutral, it is in fact hierarchical, corporate and embedded in ideological values (Van Dijck, 2018:12).

Nick Srnicek’s work on ‘platform capitalism’ (2017) showed how data and metrics have come to underpin much of the value generation of contemporary capitalism, highlighting the societal risks

of allowing a huge concentration of power by tech firms such as Google, Amazon, Facebook, Uber and Apple. Arguing so, Srnicek underlies how these major digital platforms own monopolies on data and knowledge, which are extracted and analyzed for being sold. This has serious consequences on the economic system, giving rise to a new set of socio-economic inequalities. However, only focusing on platform companies as primarily economic actors may obscure a number of ways in which these companies are transforming societies on a global scale (van Doorn, 2018), and especially how this concentration of power in the hand of few firms also translates in a monopoly of information and knowledge. Building on Foucault's theory (2008), which highlights how the construction of knowledge and discourses are strongly entrenched to power, and also considering that the discursive regimes around big data have become hard to resist (Beer, 2017), it becomes clear that platform capitalism is not only an economic problem: it is also a political one.

Indeed, platform capitalism introduces substantial new asymmetries of knowledge and power (Zuboff, 2015). As Van Dijck claims: *"the Big Five platform owners have laid the foundation for a system that offers its users convenience in exchange for control over their data, to the extent that the total infiltration of basic needs also imposes potentially political, environmental and ethical risks"* (2018:15). In this sense, infrastructural platforms can obtain unprecedented power, especially considering that these new tools, networks, apps, platforms, and media already became requirements for social participation. Platforms are neither neutral nor value-free constructs; they come with specific norms and values inscribed in their architectures. These norms, entrenched with a very specific social environment such the one of the Silicon Valley, may clash with the values embedded in other societal structures in which platforms are implemented and used (Van Dijck, 2018). Most importantly, the tendency of capitalism to monetize data acquired through pervasive digital technologies in order to predict and influence consumers' behavior is what has been called 'surveillance capitalism' by Shoshana Zuboff (2019), referring to a pervasive practice that arises many ethical issues concerning citizens' privacy, intimacy and data ownership. This concept of surveillance capitalism developed in Zuboff's analysis highlights how surveillance technique not only is combined with the economic order, but it becomes the very driving force of it. Surveillance capitalism, Zuboff argues, is the installation of a new kind of sovereign power, in which populations become targets of data extraction that can be used to sell products, influence markets and even elections. Citizens are increasingly reduced to consumers and raw data, while we still lack a debate on public goods and consent (Zuboff, 2019; Van Dijck, 2018).

### 1.3.2. Automated discrimination

Beside the social inequality caused by platform monopolies, other problems related to social discrimination have emerged together with the massification of digital platforms. According to Lupton (2014), indeed, the new concentrations of power are leading to new inequalities and insecurities with respect to data ownership, data geographies and different data-related practices.

An increasingly discussed problem is that platform owners do not provide transparency regarding how their algorithms work. Moreover, algorithms have become increasingly complex and are subject to constant tweaking (Van Dijck, 2018). This is also known as the algorithmic black boxes problem (Bucher; 2013; Pasquale, 2015). The problem of black boxes is quite essential to understand how algorithms and digital technologies may be responsible of new forms of power imbalances. When referred to digital data and algorithms, a black box is conceptualized as the node of a system that prevents an observer from identifying the links between input and output (Bucher, 2013). Bucher's work on algorithmic black boxes (2013) reveals a great deal about how certain things become visible to the individual user in their news feed of popular social media platforms, shading light on the great power of platforms in deciding about individuals' consumption of information. With metric power, the success of individuals, businesses, and their products depends heavily on the synthesis of data and perceptions into reputation (Pasquale, 2015). Stark (2020) also wrote about how metric power fosters competition and performance, arguing rankings and metrication which lies at the core of the digital social world work as engine of anxiety among users. According to Arvidsson (2016), the most worrying aspect of black boxes is that, when algorithms are covered by opacity and trade secrets, they can be used to "create a topological space where new relations between derived values can be created and calculated in ways that pay no attention to other aspects of the life of participants" (2016:11). This difficulty of comprehension of algorithms functioning has led Pasquale (2015) to conclude that we live in a black box society. This is a society, he suggests, that is populated by 'enigmatic technologies' (Pasquale, 2015). Pasquale's central point is that the values and prerogatives that the encoded rules enact are hidden within black boxes. This matters, Pasquale argues, because 'authority is increasingly expressed algorithmically' (2015:8). Such a point opens up a series of questions about the role of algorithms in the deployment or expression of power. Indeed, it is often this ability to take decisions without (or with little) human intervention that is at the heart of discussions about algorithms potential power (Beer, 2017). For these same reasons, some scholars have expressed concerns regarding the threat of an 'algocracy' (Danaher, 2016), understood as a

particular kind of governance system that is organized and structured on the basis of algorithms that are used to collect and organized the data upon which decisions are made. The threat of algocracy regards the worry that algocratic systems, rooted in predictive or descriptive data-mining algorithms, might undermine political participation and the legitimacy of public decision-making processes (Danaher, 2016; Beer, 2017).

For Tufekci (2014), the ‘opaque algorithms’ of digital platforms have “enormous consequences for political speech” as they “determine the visibility of content and can be changed at will”. Because of the ways in which commercial platforms personalize content and target individual users, the fear is that “the opacity of algorithms and private control of platforms alters the ability of the public to understand what is ostensibly a part of the public sphere” (Tufekci 2014, in Bucher, 2016:84).

The problem of not being able to check on the accountability and functioning of algorithms is even more central when we observe how algorithms may be responsible for (re)producing social inequalities. In fact, data and algorithms intersect with already existing forms of discrimination (Taylor, 2017), and risk reproducing biases against historically disadvantaged populations such as women, black people, LGBTQ+ community, or poor people. Moreover, as Curchod et al. (2019) puts it: “by mediating and objectifying relations, algorithms reproduce power asymmetries among the different categories of actors, thereby constraining human agency”. Several works have discussed the negative impacts of big data and algorithmic decision-making in a range of contexts, especially focusing on how algorithms may actively uphold and reproduce discriminatory social structures, as in the case of bias ‘learned’ by, for example, machine learning systems (Overdorf, Kulynych, Balsa, Troncoso, & Gürses, 2018; O’Neil, 2016). Particular concerns regard harmful practices such as the algorithmic profiling of marginalized groups (Heeks, 2019), algorithms policing on female bodies and discourses (Are, 2020; Paasonen, Jarrett and Light, 2019), algorithmic bias and racial oppression (Noble, 2018) or lack of collection and use of inclusive gendered data (Peréz Criado, 2019). More popular examples of algorithmic bias can be found in the recruitment programs that systematically reduce women’s presence (Noble, 2018), the use of software that predict black people as more likely to commit crimes (ProPublica, 2016), the managing of people’s housing (Financial Time, 2016), the algorithmic control in workspaces (Curchod et al., 2019; Kellogg et al.; 2020) and even predictive policing programs that downgrade poor areas (Bachelet, 2019). As Onuoha (2018) argues, this kind of threat is worrisome not only because it may create new inequalities, but because it has the power to reproduce and amplify existing ones. Predictive algorithm, in fact, is also being increasingly used



by governments, institutions and companies to automatize processes that up to now had always been operated by human beings, which entails certain worrying consequences.

Data and algorithms come into the picture as a new potential form of social inequality and often as reinforcing oppressive social relationships. In this sense, Manovich (2011) has suggested to look at data inequalities through the concept of social classes, where people would be divided into those who create data (consciously or unconsciously), those who have the means to collect it and those who have the expertise to analyze it. From another perspective, Peña Gangadharan (2019) has suggested to use the concept of a growing “digital automation of unfairness”, stressing the impending necessity to start questioning who owns the data, who owns the means of data production or data analysis, and what can users do with that. This approach builds from a literature also known as data justice (Dencik et al., 2016), which believes that the debate on technologically-mediated discrimination should be decentered and should move from data-centrism to the centrality of concepts like equality and fairness.

### 1.3.3. A human rights approach to data unfairness

As said above, the lack of transparency, accountability and social responsibility of digital platforms can lead not only to the perpetuation of inequalities, but also to their amplification and extension, thereby challenging fundamental rights such as privacy, freedom of expression, and non-discrimination. For this reason, a human rights approach to digital data and technology is necessary to address these challenges and any violations or abuse of rights, considering that the same rights should exist both online and offline. One of the biggest concerns regarding digital technology today, in fact, regards privacy violations by digital platforms and how it entrenches with human rights (Nissenbaum, 2011).

Nowadays, information technology is considered a major threat to privacy because it enables pervasive surveillance and a massive collection on citizens’ personal data (Nissenbaum, 2009). In reaction to this concern, a rich and growing literature is raising many substantial concerns associated with the anti-democratic implications of the concentration of privacy rights among private and public surveillance actors (Nissenbaum, 2009; Lyon, 2003; Dencik et al., 2017; Zuboff, 2019). What scandals such as Cambridge Analytica (Ludlam, 2018) or the Snowden leaks (Dencik, et al., 2016) ultimately have showed is the potential for governments and companies to make large use of pervasive practices of data-driven surveillance to increase social control and influence citizens’ political

behavior, a phenomenon that Dencik et al. (2016) have resumed in the concept 'dataveillance'. Dataveillance, in fact, causes significant implications for citizenship since they may target rights activists perceived as critics as well as deter people from challenging institutions of power and advocating for social change (Dencik et al, 2016). In this sense, basic rights such as the right to association, the freedom of expression, the right of movement or the right to transparent mechanisms of democracy may be increasingly jeopardized by the large-scale harvesting and misuse of data.

Responding to the criticism that privacy is an individualistic Western-centric concept that harms the public good (Allmer, 2011; Fuchs, 2011), some scholars have conceptualized privacy in an alternative way and have stressed its social and societal aspects (Nissenbaum, 2011; Solove, 2011). In fact, considering that new data technologies tend to sort, profile and inform action based on groups rather than individual characteristics and behavior (Taylor, 2017), data justice scholars encourage to consider surveillance and privacy as a collective and social issue. As Dencik et al. explain, '*referring to 'data justice' recognizes the political economy of the system that underpins the possibilities for extensive surveillance, whilst drawing attention to the political agenda that is driving its implementation*' (Dencik et al., 2016:10). Moreover, the lack of a systematic approach to the right to privacy is also seeing a growth of online harassment and serious extreme privacy infringements such as the non-consensual dissemination of intimate images (Semenzin and Bainotti, 2020), which poses a real threat to the online life of women and girls. This underlines once again how privacy should be conceived as a collective human right and how it has become a relevant collective issue, especially when the possibility of being targeted and discriminated multiplies depending on the number of categories individuals are part of.

In the debate that looks into solutions for counterbalancing algorithmic discrimination, many efforts are being spent to develop computational solutions to problems of bias and unfairness that emphasize the need to design more accountable, transparent and fair algorithms (Dwork & Mulligan, 2013). Kitchin (2014), for example, proposed that we expose how algorithms are constructed, how they work, and which performative part they then play in the world. However, data justice scholars warn on the limits of relying on techno-solutions and suggest that data inequalities should not be faced as mere technical problems, but as systemic ones.

Firstly, because this kind of solutions often seems to suggest an individualized approach that sees individuals as responsible for taking back control on their data (Dencik, 2018) while overlooking a set of access problems and bias to technology. Secondly, but not less significantly, because an

excessive techno-determinism avoids taking into account a set of social, economic and political aspects that should always be considered when approaching social issues (Taylor, 2017; Gangadharan, 2019). In fact, according to data justice principles, we should work on making data bias more visible while discussing its intersectionality with other forms of discrimination (Peña Gangadharan, 2019; Dencik et al, 2017; Taylor, 2018), remarking how everyone should have the right to be treated fairly by public (and private) authorities of all kinds (Taylor; 2017; Dencik et al, 2017; Heeks and Renken, 2016), and holding digital platforms and developers accountable for the automatization of violence, hate and discrimination. According to Gangadharan, in fact, *“what computer scientists, engineers, and industry evangelists of fair machine learning get wrong is the sufficiency of technical tweaks to prevent or avoid discriminatory out-comes. This weakness stems not only from the fact that fairness, the counterpart to discrimination, means many different things depending on one’s normative understanding of equality.”* (2019:883)

So far, however, the majority of practical solution to data unfairness have adhered more to the idea of developing technological solutions and reverse engineering, attempting for example to engineer encryption mechanisms into their networks or build decentralized technologies to overturn power relations on the Internet. But while it is important to study new technological designs, it is also necessary to delve deeper into shared values and visions that push tech-savvies to develop new kind of algorithms and platforms with the aim of having an impact on society.

## *1.4. Making sense of blockchain technology*

### *1.4.1. Blockchain origins*

In October 2008, Satoshi Nakamoto (whose name is presumed to be a pseudonym for a hacker or a hacker collective) published a whitepaper that described a new digital currency based on a decentralized peer-to-peer network, called Bitcoin. Essentially, Bitcoin was designed to propagate transactions that required validation from all participants in the ecosystem but did not need the intermediation of a central authority (Huckle and White, 2016). Throughout 2013, Bitcoin became famous thanks to the skyrocketing in its value relative to strong currencies like the US dollar (Golumbia, 2016). What was truly innovative about Bitcoin was that it was able to create a decentralized environment for cryptocurrencies, where the participants could buy and exchange

goods with digital money without needing intermediaries as was the case for previous digital currencies, such as E-Gold, Liberty Reserve or even Paypal.

Bitcoin was the first application that introduced blockchain technology. In fact, in the whitepaper Nakamoto described a technological peer-to-peer infrastructure lying behind Bitcoin, based on a new form of cryptographic software technology called a 'blockchain'. To provide a brief description of how this technology works, this ledger is composed by a chain of blocks, where every block is dependent on the information stored on the previous one. Because of its architecture, blockchain is resistant to tampering and carried out collectively by all the nodes of the system (Aztori, 2015); therefore, if someone tampers with a block on their own version of the blockchain and changes the cryptographic hash function, the successive blocks' hash functions will also change (De Filippi and Loveluck, 2016). This process is also known as 'proof-of-work'.

Blockchain can be thought as a permanent, distributed digital ledger, meaning that it is visible and verifiable to everyone, in opposition to centrally managed ledgers such as those of banks (De Filippi and Loveluck, 2016). For this reason, blockchain is also known as being a *distributed ledger technology* (DLT). Moreover, the design of blockchain technology was thought as an open network where participants do not need to know each other to interact, and in this sense, blockchain is also claimed to be a peer-to-peer 'trust-less technology' (Aztori, 2015; Gerard, 2017, O'Dwyer, 2015; Tapscott and Tapscott, 2016). In fact, using cryptographic algorithms, the electronic transactions are automatically verified and recorded by the nodes of the networks, and thus do not need human interventions or any other third parties (such as governments or banks) to make the transaction happen. This functioning has been described by Antonopoulos (2014) as representing "a shift from trusting people to trusting math". This idea is also outlined in the Bitcoin whitepaper, where proof-of-work is not described as a new form of trust, but rather as the abandoning of trust altogether as social confidence in favor of an algorithmic regulation (Nakamoto, 2008).

However, not all blockchains are the same: there exists in fact a distinction between public blockchains (permission-less) and private blockchains (permissioned). The main difference is that while the former is run on computers provided by volunteers around the world and has no central database, the latter is mostly used by banks and governments for information storage and transactions (Tapscott and Tapscott, 2016).

Equally interestingly, blockchain technology has been advocated as being applicable to a variety of other fields that go way beyond finance. In fact, even though to this day Bitcoin is still the most commonly used application using blockchain technology (Yli-Huumo et al, 2016), recent years

have seen the rise of what has been called ‘Blockchain 2.0’ (Swan, 2015, Scott; 2015; Hosp, 2019), referring to the use of distributed ledgers in different spheres that benefit from the trust protocol, beyond currency transactions (Swan, 2015).

#### 1.4.2. Blockchain applications beyond finance

Blockchain affordances have attracted so much attention that some scholars have even described it as “The Next New Thing” (Tapscott and Tapscott, 2016), and as a fundamental tool for human progress, “as the Magna Charta or the Rosetta Stone” (Swan, 2015).

Even though to this day Bitcoin is still the most commonly used application using blockchain technology (Yli-Huumo et al, 2016), recent years have seen the rise of what has been called ‘Blockchain 2.0’ (Swan, 2015, Scott; 2015; Hosp, 2019), referring to the use of distributed ledgers in different spheres that benefit from the trust protocol, beyond currency transactions (Swan 2015). One of the most known application at the forefront of the blockchain 2.0 is, for example, Ethereum, an open-source distributed computing platform developed by Vitalik Buterin, that popularized the use of DAOs<sup>3</sup> and smart contracts.<sup>4</sup> Moreover, blockchain 2.0 has expanded its use from Bitcoin and cryptocurrencies to different applications in society, among which we can find art, healthcare, ecology, education, social aid, and even governance. According to a dossier redacted by the Stanford Business Center for the Innovation (see Galen et al., 2018), blockchain applications today find place among different fields such as e-voting, philanthropy, digital identities, the digitalization of patient’s medical history, the creation of distributed energy utilities system, etc. Other examples include the use of blockchain to ensure the originality of artworks (Garner, 2018; Catlow, 2018) or the copyright in the creative industry (‘Dair and Beaven, 2017; Tapscott and Tapscott, 2016).

For blockchain enthusiasts, the fields of applications of this technology are potentially countless, since blockchain would enable the disintermediation of *any* digital transaction at global level (Atzori, 2017). Following this perspective, Swan (2015) stated that with the blockchain all kinds

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<sup>3</sup> Decentralized Autonomous Organizations (DAOs) are organizations that use blockchain technology to give its members specific rights within the organization itself. These rights are managed and guaranteed by the blockchain (see Bollier, 2015). Smart contracts are a kind of legal agreement between individuals, in the form of a computer program that triggers when particular conditions are met, and which cannot be changed once deployed (Gerard, 2017).

<sup>4</sup> A kind of legal agreement between individuals, that appear in the form of a computer program that triggers when particular conditions are met, and which cannot be changed once deployed (Gerald, 2017).

of business and human activities are expected to be reconfigured with a pervasiveness similar to that of the Web.

According to the World Economic Forum, it is estimated that over \$1.4 billion have been invested into blockchain technology over the past three years - despite many projects still being in experimental phase (Williams-Grut, 2016). There has been an increasing exuberance in advocating blockchain as a disruptive technology that could “change everything forever”, even fostering the creation of a new social contract in the digital age. More specifically, it has been claimed that the blockchain technology potentially allows individuals and communities to redesign their interactions in politics, business and society at large, with an unprecedented process of disintermediation on large scale and alter the way that people and societies interact (Tapscott and Tapscott, 2016; Swan, 2016; Abodei et al., 2019).

Because of its affordances, blockchain technology is seen as an instrument that might have significant implications for sectors dedicated to driving social impact. Research in the area of culture and creativity in particular has underscored this potential, as blockchain is foreseen to enable alternative licensing and distribution models of artworks and other intellectual property, thus paving the way for a fairer distribution of revenue deriving from collaborative projects, but also rebuild the economic fabric of domains – such as the music industry – that experienced significant economic shrinking in the digital era (see O’Dair, 2019; O’Dwyer, 2018). However, according to Magaouda (2019:65), the actual consequences of using blockchain in a creative sector like music will not depend on the positive intrinsic features of the technology, but on how digital capitalism will shape its possibilities.

In this regard, as Rozas et al. (2018) note, from a socio-economic perspective a dual debate has emerged around blockchain affordances for the social sector. This juxtaposes a techno-determinist, market-driven view, that sees blockchain as a technology deemed to ‘solve’ a number of issues and thus ‘revolutionize’ a given domain but underestimates implications concerning social organization, vis-à-vis with a critical one, which emphasizes the limitations and issues that are inherent to blockchain as an example of algorithmic governance. This has resulted in the coexistence, on the one hand, of a view of blockchain as kind of redeeming capitalist tool (Tapscott and Tapscott, 2016), and, on the other hand, of the understanding of blockchain as a device to support distributed forms of networked cooperation on a global scale (Bollier, 2015) and ultimately promote an alternative to the official venture capital system, in the form of “a non-capitalist market for capital” (Arvidsson, 2020:23) that “could bring forth a new money of the commons, divorced from capitalist forms”

(Srnicek and Williams, 2015: 182). Since blockchain was originally presented as a financial tool and is now being introduced into different sectors, there is still not an agreement on the meaning of blockchain technology for the 'social'. While blockchain 'social' applications are often advocated as revolutionary, the question of how these mediate social relations in a given domain remains open. For this reason, it is necessary to take into account the social and cultural dimensions that concur to its experimentation in society at large. To do so, it is important to expand our understanding of how society and the social sphere are conceptualized by those who concur to design, implement and experiment with blockchain in the social sphere: developers, startup coders, tech-savvies, or in other words, hackers.

### *1.5. Blockchain as a bioproduct of the crypto-culture*

#### 1.5.1. Hackers and the origins of the Internet

At its very origins, Internet was thought and built by the hacker community following a key underlying idea: the open architecture networking (Leiner et al., 2009). In 'A Declaration of the Independence of Cyberspace', digital activist John Perry Barlow claimed that the Internet was meant to be a free space, independent from governments' regulation, where individuals could have built a 'more human and fair society' (Barlow, 1996). In this sense, anarchy - the absence of governments and laws - on the Internet has always been a driving ideology inside that community that contributed to the creation of the Web, i.e. the hacker community (Castells, 2012; Gordon; 2009; Levy; 1984; Coleman and Golub; 2008; Bertelloni, 1998). Hackers are defined as individuals that consider software technologies as important conditions for taking social and cultural action (Jordan, 2003), and the hacking community is considered as a key actor in the debate on power relations and Internet technology.

Despite a popular negative stigma, towards hacking, its positive connotation of hacking and hacker ethics have been underlined by some scholars (Levy, 1984; Coleman and Golub, 2008). The hacker culture is in fact rooted in principles of P2P networks and open knowledge, so that some scholars argued that hackers represented a new ethics aiming to challenge the order of capitalism (see Himanen, 2002; Nissen, 1998; Wark, 2004), suggesting a new economic paradigm based on peer-to-peer production that can be considered as post-capitalist (Karatzogianni, 2015). Similarly, the free and open-source software movement has been seen as the promoter of a technological innovation

that is alternative to closed and commercial platforms (Coleman & Golub, 2008) or even theorized as bearer of an 'open-access communism' (Kaulingfreks and Kaulingfreks, 2013).

More importantly, some scholars shared the idea that the very nature of Internet and values coming from the hacker community, could have been beneficial for empowering citizens, enforcing social justice and, ultimately, repurpose the concentration of power (Benkler, 2006; Castells, 2000;2009). In the *Network Society* (2000), Castells wrote extensively about the Internet as a potential means to decentralize power relations, and in Castells' theorization of power and technology, the Internet would have been responsible for redistributing power of governments, companies and media, creating horizontal networks instead of hierarchies.

However, some have already highlighted that the capitalist tendency to concentrate power and wealth has not really stopped with the advent of an Internet driven by the hacker ethics, and that we are just witnessing an evolution of capitalism instead (Srnicsek, 2017; Arvidsson, 2020). As mentioned above, the data monopoly on digital platforms has indeed only worsened the concentration of ownership and the social inequalities, since the owners of big platforms of the Silicon Valley are becoming owners of the infrastructure of society (Srnicsek, 2017). Given this fact, we can affirm that the Internet of today does not look as the decentralized, peer-to-peer, horizontal infrastructure that its pioneers imagined. As soon as the Internet started to expand in the early 80's, in fact, there has been a proliferation of stakeholders, that now include national and international institutions and authorities, large private companies, bank and other private business (Leiner et al., 2009). At the same time, hacktivists, i.e. hackers that fight to conserve the freedom of the internet as a space for freedom of speech and knowledge (Hampson, 2012) – seek solutions to resist Internet's privatization. In the digital ecosystem, hackers are considered by some as the warriors of the digital society because they constantly grapple with the everyday determinations of information technologies (Jordan, 2008). However, the hacker culture is very heterogenous and difficult to be fitted into one single definition. To make sense of it, ethnographers of the hacker community have highlighted how the hacker culture is a political subculture that blends libertarianism with more anarchic inclinations (Coleman, 2008; Jordan, 2003), that gave rise to a set of different interpretations of the same ideology inside the community.



### 1.5.2. Anarcho-libertarians vs anarcho-commonists

To understand what blends hacker culture together, Coleman and Golub (2008) proposed to consider how the concept of liberalism (understood as libertarianism) works as one important context by which hackers make sense of their selves and their world as well as justify the tools they produce. This is referred to the idea that hackers discuss freedom and liberty constantly, therefore “elaborating a sense of what freedom is and what it means to be free constitutes moral discourse for hackers” (Coleman, 2004; Kelty, 2008). Drawing on Coleman and Golub’s ethnographical work on hackers (2008), which recognizes libertarianism as a primary concept to make sense of hacktivism, it is possible to distinguish three different moral expressions of the hacker community: 1) the Crypto-freedom movement, that is characterized by the passion for encryption advocated as a defensive tool against surveillance; 2) the Free Software movement, whose primary concern is the freedom of software and information access; and 3) the Underground movement, which enacts its political critique primarily through transgression, e.g. Anonymous (Coleman, 2014). However, these categories are not necessary mutually exclusive, as the hacker movement is highly individualized, fluid and decentralized, thus only serve to orient analysis of political orientations inside the hacker scene. The interpretation of what freedom means, in fact, has created several contradictions inside the hacker community, generally divided into more anarcho-leftist cultures (Coleman, 2008) and the so-called anarcho-capitalists (Golumbia, 2016; Ippolita, 2017). This ultimately means that hackers may provide substantially different interpretations of the same technologies, based on whether this conception of freedom matches with the idea of preserving and encouraging the free market.

On the one hand, anarcho-capitalists believe that the maximal expression of individual freedom lies in the elimination of states and the promotion of the freedom of property and accumulation, drawing on the libertarian free market ideology of Hayek (2008); on the other hand, anarcho-leftists are more oriented towards the idea that P2P systems might be helpful to build communities based on solidarity and equality, and commons-based peer production (Benkler, 2006).

Interestingly, when the interpretation of freedom swings towards anarcho-capitalism, part of the hacker culture is shared with the famous Silicon Valley developers’ Californian Ideology (Barbrook, 1995). In fact, the Californian Ideology has also been widely inspired by the anarcho-libertarian ideology that has grown in the hacker community. As Barbrook wrote, *‘Silicon Valley pioneers want information technologies to be used to create a new’ Jeffersonian democracy’ where all individuals will be able to express themselves freely within cyberspace’* (1995:2). Adherents to the

Californian Ideology ultimately hold that information technologies empower the individual, enhance personal freedom, and radically reduce the power of the nation-state; in their wishes, existing social, political and legal power structures will wither away to be replaced by unlimited interactions between autonomous individuals and their software (Barbrook, 1995). The Silicon Valley's imaginary mostly builds on the belief that digital technologies are inherently neutral, free, democratic and empowering for individuals (Streeter, 2005). At the same time, they suggest that social and political problems can and should be addressed through technology instead of craving for policy changes - something that Morozov (2013) called technosolutionism. But as Mosco (2005) highlighted, while it celebrates technology as revolutionary, this narrative fully contains and reproduces neoliberal discourses, helping to legitimize the growth of digital capitalism and giving rise to the emergence of new powerful actors, such as the Big 5 (Google, Facebook, Amazon, Microsoft, Apple). At the same time, the Californian Ideology insists on portraying society as classless and free of socio-economic struggles, while supporting the idea that the technological market, not government, is the place for the improvement of people's lives (Ferrari, 2020).

On the other side of the coin, commonists recognize that digital capitalism is strongly widening social inequalities. The proliferation of the 'digital commons' (Arvidsson, 2020) on the internet has given rise to a particular ethos that is reflected in the freedom of knowledge movement and peer-to-peer file networks. This experience of the Internet as a space where assets, information and content can be accessed and shared freely counterbalances the Silicon Valley orientation to the privatizing and creating closed platforms, and many collectives are developing projects and experiences based on an ideology of the commons. Dyer-Witheford (2006) described this ideology as 'commonism', a term that applies not only to the defense of the digital but also of the natural commons; in fact, it describes 'the logic of collective creativity and welfare' (Dyer-Witheford, 2006).

These contradictions become particularly visible when exploring in depth one of the trends of the hacker community, the crypto movement. In fact, encryption technologies can also be used with different aims, therefore it is important to delve into this particular expression of the hacker culture.

### 1.5.3. Politics of the cryptoculture

The idea to use strong encryption to protect citizens' freedom and privacy from governments and big corporations can be traced back to the origin of the crypto-anarchist culture of the late 1970s (Aztori, 2015). Nevertheless, the ideology of the Crypto movement has only successively been conceived as crypto-anarchism, towards the late 1980s, when Timothy C. May coined the term in an

homonymous manifesto published in 1988. The same manifesto inspired Eric Hugues's 'Cypherpunk manifesto' (1993) some years later, which constituted the emergence of a new hacker movement, known as the Cypherpunk movement. The name originally combined the "cypher" prefix, as a reference to cryptography and to the secrecy which it preserves, with "punk", a term with anarchist, anti-authoritarian and generally rebel connotations (Bertelloni, 1998).

The core principles of this countercultural movement were contained in the May and Hugues' Manifestos, which stated that freedom of speech, individual privacy in communication and anonymous transaction systems were essential conditions for an open society, and therefore, they should be used to foster social and political change (Aztori, 2015). Substantially, crypto-anarchy extended cypherpunk's logic of free expression to free markets (Swartz, 2018).

Crypto-anarchism is indeed imbued with anti-authoritarian and anti-statist ideas that insist on distrusting the centralized power of state and corporations, together with the necessity of establishing of cyber-spatial anarchy on Internet and elude surveillance facilitated by cryptographic software (Bertelloni, 1998). In this context, the diffused enthusiasm towards cryptography as a defensive political instrument has certainly played a crucial role. For this reason, the Cypherpunk movement can be termed a techno-political movement, because it realizes its political aims through technological means (Bertelloni, 1998). The cypherpunk vision of an ideal free market is a decentralized vision in which individuals participate in voluntary exchanges through secure digital platforms. By means of encryption, the deployment of decentralized networks and the implementation of online crypto-markets, cypherpunks aim at challenging centralized power structures and empower individuals on the sole base of agency (Bertelloni, 1998). The marriage of this market fundamentalism with crypto-anarchist ideas is what has also been called 'crypto-libertarianism' (De Filippi and Loveluck, 2016).

Essentially, cypherpunks consider technology as an inalterable carrier of particular patterns of power and authority, subordinating their political activities to a techno-deterministic vision of the world, as it becomes visible from May's manifesto. In this sense, the cypherpunk movement seems to take an expansive view of technopolitics, believing that technology itself, when implemented, is a political tool in its own right and serves to propagate particular values (Bertelloni, 1998).

However, not only cypherpunks became interested in encryption and crypto-anarchy. In fact, there are wide groups of communitarian anarchist reading out of the same technology. Social anarchism (Bookchin, 1995) conceptions of the world, in contraposition with the latter individualist anarchism of crypto-libertarians, does not position human nature as fundamentally self-interested,

but rather asserts that people possess a communitarian ethos, which only got alienated and corrupted within the bureaucratic hierarchies and power dynamics of large-scale capitalist system institutions (Gielen and Dockx, 2018). Crypto-commonists (a neologism coined by Peyrouzet García-Siñeriz, building on the term suggested by Dyer-Witheford), as part of the crypto movement, claim to be contrary to the neoliberal hegemony and to place the human figure back in the center, emphasizing the positive freedoms to ecological, social, political, economic and even mental welfare (Gielen and Dockx, 2018). In this sense, crypto-commonists meet all of the crypto-libertarian claims regarding the protection of negative freedoms on the Internet, but combine them with the desire to use peer-to-peer technologies to facilitate the emergence of socio-economic and political paradigms that reflect anti-authoritarian and anti-capitalist principles and advance egalitarianism.

Despite this evident difference, for years, both side of the crypto- anarchy talked about securing digital platform and fighting authorities with encryption. In the latest year, DLTs arrived to realize this aspiration, hence blockchain technology lies at the core of the debate of what encrypted and distributed technologies can and should do. If we look at the blockchain as if we looked back at the Web in the 1990s, we could to some extent affirm that blockchain technology resembles the latest innovation that is advocated to restructure dynamics of power in digitally-mediated contexts. Some scholars already argued that Bitcoin, being a peer-to-peer network, functions according to the same logic as the Internet (Brito and Castillo 2013; Grinberg, 2011), and the similarity becomes even more visible as blockchain has started to gain attention from traditional ‘intermediaries’, such as governments, and the commercial and financial sector (ICOs, banks, governments, start-ups, even digital platforms like Facebook), as it was for the Web, posing relevant questions on who will ultimately benefit from the implementation of this technology.

### *1.6. Blockchain socio-technical imaginaries*

So why is it so important to understand the trajectory of political visions that subtend the implementation of digital technologies such as blockchain? To answer this question, I turn to the concept of ‘socio-technical imaginary’.

In sociological studies, the concept of modern social imaginary has been coined by Taylor (2004) to describe the way in which people imagine and work to maintain the society in which they live, suggesting that the imaginary is essentially a commonly shared moral conception of the ideal society. A social imaginary, for Taylor, refers to how people “imagine their social existence, how they fit together with others, how things go on between them and their fellows, the expectations that are

normally met, and the deeper normative notions and images that underlie all these expectations” (2004:23). Social imaginary works as a mechanism of “social-representation” (Castoriadis, 2005: 247). Considering that “social imagination is a key process in all social life” (Schinkel, 2017: 6), digital technology constitutes today an important ground of such imagination, and therefore “a central concern for our imaginative faculties” (Milan and Kazansky, 2021:366). Following this assumption, STS scholars have broadly focused on the existence of socio-technical imaginaries (Jasanoff and Kim, 2009;2015; Mosco, 2004), understood as a combination of hopes, visions, symbols and values that exist in society and groups. In the STS tradition, imaginaries are investigated as “entwined with the socio-material practices of technological use and development” (Milan and Kazansky, 2021:366), especially considering that infrastructures are not neutral facilitators of content circulation, but are imbued with values, discourses and representations (Magaudda, 2019). The concept essentially serves as a lens to analyze the interplay and mutual shaping of science, technology, and society (Mager and Katzenbach, 2021), highlighting the ‘instrumental and transformative’ role that technology developments play in generating imaginaries of social order (Jasanoff, 2015). According to Jasanoff (2015:4), sociotechnical imaginaries can be defined as: “collectively held, institutionally stabilized, and publically performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of advances in science and technology”. Socio-technical imaginaries influence (individual and collective) behavior and identity, as well as the development of narratives and policies (Jasanoff and Kim, 2015). Thus, they emerge from “the imaginative faculties, cultural preferences and economic or political resources” of individuals (Jasanoff, 2004: 16).

In more recent studies, the notion of social imaginaries has started to gain attention in the context of narratives on the Internet, datification and algorithmic structures (see for example Bucher, 2017; Bory, 2020; Lehtiniemi and Ruckenstein, 2019, Mansell, 2012). Since socio-technical imaginaries can be understood as collective, shared visions about technology which include intentions, projects, ideologies and utopias (Flichy, 2007), we can argue that they also orient users to think about the digital environments they navigate (Milan and Kazansky, 2021). It is important to start from here, because I will look at blockchain as a narrative technology (Reijers and Coeckelbergh, 2016), capable of having a normative and performative function as “its promises and expectations help mobilize the future into the present” (Magaudda, 2019:59).

Since social imaginary is one of the most powerful instruments to weave, promote and disseminate ideological stances and power (Jasanoff and Kim 2015), it then becomes necessary to

delve deeper into the imaginative power of blockchain technology. Particularly, as Bory (2020) stated, it is relevant to study Internet imaginaries since they are driven by narratives regarding the digital revolution which came to create myths and expectations towards digital technology. In this respect, I argue that we should look at blockchain as embedded with narratives and discourses regarding desirable futures which deserve further attention. An analysis of discourses, promises and expectations that circulate around blockchain technology will not only help to critically address the general enthusiasm about the future consequences of its implementation in the social sphere, but also help to contextualize and understand the cultural and political visions that are driving the shaping of this technology. In this work, I will thus use the notion of “imaginary” applied to blockchain technology to capture the spectrum of values and visions subtending its use and implementation, as well as the narratives and discourse that contribute to create shared ideas about the role of this technology. More specifically, I will look at blockchain as an algorithmic platform which mediates human relations while creating social aspirations. This process of “co-production” happens among a variety of actors with different values, modus operandi, and interests (Wyatt, 2004), thus requires studying how visions of the future emerge as relevant narratives, how they are mobilized by stakeholders who detain individual interests, and how, in turn, they inform and shape practices in the present.

To recognize that technology is implicated in this manner in the production of collective visions of futures recognizes once again that computer scientists and engineers are key participants in propagating ideas about the nature, purposes, and social significance of their work, making it particularly important to understand how they participate in the creation of certain imaginaries attached to technology. As already discussed, in fact, software developers and technology companies draw indeed fully from cultural norms, visions, and values to support the implementation of digital artifacts, and thus the social imaginary they aim to disseminate deserves attention.

Existing sociological research on the uses of blockchain technology in societal contexts is sparse and limited. But since blockchain has also been depicted as possibly separated from the world of finance and market (Al-Saqafa and Seidler, 2017), we should look at blockchain ‘for the social’ as a broader social phenomenon. In this sense, this work seeks to investigate imaginaries and actors that revolve around blockchain social applications, trying to understand who participates in its implementation in a wider set of societal contexts beyond finance, which visions of the world they have in mind, and what is its relationship with the different, sometimes contradictory, political and economic interpretations that come from the crypto community that created it.

In the next paragraphs, I will discuss how blockchain imaginaries have been already studied in the context of finance and politics, showing a gap in studies regarding narratives on its “social drive”.

### 1.6.1. Blockchain financial imaginaries

Most of the analysis on blockchain imaginary come from the literature that focus on its innovative and disruptive potential for restructuring financial and economic systems (e.g. Swan, 2015; Tapscott and Tapscott, 2016) and looks at the existence of certain Bitcoin imaginaries as related to the imagination of new economic structures (see Swartz, 2018, De Filippi and Loveluck, 2016). Considering the peer-to-peer nature of blockchain technology, some have explored the possibilities for a ‘distributed creative economy’ (O’Dair, 2019), while others have examined blockchain potentiality to create a peer-to-peer sharing economy or an economy of the commons (Arvidsson; 2015; O’Dwyer, 2015; De Filippi and Hassan, 2016), looking at blockchain as an alternative to the prosperity of the monopolistic platform capitalism (Tapscott and Tapscott, 2016).

As already mentioned, the very innovation of blockchains comes from the possibility for actors to participate in the system without introducing any kind of centralization, thanks to the use of distributed infrastructures. According to O’Dwyer (2015) and Bollier (2015), in fact, blockchain-based technologies can support distributed forms of networked cooperation on a global scale, while applications like the Decentralized Autonomous Organizations<sup>5</sup>, are advocated as organisations that are interested in fostering commons-based peer-production since they help to reach consensus, negotiate trust, scale interactions and support complementary currencies (O’Dwyer, 2015; Bollier, 2015). Some scholars put forward the idea of using the blockchain for creating Distributed Open Cooperatives, in which blockchain technology could be used to assist with cooperative activities, help people to share resources and make collective decisions (O’Dwyer, 2015; Catlow, 2019). This same idea has also been supported by Arvidsson, who considers the crypto-economy as “a tangible alternative to the official venture capital system: a non-capitalist market for capital” (2019:15), as well as by Srnicek and Williams (2016) who argue that crypto-currencies and their blockchain technology ‘could bring forth a new money of the commons, divorced from capitalist forms’.

On the other side of the coin, however, there exists a totally opposite view on blockchain imagined affordances (Neff and Nagy, 2015) for the economy. Kostakis and Giotitsas (2014) have

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<sup>5</sup> abbr. DAOs; organizations that use blockchain technology to give its members specified rights within the organization, which are managed and guaranteed by the blockchain (see: Bollier, 2015).

described blockchain as an architecture that mostly exemplifies “distributed capitalism”, where “everyone can become an independent capitalist” (Kostakis and Bauwens 2014), while Herian (2018) has highlighted that blockchain tends to re-centralize class power and ends up reproducing capitalism logics. Following from the literature on crypto-anarchy, moreover, some have argued that blockchain sprouts from an extreme libertarian view that dismisses the very role of states and governments and may lead to a disempowerment of citizens and even to the emergence of a global society without states and governments (Atzori 2015; Golumbia 2017). Blockchain and Bitcoin, as bioproducts of the libertarian cryptoculture, attract anarcho-capitalists with ideological attempts to decouple currency from states and their central banks. The desire to erode the existence of governments and central institutions is part of the crypto-libertarian’s aspiration to eliminate politics by relying on technology, and to outclass banks and other financial institutions by using cryptocurrencies. In this sense, Ishmaev (2017) points out that Bitcoin satisfies the principle of ‘absolute ownership’ that the libertarian view of private property advocates, since the absence of intermediaries makes Bitcoin resistant to regulation and taxation. Golumbia (2017) warns that Bitcoin has become a tool for existing power to increase its concentration, rather than a challenge to the financial establishment. This also led Kostakis and Bauwens (2014) to argue that Bitcoin exemplifies the ideological incoherence of libertarianism, wherein theoretically, ‘equipotential’ individuals participate in decentralized free markets, but in practice, concentrated capital and centralized governance become the norm.

The resulting expressions of these opposite views on blockchain affordances for the economic sector can be exemplified by cryptocurrencies implementations, i.e. Bitcoin and Faircoop. While Bitcoin and FairCoop are both cryptocurrencies, based on the same distributed ledger technology, they maintain diametrically different visions of the way in which socio-economic systems should operate. Bitcoin is in fact ultimately driven by the preservation of economic freedom from centralized authority, following crypto-libertarians, while FairCoop, following crypto-commonists, places ‘the good human life’ and the desire to create cooperative communities at its nucleus.

### 1.6.2. Blockchain political imaginaries

A political imaginary could be seen as a part of a broader social imaginary and is conceptualized as “a collective structure that organizes the imagination and the symbolism of the political, and therefore, organizes the instituting process of the political as well” (Browne and Diehl, 2019:394). So far, few studies have looked in depth into blockchain visions of the world to make



sense of their political significance, and study which kind of political discourses are dominant when experts discuss blockchain affordances and possibilities. Although we know that blockchain is strongly blended with political visions of the crypto community, most research has not discussed yet the long-term socio-political implications that blockchain projects may have on society and politics at large (Atzori, 2015).

So far, Husain (2019; 2020) was the first to delve into blockchain political imaginaries, showing how emerging technologies like the blockchain are built upon certain political orientations and are constructed with determined political aims. In this sense, Husain speaks of 'prefigurative politics by-design' of the blockchain, referring to the embodiment of power structures into technology as a result of the political change their practitioners want to enable in society (Husain et. al; 2019). These in-built affordances and features could be related to access, decision-making and value, with floating interpretations that affects individuals and communities according to the different political projects they embody. In an effort to classify the different political orientations that blockchain embodies, Husain identified four categories of analysis, each of which conceptualizes political imaginaries differently and highlights different types of socio-political processes and transformations. According to the scholar, blockchain political imaginaries can be labelled as: crypto-libertarians, crypto-commonists, crypto-governmentalists and crypto-collaborativists. This classification is showed in figure 1.

The first two categories (crypto-libertarians and commonists) are somehow related because, again, they can both be seen as opposite sides of the same crypto-anarchist ideology that aims for a detachment from the state but approach the organization of market from the antipodes. Conversely, the other two, fall under the umbrella concept of 'crypto-institutionalists' (Husain et al., 2019:383), referring to the fact that individuals in these categories recognize and accept governmental institutions and try to include blockchain in governments. In other words, what ultimately distinguish both clusters is that, while crypto-anarchy builds on the idea that '*code is law*', crypto-institutionalism looks at blockchain to improve governmental efficiency, security, transparency and accountability, and restructure existing political infrastructures (e.g. e-Estonia, see also: methodological chapter).

	<b>Crypto-anarchists</b>		<b>Crypto-institutionalists</b>	
	Crypto-libertarians	Crypto-commonists	Crypto-governmentalists	Crypto-collaborativists
<b>Basic political imaginary</b>	Free-market libertarian political economy	Commons-based political economy	Free-market, government regulated political economy	Commons-oriented, municipalist political economy (hybrid), transnational movements
<b>Mode of governance</b>	Decentralized mass-driven, individualistic	Decentralized collectivist, commons-driven	Centralized, state-run	Partially decentralized, municipal and civil society, transnational institution and global civic society
<b>Value and incentives</b>	Speed, efficiency, risk, growth	Equality, social justice, ecological (commons goals)	Efficiency, transparency, accountability, growth	Collaborativism, translocalism
<b>Political scale</b>	Global/translocal	Local/translocal	National	Local/municipal/translocal
<b>Implementation process</b>	Start-up/crowdfunded	Start-up/crowdfunded	Government-led	Municipal/citizen-led, institution-led
<b>Dominant node of power</b>	Market, mass consensus	Collective	National government	Municipality/city

Figure 1. Husein's typology of blockchain political imaginaries (2020:88)

Although the work of Husain is extremely relevant to construct an initial understanding of the prefigurative political imaginaries of blockchain (Husain, 2020) and understand their relationship with post-political visions of the world, it is important to dig deeper into the broader social imaginary blended by this technology. In fact, while blockchain 'social' applications are often advocated as revolutionary, the question of *how* these mediate social relations in a given domain has remained somewhat unchallenged. While research exists in the context of computer science (e.g. Yang et al., 2018; Hawlitscheck et al. 2018) on the advantages and criticalities that concern technological systems and trust-building processes among users, as well as in the context of law, where the challenges of "ruling by code" (De Filippi, 2018) have been observed, remarkably a lack of research on the social and cultural understandings of society in the context of blockchain 'social' applications remains. The vision of blockchain as a tool to promote technologically-enabled democracy, social trust and social change cannot however be separated from the question of what is 'social' and sociality for those promoting this view, and how these understandings are encoded in the applications their promoters

seek to popularize. It seems vital, in other words, to expand our understanding of how social relations and society at large are conceived by individuals seeking to implement blockchain technology in a given social context, in order to properly assess their experimentations. For this reason, the main challenge of this work is to delve deeper into blockchain encoded visions of the world and to look for a *fil rouge* that unite them despite their differences. Such an approach is essential for gaining a broader understanding of blockchain imaginaries and their potentiality in response to the ever-growing imbalances of the digital society.

### 1.6.3. Studying blockchain social imaginaries

In the 1980s, David Chaum, the developer of Bitcoin's ancestor Digicash, argued that the emergence of decentralized applications could enable major global changes by solving problems of mass surveillance, online participation and democratic governance (Chaum, 1985:1044). Building from an approach that looks at datafication imbalances and the urge to find new answers, blockchain comes into the picture as a potential solution claimed by the tech world which looks at distributed technologies as means to disrupt data power and digital-mediated social relations. Blockchain has been advocated as a solution to several issues arising from the datafied society, e.g. the need for retrieving citizens' data ownership (Tapscott and Tapscott, 2016), the urge for privacy protection (Zyskind et al., 2018) and the demand to end with opacity in platforms' black boxes (Tapscott, Tapscott, 2016, Catlow, 2017). Accordingly, blockchain infrastructure would provide a response to problems of mass surveillance by including encryption and anonymity by-design, while the introduction of decentralization would give users more control on their data, therefore deploying a solution to problems of dataveillance and algorithmic-based discrimination. In addition, the transparency of the infrastructure would be responsible of finally opening up black boxes, while the use of a public key infrastructure (PKI) in blockchain technology that makes it secure and potentially non-hackable, provides a final solution to problems like hacking, identity theft, fraud, cyberbullying, phishing, etc. (Tapscott and Tapscott, 2016).

However, this position has been criticized by a small number of scholars who highlighted how, despite its open source and P2P nature, a massive adoption of blockchain services with no public institutions to coordinate their action might end up creating new oligarchies and a strong polarization in society instead (De Filippi and Loveluck, 2016).

Since blockchain is a relatively new technological item and its applications within the larger society are just starting to be seen, some (Golumbia; 2016; Stinchcombe, 2018) –as well as some

developers- are criticizing an excessive cyberoptimism and techno-solutionism. Example of criticism against blockchain being a solution to the data imbalances refer mainly to an actual hackability of the network as for Ethereum (Orcutt, 2019), to the dangers of implementing irreversible contracts (Catlow, 2017), to the sustainability problems of the blockchain (O’Dair, 2019) and to the potential for making illicit transactions (De Filippi and Wight, 2015). Other detractors have also questioned the idea that blockchain protects users’ privacy, expressing concerns for a new potential technology for social control (De Filippi, 2018). In fact, it has been argued that the immutability feature of the ledger, would not really provide more privacy to users; rather, blockchain risks violating the ‘right to be forgotten’ contained in the European GDPR by recording all the transactions forever (see for instance Berberich and Stainer, 2016). Plus, regarding for instance online violence and hate, blockchain distributed infrastructure might facilitate the illegal storage of digital works and make them difficult to remove (O’Dair, 2019).<sup>6</sup>

Nevertheless, most critiques are being moved on the technical side while few research has analysed more in depth the visions of the world that underpin such beliefs in the power of distributed technology. Blockchain supporters suggest that opening black boxes and using blockchain technology to engineer transparency and decentralization in the digital architecture will revert data power and end with online discrimination. However, we learn from the data justice approach the limits of approaching such problems only from a technical side without considering existing social bias that technologies reproduce and that cannot be fixed by code (Dencik, 2018; Taylor, 2017; Peña Gangadharan, 2019; Heeks and Renken, 2016). In fact, as O’Dair (2019) notices, not only do decentralized technologies not necessarily decentralize power, but the asymmetries of wealth and power might also be simply replicated or accentuated with the blockchain, if society does not open up a discussion on the values that could be driven by the use of this technology.

In conclusion, since Blockchain implementations “need to be supported in their early stages by a specific set of expectations and promises” (Magaudda, 2019:59), they require further attention and investigation. For these reasons, this research will look at blockchain encoded values and visions of the world by entering the blockchain scene and analyze conceptualizations of what is ‘good’ for society according to those who participate in it.

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<sup>6</sup> This is particularly relevant as new forms of violence, such as image-based abuse, are growing in the society.

## *1.7. Conclusion*

This literature review has served to show how blockchain technology should be considered as a social phenomenon, which is rooted in deeply political visions of the world. The importance of adopting such lens is especially given by the necessity to understand power relations in the digital society by asking who holds data power and which values are at stake when technologies are implemented with social aspirations. In the next chapters, by delving into blockchain imaginaries through a better understanding of how experts and pioneers conceptualize the new challenges of the digital society, I will critically reflect on the kind of power that core developers and foundations developing these protocols hold.

This research looks into blockchain cultures in two ways: on the one hand, it starts by asking which visions of the world are embedded in blockchain technology as applied to the social sphere, trying to grasp who are the involved actors, what they say regarding blockchain and how they imagine it for the social sphere. On the other hand, by posing such questions, the analysis also focuses on understanding what is social in blockchain technology, who does it aim to empower, which idea of society underpins its implementation and which biases may be encoded into it.

The discussion aims at filling gaps both in the blockchain and data justice literature, conceptualizing new forms of imagining the politics of technology and discussing its (potential) limits or advantages. In order to encourage the elaboration of new original answers to issues posed by the wide adoption of technology in our Western societies, this research looks at blockchain beyond a pure technical approach following a more human-centered approach suggested by the data justice literature. In this sense, threats such as mass surveillance, algorithmic discrimination, online hate, etc., are seen more as social problem rather than technical, and therefore, the question of who has the power to implement and spread certain visions of the world inside technology becomes central to contribute to the discussions on the future of the digital society.

As argued by Mager and Katzenbach (2021), socio-technical imaginaries are multiple, contested and commodified. This means that imaginaries should not be understood as monolithic or fixed, but rather as dynamic and multi-faceted (2021:225). In this sense, we need to expect that blockchain imaginaries will present similar characteristics of multiplicity and controversy. Sociotechnical imaginaries are indeed never consensually defined: different actors, influenced by their own sociocultural context and personal interests, construct narratives of the futures and strive to translate them into social imaginaries. In other words, when certain sociotechnical imaginaries arise, there

may always be a competition for dominance (Jasanoff, 2015 in Mager and Kezenbach, 2021). Moreover, sociotechnical imaginaries are being increasingly commodified by economic actors, as “in this process of negotiating the future, it is often not state actors that act as primary agents of powerful imaginaries, but corporate players: entrepreneurs routinely attire their products and services in utopian visions of the future, narratives of community-building, and the promise of technological fixes for social problems” (Mager and Kezenbach, 2021:227). For these reasons, studying how social imaginaries emerge in different cultural settings, which actors participate in the construction of imaginaries and how they struggle and compete with each other to dominate the creation of alternatives, is particularly original and relevant for blockchain studies.

By integrating STS studies with data justice literature to look at blockchain, the social becomes not just an explanatory and foundational category (Law, 2008) but a central way to understand the construction and power of sociotechnical imaginaries which highlights data bias and assumptions encoded in technology. In other words, this means essentially to focus on structural imbalances, social inequalities and discrimination that participate in shaping digital technologies and look for hegemonic narratives and their aims. For this reason, my theoretical framework integrates previous studies on sociotechnical imaginaries with theory coming from semiotics and cultural studies, with the aim of expanding sociological literature on blockchain research and provide useful insights on the power of algorithmic imaginary.

## 2. *A multisited ethnography to unpack blockchain cultures*

### 2.1. *Introduction*

This chapter provides a discussion on the methodological strategy adopted to conduct the present work. The main research goal was understanding which kind of cultural imaginaries develop out from the blockchain community, as well as which interpretations of potentiality and limits of this technology for ‘the social’ do developers hold. This meant unpacking discourses and statements on blockchain technology to fully grasp the diffusion of specific visions of digital technology affordances in Western, neoliberal societies. The main research question underlying this work indeed revolved around questioning which kind of visions of the world hold individuals participating in the blockchain scene, trying to delineate contradictions and common patterns of thinking. Other sub-questions underlying this work have been: what is the meaning of blockchain for those who create, implement and use it? Which discourses develop out from the analysis of blockchain imaginaries? Which values do these discourses embody? Who do they aim to empower and who is left at margins?

To study imaginaries ultimately means to dig into people’s visions of the world and study the ways people imagine their social existence (Taylor 2004). In the case of blockchain, I needed to delve into the socio-technical understanding of this technology hold by developers, startupper, activists and blockchain experts in general (which in the following chapters I will call ‘*blockchainers*’), exploring the vagueness around the concept of ‘blockchain’ and ‘social’. The aim of this work was to problematize such fuzziness by analyzing the forms in which participants in the blockchain community bind certain assumptions on blockchain affordances (which in chapter 4 I will call ‘regimes of truth’) to specific visions of the world. My goal was to get a more accurate sense of the relationship between the implementation of blockchains and the framing and naturalization of ways of thinking of possible futures, also studying how certain social values do enable (or restrict) social, political and economic actions.

Since blockchain is a socio-technical object, it was necessary to study discourses around it, both in the online and offline dimension. The research design thus comprises of a combination of different qualitative methodological techniques that have been collected under the umbrella concept of ‘multisited ethnography’ (Marcus; 1995) and combines interpretative research with digital methods (Rogers, 2013). More specifically, to tackle these questions, I conducted a one-year qualitative multisited ethnography in Milan, London, and Tallinn and the online sphere – in particular,

on the platform Twitter - from October 2018 to October 2019, where I collected conversations with blockchain experts and developers.

In this chapter, I will explain and justify my methodological approach describing how I developed the ethnography, and which challenges I encountered and overcame. In the next paragraphs, I also will provide more details on my selected fieldworks, case studies and, of course, my interviewees.

This chapter is structured as it follows: I begin by providing a theoretical justification of my chosen approach, by discussing multisited ethnography as a method and explaining the potentiality of doing multisited ethnography for studying and mapping imaginaries. By presenting these first reflections, I also explain how doing a multisited ethnography in the context of a digital society urges the ethnographer to also take into account research in the digital sphere.

Following this discussion, I then explain how I 'followed the object' and designed a fieldwork experience based on shadowing, participant observation and interviews. Later on, I illustrate how I used digital methods for mapping imaginaries on Twitter and how I involved in the research the use of online documents and forms.

Finally, I provide relevant data on my research informants and provide details on the selected case studies to observe blockchain imaginaries. This part is followed by a paragraph that discusses the ethnographical reflexivity and a paragraph on ethics of the research. I conclude by showing how this research design allowed me to delve into blockchain imaginaries and immerse myself fully into my object of study.

## *2.2. A multisited ethnography*

The developments in the field of civic tech, blockchain technology and digital rights political movements are constantly changing at global scale, thus require an innovative and mixed approach to make research on imaginaries.

For this research, I was precisely in need of a research method that could allow me to grasp participants' beliefs, feelings and experiences, meaning that I needed to access their communities, spaces and practices in the first place. For this reason, I decided to rely on ethnography as the most reliable and exciting method to observe my object of study in its daily practices, limiting artificiality as much as possible in the research.



Ethnography is the practice of immersing, observing and entering 'the everyday' for studying social worlds and cultural forms naturally emerging from them (Pink et al, 2016). Ethnography involves the researcher participating (overtly or covertly) in people's daily lives for a sufficient period of time, listening to conversations, observing what happens, collecting documents and materials, and asking questions through informal and formal interviews (Hammersley, 2007; Spradley, 2016). In the case of this research, I tried to use every means at disposal of an ethnographer and engaged in several formal and informal conversations: events, conferences, hack meetings, roundtables, reunions, lessons, networking sessions on blockchain technology in the social field, and even 'crypto-aperitivi', were all valuable occasions for undertaking my participant observation and get closer to a community that I only partially knew before starting this research.

Moreover, not only I evaluated this method as the most useful for the understanding of imaginaries and discourses, but since hacker and crypto communities might be difficult to access, I also considered it as the most feasible way to access a variety of participants, projects and documents.

As described in the literature review, blockchain is a digital object that developed out from the hacker community, which by definition is a decentralized, individualized, transnational and fluid social world. The characteristics of the community and the organization of movements, collectivities and actions do reflect the initial scope of the Internet, initially thought as a horizontal and decentralized space that could empower individuals and communities. The same premises are at the basis of the implementation of blockchains and DLTs, which maintain a decentralized and transnational scope. Given these considerations, the methodological approach for answering my research questions was relying on a multisited ethnography that could reflect the transnationality of the debate.

The definition of a multisited ethnography was provided by Marcus (1995) who defined it as *"a mode of ethnographic research self-consciously embedded in the world system, which moves out from the single sites and local situation of conventional ethnographic research design to examine the circulation of cultural meanings, objects, and identities in diffuse time-space"* (1995:96). Marcus acknowledged that for ethnographers interested in contemporary social and cultural changes, single-sited research may be difficult to be located in a world system perspective. In this sense, the ethnographer should *"follow the thing"* and *"follow the people"* moving from *"conventional single-sited location to multiple sites of observation"* (Marcus, 1995: 95).

The concept of multisited ethnography is particularly relevant for this research, since it developed out in three different geographic contexts (London, Milan and Tallinn), as well as in a digital context.

As Caliendo (2018) highlighted, in fact, for an ethnographer living in contemporary digital society following things from site to site means also confronting online environments, which “tend to be ubiquitous and places where social actors spend a significant part of their everyday lives” (Beneito-Montagut 2011 and Hine 2007, in Caliendo, 2018:5). Separating the online and the offline is becoming more and more impractical, and, as Pink et al. state, “online-offline are part of the same processes through which localities are produced, experienced and defined” (2016: 577–578), thus digital ethnography can be conceived as a natural extension of multisited ethnography (Caliendo, 2018; Pink et al., 2016; Markham, 1998). In the context of blockchain, the local also implies a relationship with the scale of Internet (Husain, 2020). It becomes then necessary to “find, distinguish research online localities and/or how localities spill over between the online/offline in ways that acknowledge their partial merging” (Pink et al. 2016, p. 561).

Since I was interested in observing political cultures, I indeed immersed myself as much as possible in the blockchain community at a formal and informal level. Goodenough, quoted by Geertz, says that a culture ‘consists of whatever it is one has to know or believe in order to operate in a manner acceptable to its members’ (Geertz, 1973:5), thus I firstly needed to access the culture I was aiming to study. For one year, the developing of my fieldwork involved my presence to a great variety of local and online events which allowed me to reach a deeper sense of the way in which participants thought of blockchain technology in the social sphere, as well as how they perceived themselves in relation to the work with it. This method has been useful also to examine individuals’ opinions or behavior not as separated, but as combined.

To preserve methodological validity, during the whole ethnography I took field notes at events and presentation I was attending, as well as during interviews and shadowing. These notes served to operate a constant comparison between data collection and theory, following a grounded theory approach (Glaser and Strauss, 1967). During the whole data collection process, I revised and systematized my field notes in order to facilitate the following interpretation and analysis. As I will explain more detailly in the paragraph on interviews, I used selective coding (Bryman, 2012) to label recurrent topics and arguments that emerged from my ethnographic work.

Finally, my personal experience as an ethnographer was also key in developing analysis on blockchain imaginaries. When I started my PhD, I was already familiar with hacktivist spaces, hacker

culture and crypto-communities because of my involvement in political activist environments. However, understanding the meaning of blockchain as a cultural and political object coming from the hacker community was a completely new and challenging task, which took me to constantly question my initial assumptions and hypothesis. In this sense, the research path of understanding blockchain as a cultural and political object contains, to some extent, elements of 'autoethnography' (Ellis, 2010). To make sure my work can be fully interpreted as a valid ethnography, I will discuss this point further in paragraph 8, in which I address the reflexivity of this research.

### *2.3. "Follow the object": contextualizing the offline field*

Studying groups who are not geographically grounded and can exist both online and offline could be a challenging task. Previous research on developers and hacker communities showed that ethnography can be a useful method to access discourses and political imaginaries (see Hine, 2000 and Coleman, 2014 among others).

Coleman (2010; 2014) was one of the first scholars to provide an important contribution to the understanding of hackers, firstly by delving into the world of Anonymous by means of a popular, immersive digital ethnography, and secondly by providing ethnographical observation at hacker conferences and meetings. Coleman's work was especially crucial to the understanding of the hacktivist movement as deeply individualized, fluid and fragmented, showing how innovative ethnographic methods can be particularly helpful for entering emerging digital groups.

Haywood (2012) also applied ethnographic methods to the study of hackers by using shadowing technique in conferences to gain a sense of 'hacker ethics'. Building from this approach, I will also apply the shadowing technique in this research, which essentially involves following particular individuals of interest in their day to day lives, studying their relationships with its cultural, social, economic and political context (Bandinelli, 2017). Haywood's work engaged with this technique to explore how hacker groups produce technologies as cultural and social artefacts, tracing a journey on socio-technical imaginaries and showing how shadowing can reveal common narratives inside hackers and developers' communities. Shadowing is also a useful method to apply considering a "networked individualism" (Flichy, 2004.; Wellman et al., 2003) which points out to the contemporary importance of personal networks which are also supported by digital technologies. I will discuss this further in section 2.6.

So far, a limited number of studies has looked into blockchain imaginaries and discourses as related to the social sphere. The doctoral work of Husein (2020) looked at political imaginaries of the blockchain to map and systematize different political orientations (see literature review), who firstly used an ethnographical approach to access the community, but especially relying on digital data. In the case of my research, what I believed to be a strong and solid approach was instead 'following the object' and developing a multisited ethnography that could grasp as much as possible the shadows and the meanings of such a variety of individualized imaginaries. For this reason, I considered three different local contexts for the 'offline' ethnography and focuses on Twitter for the digital part.

For the offline part, I selected the local contexts according to the presence of a large 'blockchain scene' and due their renown status of 'tech hubs' of the European area broadly intended. The first local context in which I started my research on blockchain is London. Considered as the tech-capital of Europe, London's digital sector boosts the UK's economy by £18bn in 2015 and employs around 200,000 people (Oxford Economics, 2018). Accordingly, London is a European hub of blockchain applications and a nest of key actors looking to develop blockchain start-ups (Tapscott and Tapscott, 2016). Given this particularity of the city, I lived in London for three months where I started to gather informants, attended blockchain events and launched my Twitter scraping. Events and initiatives that I attended in London were very different and heterogenous, thus for my research I engaged in art exhibitions, workshops for tech-artists, university conferences, meetings of blockchain networks (e.g. Women in Tech), company events, technical debates among hackers, and so on. My research on blockchain for the social field started from London, making me understand from the very beginning the complexity of a technology that could be discussed and advocated as revolutionary both in libertarian, conservative spaces and opposite resilient, radical-leftie spaces.

The empirical reason for doing fieldwork in the second context, Milan, is justified by similar reasons. Especially after Expo 2015, Milan has started to be considered as an emergent Italian tech hub which is hosting more and more tech events, such as the Milano Digital Week, the Digital Innovation Days, etc. Due to this, many blockchain start-ups and companies have started to concentrate in the area of Milan, giving rise to a lively blockchain community. Given this, Milan became a useful location to get sense of the general blockchain Italian context, and gain access to relevant key informants, especially considering that the city has also previously being a field for important empirical researches about creative and digital industries (see Arvidsson et al., 2010, Gandini & Leonini, 2019). Moreover, I deployed an eight-months shadowing observation in Milan to follow my object of study and deepen my understanding of blockchain technology and imaginaries

(see paragraph 2.6). Finally, giving the familiarity with the culture and given my personal engagement as an activist with Macao Milano, an occupied center for culture, arts and politics (see Cossu and D'Ovidio, 2017), I had the chance to access a consistent number of hacktivist environments, such as hacklabs and hack meetings, and blockchain informants.

In the case of the third social context, Estonia, I consider my staying in Tallinn as an important opportunity to study blockchain. Since the adoption of E-Estonia (in 2008), the country has been often advocated as 'the first digital republic' (Heller, 2017) and nowadays represents the most advanced example of a government using blockchain technology for enhancing government services. Since E-Estonia is an ambitious project that includes all members of the government and affects citizens' daily lives, it represented a great practical case study for blockchain social applications. E-Estonia is often described as a technology-based information society that establishes the principles of e-government (Kalvet, 2012), and in fact all the public services in Estonia do in fact include an e-service component (e.g. e-health, e-voting, e-residency<sup>7</sup>). During my research visiting, I took the chance to converse with people who could provide useful details on the e-Estonia project, such as governmental actors, developers, university professors and famous cryptographers, and also had the chance to visit the E-Estonia Briefing Center where attendees are introduced to the digital Estonian society and the main features of the e-governance model.

Since Estonia is a country that counts with a small number of citizens (1.2M), it was never too difficult to reach out to key informants: I was actually quite excited by discovering that governmental actors were replying to my emails and were in most cases available to meet me for interviews. Interestingly to note, during several conversations with actors who participated to the core of the Estonian digital project, there was always a third person listening to the interview. While I was not bothered by this fact, it still gave me a sense of being in front of a certain level of governmental propaganda on blockchain affordances for Estonia. For this reason, in Tallinn I tried to gather a diversity of participants in order to hear to also to different opinions on how blockchain works for the social in Estonia.

Generally speaking, my fieldwork experience was exciting and often unpredictable. My research method involved traveling to different places, engaging with different cultures, observing different social contexts and having a highly flexible time schedule. This was both a chance and a

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<sup>7</sup> The latter, however, is an algorithmic-based ID system mostly used for commercial purposes, such as opening bank accounts or fastening trading that the government has mainly implemented to attract foreign investors and startups to start businesses in Estonia (Tammupuu & Masso, 2018).

challenge as a researcher, because I experienced a set of situations that could be completely unforeseen, but yet were extremely stimulating for the kind of conversations I was conducting. Since the variety of applications of blockchain in the social sphere can very heterogeneous, one day I could easily find myself sitting on the floor of an occupied center listening to conversations on blockchain for empowering art and collectives, while one week before I was sipping white wine on a rooftop of a fancy hotel in Tallinn with a famous cryptographer. This flexibility of following my participants and letting them set the location for meetings and interviews gave important fluidity to my research and it also helped me to gather a big variety of imaginaries providing an accurate overall picture of the existing conversations on blockchain affordances, a discussion that takes into account also limits and controversies.

#### *2.4. Digital methods for ethnographic research*

Chronologically, the point of departure of this research was Twitter. From the very beginning, I considered Twitter as a useful platform to start making sense of different perspectives on blockchain technology because Twitter affordances allow for defining the object of study using keywords, collecting textual data for content analysis and gathering data on users who are involved in the conversation (Caliandro and Gandini, 2017; Kwak et al. 2010). Since the discussion on blockchain is often difficult to systematize, I relied on Twitter to start mapping imaginaries and actors.

The tradition of digital methods (Rogers, 2013; Marres, 2012) developed the principle of “follow the medium”, conceiving the Internet as a space where methods of research are intrinsically built *into* functions and online devices (Caliandro and Gandini, 2016). This technique, which was developed by the DMI (Digital Methods Initiative) at the University of Amsterdam, is different from the idea of simply ‘digitalize the methods’ to study online behavior, because it sees the online as an environment where researchers can ground findings about reality (Rogers, 2010). As mentioned above, this research uses digital ethnography to look at online discourses, imaginaries and narrations (Caliandro and Gandini, 2017), applying digital methods within a more qualitative frame.

My research on Twitter worked as an explorative research and, in fact, it helped me to provide a descriptive analysis of the diffusion of the different discourses related to #blockchain discourses on Twitter, contained and discussed in chapter 3.

The research on Twitter took place in three steps: data collection, data analysis and data visualization. For the first step of this work, I mapped the blockchain scene on Twitter using the TCAT

software from Digital Method Initiative, a tool that allows for big collections of tweets through scraping technique (Marres and Gerlitz, 2015). On the 11<sup>th</sup> October 2018, I launched a query for the hashtag '#blockchain': the reason why I decided to use a broad query for the collection was getting a sufficient dataset to develop further in-depth analysis and a broad overall picture of imaginaries. I set the scraping from October to December 2018, obtaining a final dataset with a 5.7 millions of tweets.

As showed in figure 2, I owned an initial dataset of more than 600'000 distinct users. During the analyzed timeframe, users have included #blockchain for around 100'000 tweets per day, with peaks of tweets production in the days of international conferences<sup>8</sup> or price fluctuation of cryptocurrencies<sup>9</sup>.

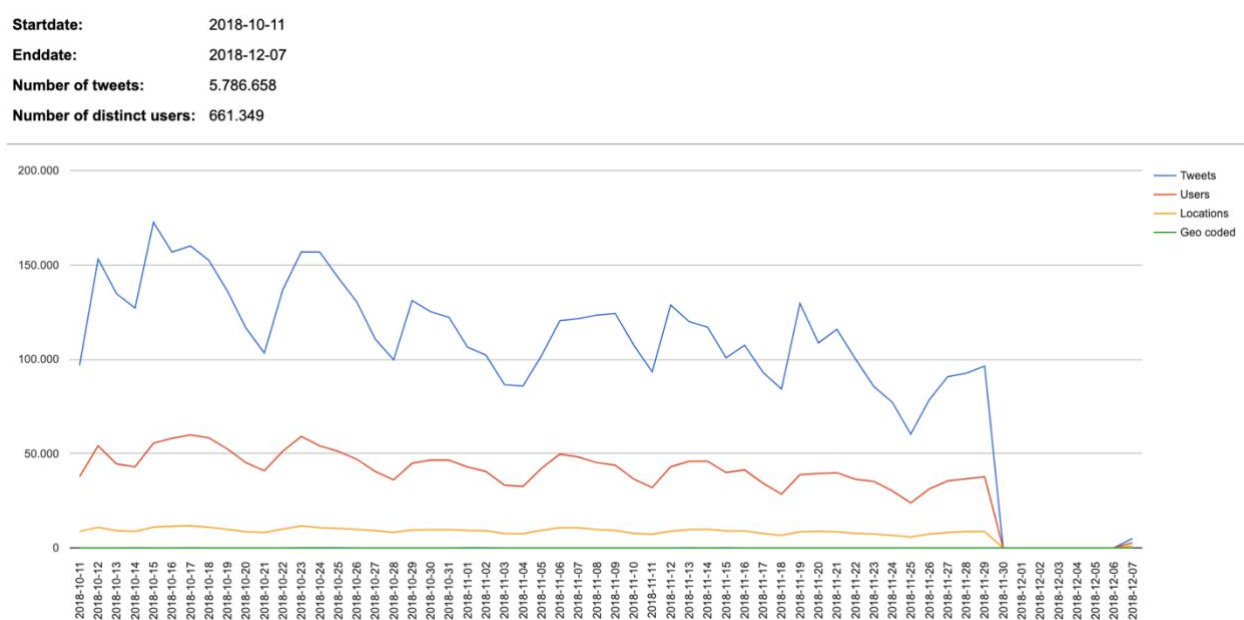


Figure 2. Overview of Twitter dataset

Since the dataset was too big to be fully analyzed and visualized and considering these tweets peaks as relevant because of two big events on blockchain taking place, I extracted a one-month sample for the networks (11-10-2018 to 11-11-2018) containing 3.995.369 tweets and 516.482 distinct users.

After obtaining the dataset, I operated a semantic network analysis through co-hashtag analysis (Marres and Gerlitz, 2015) and started to investigate the discourses and values emerging

<sup>8</sup> Malta conference: <https://whatupintown.com/de/x/blockchain-bitcoin-conference-malta/>

Dubai conference: <https://www.blockasia.io/world-blockchain-summit-dubai-24-25-october-2018/>

<sup>9</sup> Bitcurate (2008). Available at <https://medium.com/@bitcurate/two-reasons-why-bitcoin-price-fluctuated-on-october-15-2018-ab2c7c84f5ab> (Last 29/11/2020)

around blockchain and its societal application. This part was useful to pinpoint particular discourses focused on blockchain for the social sphere. A second part of the analysis was operated on users' interactions to find blockchain 'influencers' (Abidin, 2016), mapping existing "hubs" and communities on Twitter in order to spot relevant narrations of the object and of the self. Finally, to add a more substantial content analysis, I extracted a random sample of 1000 tweets that I manually read and interpreted to make sense of blockchain discourses on Twitter.

Finally, for the visualization of the networks, I relied on Gephi software which allows for working with big datasets and create network visualizations of consistent numbers of tweets.

As Caliendo (2018) argues, "*Digital Methods could inspire the ethnographer through the new methodological strategies and conceptual frameworks that are useful for mapping the social structures and cultural processes being deployed in social media environments*" (2018:7). In this sense, my digital data collection and analysis opened up to a set of interesting reflections on blockchain in the social sphere and was the beginning on my investigation on the floating meaning of blockchain, as I will describe in the following chapter. Moreover, the Twitter analysis also allowed me to acknowledge the existence of blockchain initiatives and events, especially at the beginning of the fieldwork when I was in London and get to know well-known online blogs and platforms that spread information on blockchain technology.

## 2.5. Blogs, whitepapers and Telegram

As highlighted by the Harvard STS initiative<sup>10</sup>, "documents and other verbal texts related to science, technology, and power may provide some of the most accessible and ubiquitous resources for analyzing sociotechnical imaginaries". For this research I also relied on documents that were available for consultation on the web, such as news platforms, blogs and whitepapers. Starting from the latter, blockchain projects normally have a whitepaper or at least some links to public sheets containing information about their initiative. These are preliminary documents stating the vision and the goal of a project based on blockchain technology. Whitepapers normally include the tracing of a problem that the project aims to solve, a suggested solution, a description of the architecture of the product and its interaction with users (CoinTelegraph, 2018). In this research, I

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<sup>10</sup>See more at: <http://sts.hks.harvard.edu/research/platforms/imaginaries/ii.methods/methodological-pointers/>



read the whitepapers of the projects of my interviewees, when available, or whitepapers that informants mentioned to me as relevant to read. However, I did not undertake a systematic analysis of these documents; rather, I have used them as a baseline for approaching the field with interviews and participant observation in support to my ethnographic activity.

At the beginning, I also needed sources to delve fully into the understanding of what blockchain technology is for. For this reason, on a monthly basis, I read blogs to stay up to date with blockchain news. These included blogs of figureheads and influencers of the blockchain community, academic researchers discussing available data, and anonymous blogs created in the sphere of hacktivism.

Finally, during the digital ethnography part I also collected some digital data by scraping Telegram considering it as an emerging relevant platform to observe discourses in publics formed around controversial topics (see Semenzin and Bainotti, 2020; Rogers, 2020). However, I decided not to include these data in my results because most conversations in Telegram revolved around cryptocurrencies, finance and mining. Anyways, I still consider this as relevant to mention in this section, since Telegram offers a perspective on the fragmentation of blockchain imaginaries with a still prevalent presence of financial discourses, as I will also discuss in the next chapters. In this sense, since the research focused on blockchain for the social, I only considered Telegram data as part of the path to reach a deeper understanding of blockchain as a cultural object and to delve into different meanings and interpretations arising from different social contexts. As an ethnography involves a continuous path of knowledge of the research object, these conversations still represent to me some pillars for my understanding of the case study.

## *2.6. Participant observation and shadowing*

An ethnography that includes different methods and locations for observation can provide a number of advantages for research on socio-technological imaginaries. In fact, integrating interviewing data with shadowing observation can be useful to diminish the effect of informants' performance in interviews, which according to Becker and Geer (1957) could bring participants to omit, more or less consciously, certain topics while stressing and highlighting others. This issue may emerge when, in a formal conversation, interviewees perform brands, as research on entrepreneurs (see Arvidsson et. al., 2016; Bandinelli, 2017) or changemakers (Bandinelli and Arvidsson, 2013; Arvidsson, 2020) show. Since most of my informants pertained to one or both categories, I considered

important to participate in local events and get a broader sense of the dynamics and relationships existing within blockchain communities.

As argued by Kozinets (2010), in an ethnography it is important to repeat contact and familiarity with the object of study and entering rituals and costumes by feeling some sense of obligation and participation. This brought me to attend blockchain debates, presentations and meetings happening in coworking spaces, universities, occupied spaces and informal networking sessions. At the end of every events, participants engaged in networking and establishing contacts, meeting potential partners and discussing further presentations. Me, as a researcher, I was always taking ethnographic notes about debates and participants and using the events for networking too. I was interested in understanding more about what brought participants to attend blockchain events, thus I often engaged in informal chats at coffee breaks or listened to surrounding conversations.

Most of these debates were oriented towards the discussion of technical issues, while others touched upon the debate on how blockchain may pave the way to future political and economic scenarios. Considering the nature of the majority of events, the required level of computer expertise was generally high, and thus mostly involved the participation of computer scientists and developers. Other events, more directed towards a broader political discussion of the blockchain, attracted the curiosity of other kind of actors coming from diverse backgrounds such as business, activism, art, healthcare, etc.

Alongside participant observation, I selected a case study for doing a closer shadowing observation in the Italian contexts. Shadowing is a form of structured observation that aims to seize both behaviors and opinions. As a data collection strategy, shadowing is particularly convenient for addressing research questions where the unit of analysis is not the individual but the social relation (Quinlan, 2008). This method in fact allowed me to get a broader sense of how a project arises, develops and is discussed among blockchainers.

The possibility for doing shadowing presented itself spontaneously. In Milan, I often participated to hacktivist meetings in occupied spaces and used my network to expand my knowledge on blockchain technology. While I was gathering new possible informants for my research, I spread the rumour at Unit hacklab and was soon contacted by Alessandro, a computer scientist who was starting to implement a blockchain-based project for education called GrowBit. He reached out to me, saying that he was in need of an academic perspective on his work. The main idea of Alessandro was that students need to be encouraged to pursue their studies as a form of personal enrichment, thus Growbit aims at *“reducing the rate of students abandoning their studies prematurely by using*

*blockchain to increase the interest in knowledge and curiosity*" (Growbit.xyz). This view intrigued me, and I was also curious to deepen my knowledge on blockchain affordances for education. Alessandro provided a lot of documents, infographics and presentations on Growbit that allowed me to investigate more in depth its goals and functioning, thus we decided to meet and exchange knowledge on the topic. When we met, Alessandro was seeking help from my side to give solidity to his project, so I suggested him to become my main case study in Milan and start a closer shadowing to get to know more about Growbit.

Shadowing entails a researcher closely following a subject over a period of time to investigate what people actually do in during their everyday lives (Pickering, 1992). In Milan, I used to meet Alessandro at least once a week for lunch or coffees in which we discussed updates on the development of his project, news regarding blockchain technology and upcoming events in Milan. I followed Alessandro in his everyday practices that were related to blockchain: he took me to his office and introduced me to colleagues and friends, he took me to blockchain conferences and seminars he was interested to attend, we had formal interviews followed by several informal conversations, I helped him organizing hackathons, we went together to hack meetings, etcetera. Alessandro was always extremely kind and helpful with me, inviting me to a big number of events in Milan (formal and informal), constantly naming possible informants and relevant documents to read, and giving me access to essential networks such as the Italian Blockchain Education Network.

By establishing a solid and sincere dialogue with Alessandro, I was able to continually ask him questions and explanations on things that could sound contradictory or unclear to me. Building our relationship on the basis of trust and confidence, allowed us to engage into spontaneous and open conversations that I consider as extremely enriching for this research: it is that kind of 'social proximity' (Bourdieu, 1999) between interviewers and interviewee that allowed me and Alessandro to establish a horizontal dialogue, in which we could feel free to express doubts, criticism and interrogatives to each other. This shadowing lasted for approximately eight months.

## *2.7. Interviews*

Within the context of a multi-sited ethnography, a consistent part of my work consisted on in-depth semi-structured interviews (Kallio et al. 2016). The selection of informants was intentionally heterogenous, including participants from different countries, social contexts and field of work: this cross-contextual approach has been described by Mason (2002), who highlights the benefits of a

heterogeneous set of interviewees to provide evidence of commonalities across a diverse group. Accordingly, *“the heterogeneity of sample helps provide evidence that findings are not solely the preserve of a particular group, time or place, which can help establish whether a theory developed within one particular context applies to other contexts”* (Mason, 2002, in Robinson, 2014:3). However, at the beginning of this work I engaged in a research which helped me to identify a number of existing platforms already working with blockchain applications in the social field that I wanted to contact for interviews. In this sense, a kind of homogeneity among research participants was provided by the main research question, which pushed me to pick informants who were actively participating in projects of blockchain for the social field and blockchain’s use beyond Bitcoin and cryptocurrencies. Considering also that sociotechnical imaginaries are unfolded by state actors and governments, big technology companies, influential CEOs, corporate communications, technology events, industry consultants, research groups, and grassroots activists (Mager and Katzenbach, 2021), I selected different blockchain experts as research informants. These were blockchain entrepreneurs and startappers, hacktivists and artists experimenting with blockchain technology, scholars and developers, institutional actors, blockchain “evangelists”; all individuals that in this work I call ‘blockchainers’.

The different fields of application in which informants were involved are reported in table 1: among them, we can find for instance art, social aid, green mobility, healthcare and e-governance. In one case, I interviewed an informant (I:29) who was not working with blockchain but was well-known among my informants for his critical views on the technology for the social.

To a lesser extent I also applied snowballing sampling, asking to participants to mention other possible relevant informants for my research, which resulted crucial for the research in certain contexts in which I needed to access sensible information and personal recommendations were essential to gather the participation of governmental actors, i.e. Estonia.

At the end of the fieldwork, I conducted 30 different interviews. Conversations with informants lasted on average one hour (sometimes more, sometimes slightly less), and were conducted face to face when possible. In a few cases, Skype, Telegram and Whatsapp were used in the case participants were not available for meeting me in person. Although it is always better to conduct interviews face to face, the flexibility of the research method also allowed me to include in the sample also participants from other European cities, as showed in table 1.

ID	Date	Place	Field of blockchain application	Profit/Non profit
participant 1	30/10/18	London	Green mobility	Profit
participant 2	15/11/18	London	Art	Non profit
participant 3	21/11/18	London	Social aid	Non profit
participant 4	26/11/18	Madrid (Skype)	Sharing mobility	Profit
participant 5	27/11/18	London (Skype)	NGOs	Profit
participant 6	05/12/18	London	Healthcare	Research project
participant 7	07/12/18	London	Data protection	Research project
participant 8	10/12/18	London	Education	Profit
participant 9	07/01/19	London (Skype)	Social aid	Profit
participant 10	18/02/19	Rome (Whatsapp)	Data protection	Profit
participant 11	03/04/19	Torino (Telegram)	Social aid	Profit
participant 12	11/04/19	Milan	Education	Non profit
participant 13	08/05/19	Milan	Social awareness	Youtube channel
participant 14	22/05/19	Milan	Cybersecurity	Profit
participant 15	09/09/19	Milan	Education	Non profit
participant 16	21/09/19	Tallinn	Cybersecurity	Profit
participant 17	23/09/19	Tallinn	e-Governance	Profit
participant 18	27/09/19	Tallinn	Cybersecurity	Governmental
participant 19	27/09/19	Tallinn	e-Governance	governmental
participant 20	01/10/19	Tallinn	Self-sovereign identity	Profit
participant 21	03/10/19	Tallinn (Skype)	Healthcare	Governmental
participant 22	08/10/19	Tallinn (Skype)	e-Voting	Governmental
participant 23	28/10/19	Milan	Self-sovereign Identity	Profit
participant 24	28/10/19	Vienna (Skype)	Education	research project
participant 25	30/11/19	Milan	Data ownership	Profit
participant 26	07/11/19	Ravenna (Skype)	Self-sovereign identity	Profit
participant 27	15/11/19	Milan	e-Voting, music and art	Profit
participant 28	15/11/19	Milan	e-Voting, music and art	Profit
participant 29	03/12/19	Joigny (Skype)	Education	(null)
participant 30	20/12/19	Milan (Skype)	Data ownership	Profit

Table 1. Location and field of blockchain applications of interview informants.

In three cases, I interviewed two people from the same company/startup. However, since the interviews with informants were normally conducted separately, I considered them as two separate conversations, also taking into account the importance of subjectivity in the construction of social imaginaries. Only in one out of three cases, interviewees were interviewed together and completed

each other's' answer during interview: for this specific case, therefore, I considered the conversation as a single interview.

During interviews, I followed a fixed structure which aimed at touching three main areas of discussion, but conversations also 'followed the flow' and asked more specific questions when I considered it necessary for the emergence of relevant topics. In general, interviews started with some socio-demographic break-the-ice questions, which served me to collect information on their age, status and career path, and then followed with 1) participants' work with the blockchain, 2) their evaluation of blockchain for the social sphere, and 3) their political orientation and participation. This method allowed me to listen to participants' visions to change the world, ask them about how their dreams blended with the implementation of blockchain technology and looking for recurrent patterns within their political opinions.

Personal information is reported in table 2 and 3. As showed, participants of this research were mostly young, middle class men operating in urban contexts. Most of them hold a university degree, normally in the field of computer science, engineering or business and finance. Many, in line with the 'hacker ethic', told me they grew as self-taught hackers. As a result, a majority of them work as a developer or were CEOs or business experts in tech companies and start-ups. Overall, research informants were largely male: only 6 over 30 interviewees were women (1 in Milan, 5 in London). Interestingly, only one out of the few interviewed women holds an IT background, while the others have backgrounds in the context of care, social work, or art.

Age group	Frequency	Percentage on total
20-29	8	27%
30-39	11	37%
40-49	4	13%
50-59	6	20%
60+	1	3%

Table 2. Age group of interviewees

Gender	Frequency	Percentage
F	6	20%
M	24	80%

Table 3. Gender of interviewees

All the interviews were recorded with the consent of participants, and later manually transcribed for operating the interpretative content analysis. After the transcription, I systematized and labelled my interviews into component parts according to recurrent topics. This is called selective coding (Bryman, 2012), a technique that serves at identifying core categories and key concepts to help in the interpretation of the analysis. The latter was done using analytical categories to look at data, such as participants' definitions of concepts such as decentralization, privacy, transparency and security, and their own interpretations of 'the social'.

Moreover, although all my research participants gave me their consent to record interviews for the aims of the research and were specified the nature and goals of the interview, I decided to guarantee anonymity to both participants and projects. Considering that I have engaged with individuals who mostly come from the hacker community, I acknowledge that preserving their privacy and anonymity could be necessary when writing down results. Since I was also asking for political opinions and experiences, I considered quite important limiting the risk that an employer or activist could be recognized and experience any kind of negative impacts. Furthermore, institutional actors were quite reluctant to be quoted with their names. Thus, in deciding how to face this limit ethically, I decided to apply to all my informants the same safety and anonymity. In this sense, I consider that the choice of avoiding quoting names of platforms and informants does not cause any major problem to the research.

Only in the case of shadowing, my interviewee was personally asked for consent to become the case study and being quoted in this work. This was due to practical needs for also citing sources and official documents while delving into the interpretative analysis and explaining my results.

## *2.8. Reflexivity*

For relying on a sound ethnography, reflexivity is a foundational principle that is considered as crucial across the social sciences (Maxey 1999; Darawsheh and Stanley, 2014). Ethnographers, indeed, are highly encouraged to provide a reflection on how their participation and perception might have intervened in their research findings, highlighting the importance of a critically reflexive and engaged position for the academic researcher to celebrate the discursive production of activism (Maxey 1999).

My research on blockchainers and their cultural imaginaries required a continued reflexivity on my role as a researcher, especially considering my starting point as an activist and, to some extent,

as a participant in the scene. In fact, since before the beginning of my work, I used to attend meetings and events in hacker spaces discussing the role of technology for protecting digital rights, somehow starting this research on blockchain as a member of the hacker community. In the past years, I have strived to bind my academic research with political activism, arguing that only a deep knowledge on social issues can help us to build social solutions. But while at the beginning of the PhD I was maintaining a sort of techno-optimistic view on blockchain technology, often framing hacktivist tools as a relevant response to issues arising from the datafication of society, during the development of my research I gradually observed my opinions and practices changing and taking more rational distance from my object of study.

At some point, in fact, I slowly started to feel different from my research participants: the more I was studying and reading data justice literature, the less I could share their enthusiasm for encryption and algorithms as a means to change the world. I became more and more skeptical about using technical solutions to solve social problems, and this took me to engage in a number of discussions and arguments with other hacktivists in the activist scene who could not see or share my political views. It was when I started to notice a lack of structural criticism against systematic inequalities and the almost complete absence of discourses on privilege inside the hacker community, that I experienced frustration towards assertions such as 'code is law' or 'encryption will save us'.

All these feelings and sensations brought me to analyze and fiercely challenge my own position as an activist doing research, forcing myself to make sure that the effect of my political positions would not interfere into the building of a solid and, as much as possible, objective discussion. This ultimately meant, for example, conducting several in-depth interviews with individuals who maintained a radically different political position from my own, separating research from my personal engagement, trying to always ask balanced questions and talking to my interviewees in a non-judging and horizontal way. For this reason, this research was extremely challenging but, at the same time, extremely enriching for my personal growth as a scholar and as a person.

However, being a woman interested in the hacker community has also been a limit sometimes. The prevalence of male-identifying individuals inside spaces and events that I was attending caused me certain difficulty at some points of the research. In fact, although I was conscious of my position as a women researcher, I sometimes experienced a sort of performative anxiety when I had to speak out my doubts or ask questions during reunions and events. Moreover,



in more than an interview, I received mansplaining (Bridges, 2017) regarding topics that I was investigating in the first place, e.g. decentralized governance; digital rights protection; algorithmic discrimination. However, this pushed me to reflect even more on my knowledge on the topic, forcing me to build a solid theoretical framework before starting the interpretative analysis.

Another challenge that I had to overcome was the broad use of coding language in reunions and my lack of programming skills. It took me indeed a certain amount of time to figure out how to define blockchain technology, also considering that information was quite sparse. However, the reflexivity on this problem took me to develop a critical reflection on the meaning of blockchain, as it will be explained in the following chapter. In this sense, I consider that trying to overcome this linguistic limitation definitely helped me to build an interpretative framework that allowed to expand reflections on the role of developers and their imaginaries. A sociological view on a still quite unknown territory may in fact pave the way to a more comprehensive knowledge on a topic that, so far, has been mostly discussed inside computer science literature.

Finally, in some cases, and as pointed above, I noticed that interviewees tended to answer my questions less personally and more as 'brands': this was very frequent in cases of implementations of blockchain at a governmental level, in which interviewees were less propense to express personal opinions and views and tended to bind their answers to the public discourse of the projects they were working into. In these cases, I oriented my questions towards the understanding of the reasons why the individual would feel represented and involved in projects with the blockchain and adjusted my conversations on the basis of how much the interviewee seemed eager to open up to political discussions. At the end of the day, instead of becoming frustrated by the rigidity of some participants to express their personal opinions and views, I used these conversations to propose a broader reflection on the status of political imaginaries among young developers.

## *2.9. Conclusion*

The ethnography that I conducted within the blockchain scene provides relevant insights for the understanding of cultural imaginaries among developers and hackers. As I have explored in this chapter, the use of a reflexive, multisited ethnography opens up for a greater access to individuals in the community and their discourses. Traditional ethnographical methods, mixed with digital methods, represented the core design for the analysis of this research. These methodologies ultimately allowed me to collect data and articulate an intellectual production on blockchain

imaginaries based of my observations and studies. In the following chapters I proceed to illustrate how my methods were useful to bring to light common patterns and contradictions within the blockchain discourse for the social field.

### 3. Blockchain as a floating signifier

*“To me is not quite clear what blockchain is.  
Everybody seems to think different when using the word.  
Maybe I should ask you what you think a blockchain is?”*  
(A cryptographer from Tallinn)

#### 3.1. Introduction

“Blockchain” has become a global buzzword. Not only is it a recurrent word used in hacker and tech contexts, but also political institutions, digital platforms and financial actors are increasingly becoming interested in the potentiality of this technology. To explore the social significance of blockchain, it is necessary to define what ‘blockchain for the social’ means to those who create and use it, and which definitions of the same technology circulate in the scene. However, despite a growing interest in distributed ledger technologies, there is still a lack of universal agreement on important definitions such as which kind of features define a blockchain, and what does it mean to introduce it in societal contexts. The discourse on blockchain technology reveals certain interpretative flexibility (Pinch and Bijker, 1984), in which the technical features frequently overlap with more conceptual definitions of the potential of this technology and there is still no homogeneous interpretation of its social significance.

This chapter explores the heterogeneity of definitions that surround blockchain technology, analyzing the consequent diversity of political meanings attached to it: in fact, one of the most striking results of my research was precisely that it is often complicated to draw a line to delimit the concept of blockchain technology in social contexts and thus blockchain can be seen as a floating signifier (Laclau, 2005; 2014). As I will discuss in the next paragraphs, when asked to dig deeper into definitions, interviewees showed different approaches which can be ascribed to different political ideologies.

The intrinsic fuzziness of the word ‘blockchain’ is what makes it a floating signifier with interesting implications for the analysis of the social imaginaries that surround it, because this definition ambiguity plays a role in the construction of blockchain imaginaries. In the next paragraphs, I discuss the results of my ethnography in relation to blockchain definitions and argue that the concept of blockchain works as a container of multiple imaginaries that are often contradictory. To show this, I analyze blockchain as a floating signifier using three antagonistic categories in which blockchain becomes a contested object in economic, technological and social dimensions. This effort

is the starting point to unpack further blockchain narratives and understand the tight relation between meanings, interpretations and discourses in building social imaginary.

### 3.2. *The meaning of blockchain*

After the arrival of Bitcoin, blockchain has gradually acquired a certain visibility and has been claimed to be capable of bringing groundbreaking changes to a number of social sectors. Only in 2016, more than 26.000 blockchain projects were launched (Trujillo et al., 2017) and, according to a report redacted by Stanford (see Galen et al., 2017), a steady surge in new projects, organizations, and platforms oriented toward the use of blockchain technology began in 2013 and has grown at an accelerating pace. This has pushed international institutions such as the European Union to launch initiatives like the EU Blockchain Observatory and Forum (Courcelas, Lyons and Timsit 2020), and include the discourse on its potentiality as relevant for the purposes of the union. Because of this increased attention in blockchain technology, it is important to understand better what a blockchain is, where it comes from and which kind of imaginaries does it conceal.

In the original whitepaper, Nakamoto (2008) firstly called the technological peer-to-peer infrastructure lying behind Bitcoin a 'blockchain'. As already mentioned, blockchain was defined as a permanent, distributed digital ledger, visible and verifiable to everyone, and opposed to centrally managed ledgers such as those of banks and states. In this sense, and to underlie its features, the definition of blockchain often overlaps with the term 'distributed ledger technology' (DLT).

But while I was doing research on blockchain significance and trying to make sense of its promises, I often noticed a quick jump that mixed the technical definitions with more conceptual, and ideological, ones. The distinction between these two dimensions was made clear by Drescher (2017) while describing blockchain technology in his book 'Blockchain basics: a non-technical introduction in 25 steps': *"On an operational level, information about verified transactions are recorded and stored on blocks of data then "chained" together by an identifier and distributed across a network of computers. The identifier, produced by an algorithm, frequently an alphanumeric string of characters, which is inserted sequentially in the blocks. Using the identifier to link (or "chain") the blocks together was designed to detect changes, and distributing records provides copies that would make it hard for an individual or institution to take command of content by, for example, deleting copies. On a conceptual level, the term is also used to describe a data structure as an algorithm, a suite of technologies that can be configured in multiple ways, and as an umbrella term for a*

*distributed system*” (Drescher, 2017:33). Starting from here, we could already see how in the explanation of what a blockchain is, the algorithmic imaginary around its affordances frequently overlaps with more conceptual definitions of the potential of this technology.

As already noted by Woodall and Ringel (2019) while analyzing several documents and articles on blockchain projects, this might be due to the fact that the production of discourses on blockchain mostly come from engineers and technicians who are deciding “which problems are relevant to their target audiences and thereby defining what meanings to attach to blockchain” (2019:3) and try to introduce blockchain to journalists, institutions and civil society. In this sense, the discourse reveals the interpretative flexibility (Pinch and Bijker, 1984) of blockchain technology, which was originally presented as a financial solution and is now being introduced to different sectors according to new interpretations. Since on the conceptual level the definition boundaries are quite blurred, it is not always easy to make sense of the extent to which blockchain can work as a social application and how much it is separable from the world of cryptocurrencies.

At the same time, not even technical definitions of the blockchain have formulated a generally accepted definition of the architecture of a blockchain technology. Although it is generally agreed that blockchain relies on a distributed architecture, there are still differences in the shape this architecture can take. The distinction between permissionless (public) and permissioned (private) blockchains was made by Tapscott and Tapscott (2016), arguing that both architectures can be considered blockchains. While permissionless blockchains are open to anyone to participate and individuals are fully autonomous and can act on their own to send and receive information, permissioned blockchains are instead centralized, have administrators that control permissions of adding/modifying data and make it possible to keep parts of the data transparent to some nodes while keeping the rest hidden. To exemplify this distinction: the most popular blockchain, Bitcoin, is a public blockchain, whereas Ethereum is the most known example of private blockchain.

However, since Blockchain was originally described as a DLT, other authors like Drescher (2017) argue that blockchain is only related to distributed digital architectures and it serves to achieve and maintain integrity in distributed systems. Drescher (2017) makes a distinction between centralized and distributed systems in architectural approaches for software systems, where the two models can be seen as antipodes. Briefly, the difference is that in centralized software systems, there is one central component, and all the other components are connected and located around it. In contrast, the components of distributed systems can be visualized as a network of connected components that ‘do not have a central element of coordination or control’ (Drescher, 2017:11).

Moreover, Drescher argues that peer-to-peer networks are a special kind of distributed systems, which consist of nodes (individual computers) that are directly available to all the other members of the community and no central node of control exists. In words of the author: “the nodes in the network are equal concerning their rights and roles in the system. Furthermore, all of them are both suppliers and consumers of resources”.

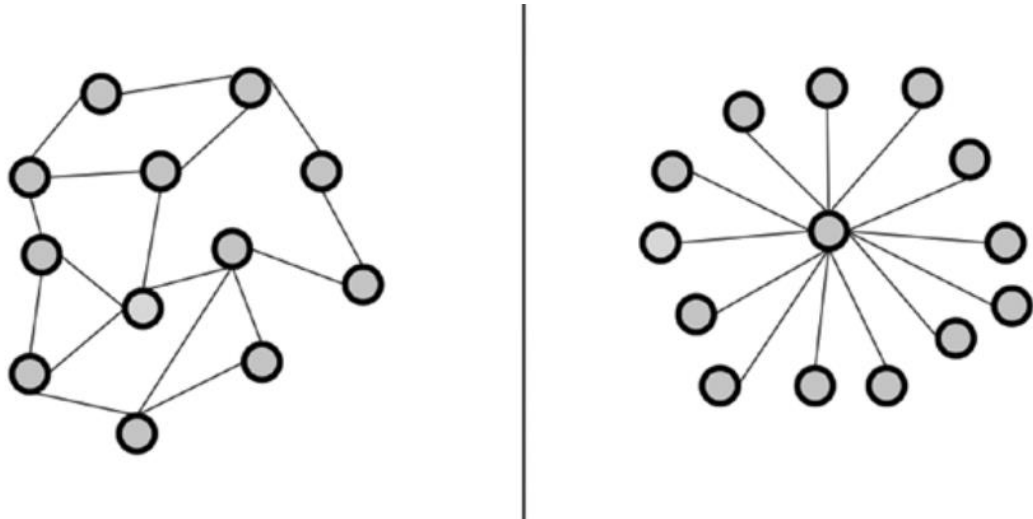


Figure 3. Drescher's distinction of distributed vs centralized system architecture (2017:11)

However, there exist also hybrid systems that mix the features of distributed and centralized systems, as represented by Drescher in figure 2. Such systems might appear centralized at first glance, but the central component actually contains a distributed system at its inside. The components in the periphery may not even be aware of the distributed system that lives within the central component. Examples of hybrid blockchains can be found in cryptocurrencies, such as Ripple or XRP, which try to mix like the speed of private blockchains combined with the security of public blockchains.

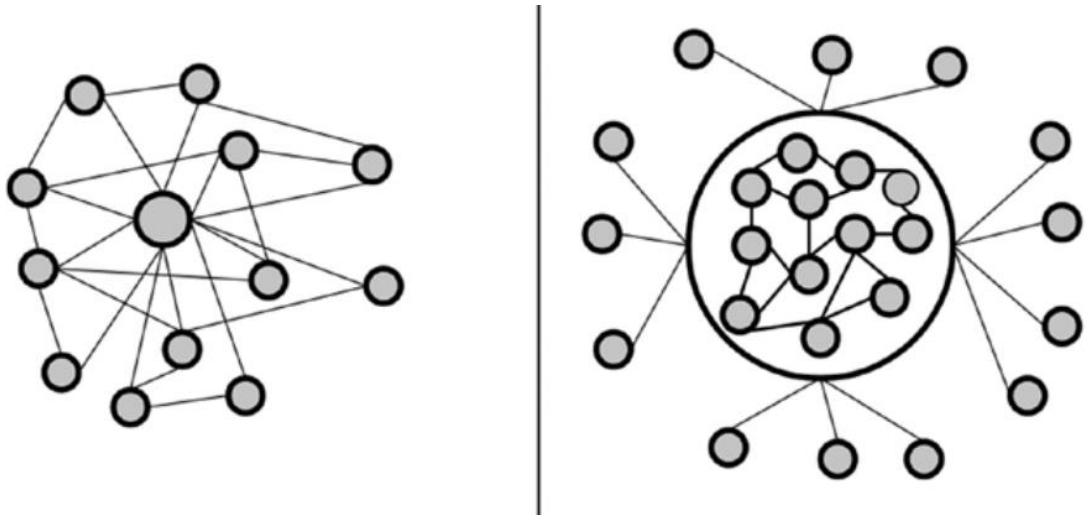


Figure 4. Drescher's explanation of hybrid systems (2017:15)

As I will explore in the next paragraphs, the unclear distinction between centralized, distributed and hybrid systems as applied to the blockchain opens up to different interpretations of its nature and its purposes. According to Bory (2020), sociotechnical imaginaries are often characterized by a conceptual shift from a technical object to an ideological reference that may suggest certain models for the organization of societies; in this sense, the ways in which blockchain is imagined, defined and conceived from its users and designers can take different political shapes and interpretations that require more attention. In line with the understanding of sociotechnical imaginaries as multiple and contested, blockchain presents an interpretative flexibility and moves across very different political projects. For this reason, I argue that blockchain works as a floating signifier.

### *3.3. Floating signifiers and the blockchain*

Discussing imaginary as 'social' serves to emphasize societal discourses of the individual as a methodological device (Mountian, 2009), but also to acknowledge that the individual and the society cannot be separated. In this sense, the concept of 'imaginary' is also at the core of the Lacanian psychoanalytic theory, which refers to the imaginary as a fantasy in which the subject constructs an "ideal-ego" out of social symbols, norms and expectations (Lacan, 1956). For Lacan, a proper comprehension of the structure of a personality requires taking into account both the imaginary and the dimensions of the 'symbolic' and the 'real'. The imaginary realm, in fact, is constructed by the symbolic, as well as the signifier (basic units of language, related to structure, words, sounds, images)

is always related to the symbolic. In this regard, to understand how blockchain imaginary is constructed and rooted in discourse, we shall start from the existence of blockchain as a signifier.

In semiotics, there has been a long debate on the relationship between the signifier and the signified. Saussure (1979) firstly defined a linguistic sign as composed of a *signifiant* – the shape – and a *signifié* – the concept that the sign represents. The combination of the signifier and the signified, according to Saussure, creates a sign, which is “a recognizable combination of a signifier with a special meaning” (Moraes, 2014). According to semioticians who adhere to Saussure’s theories, signs do not have an intrinsic nature: on the contrary, the relationship between signifier and signified is somehow arbitrary and signs mostly refer to one another. Put more simply, this conceptualization points to the idea that no sign makes sense on its own, but only in relation to other signs (Moraes, 2014). This perspective has seen the growth of postmodern theories, in which the signifier and the signified appear as disconnected to each other and signs do not need to be attached to any particular signified (see also Lacan, Barthes and Derrida works). From this debate, it emerged the concept of ‘floating signifier’, which was firstly discussed in the work of Lévi-Strauss, who defined it as a “symbol in its pure state” (Lévi-Strauss 1968:63) and saw a more recent development with the work of Laclau (1996; 2005).

Laclau, together with Mouffe (2014), elaborated the concept for the analysis of politics and ideology by integrating Foucauldian discourse and Gramscian hegemony (Howarth 2015:195). For Laclau, there are in fact two types of particular signifiers: empty signifiers and floating signifiers. In order to grasp one, it is necessary to know and understand the other.

Laclau’s (1996) definition of an empty signifier is a “signifier without a signified”, referring to a linguistic concept that does not correspond to a precise object. Laclau followed the lacanian psychoanalytical tradition on the impossibility of representing the real (Lacan; 1956). In this sense, empty signifiers are not grounded neither on reality nor at a specific signified; rather, they are characterized by a lack of stable meaning, or in other words, a lack of ‘constant’/solid meaning (Laclau, 2005). Therefore, the content of empty signifiers is always dependent upon the outcome of a continuous struggle of various alternative representations that compete over them and try to hegemonize by being the ones that give them meaning. The ones that will be able to fill the empty signifiers with meaning are going to dominate. (Laclau and Mouffe, 2014).

Notions like “solidarity”, “democracy” or “Europe”, for instance, cannot have clear conceptual definitions and are open to contestation and articulation in radically different political projects. For this reason, an empty signifier, as an indeterminate sign, may even contain contradictory instances,



and in many ways deeply opposing political projects as a means of constructing political identities, conflicts and antagonisms. In his book 'On populist reason', Laclau (2005) explores the ideology of populism and argues that it represents an example of an empty signifier, where the hegemony is given by the appropriation of the significance of "people" by certain social groups. These groups can easily stand on very opposite ideological sides (e.g., far right populism vs leftist populism) because populism does not have a precise content. In this regard, an empty signifier is one that tries to break its relationship with any meaning in order to represent a heterogeneous field.

A floating signifier is slightly different from an empty signifier. A floating signifier can link up with different projects and move between them, as well as it can be connected to different contexts and discourses. For this reason, it is considered 'floating' and not just 'empty': because a floating signifier fluctuates between different forms of articulation in different projects. Such signifiers may in fact mean different things to different people depending on whatever their interpreters want them to mean. This concept denotes situations in which *"the same democratic demands receive the structural pressure of rival hegemonic projects"* (Laclau, 2005).

In being simultaneously articulated within two (or more) opposing discourses, in fact, a floating signifier can also be positioned within different signifying systems of conflicting political project. If the signifier's meaning later appears stable or fixed, this will be the result of one particular discourse's ability to successfully hegemonize the social, in other words winning the struggle against other discourses and repressing other forms of meaning (Laclau, 2005). According to Laclau, floating signifiers tend to emerge in times of organic crises and historical periods in which the "underlying symbolic systems are radically challenged and eventually recast" (2005:132). The concept is used to describe a precise historical conjuncture in which a particular signifier (caught in-between several opposing, antagonistic, hegemonic projects) is used as part of a battle to impose a certain viewpoint onto the world. The two concepts, floating and empty, often overlap, because it is difficult to have a signifier *"that is so precisely linked to a meaning that the emptiness fully disappears, as well it is complicated to find a signifier that is so empty that no reference is included in it"* (Moraes, 2014:30). In fact, the categories floating and empty constantly cross each other, but analytically it is still important to distinguish between them.

For Laclau, discourse is the primary ground of constructing objectivity, thus hegemony plays a crucial role in determining objectivity, which is based on universalistic claims attached to particularities (Szkudlarek, 2007), and which in turn demand the work of floating signifiers.

Essentially, under floating signifiers, a chain of signifiers takes a specific meaning and enable the creation of a 'stable' political field (Laclau, 2005).

The lack of universal objectivity in defining what a blockchain is makes it a peculiar case of floating signifier. Blockchain is a floating signifier because it is used by different positions with different means of hegemony: it becomes a signifier stuck in-between different hegemonic projects seeking to provide an image of how society is and how it should be structured. In fact, when blockchain technology is defined, its technical features become linked to a chain of other floating signifiers like decentralization, horizontality, openness, infrastructure, etc., typical of networks imaginary (see Bory, 2020). These concepts are themselves floating signifiers because they are broad, complex concepts, that are framed differently according to subjectivities and ideologies. They are terms of political contest for being embedded in technical practice.

To understand how all this relates to the construction of social imaginaries on blockchain, in the next paragraphs, I will show how the word is used as a floating signifier by experts and developers, delving into blockchain interpretations. The peculiarity of blockchain discourse is that it draws on different meanings to shape the way in which technology is introduced and understood and promote it among communities that might otherwise associate it only with cryptocurrencies. This happens "through the encoding of shared meanings, ideas, values, institutions, sensibilities, as well as social anxieties that are then translated into the discourse" (Woodall and Ringel, 2019). Since studying social imaginaries means making the performativity of discourse evident (Mountian, 2009), it is important to delve into blockchain definitions through the idea of signifiers and look better at their relationship with the construction of hegemonic power.

### *3.4. Mapping blockchain narratives on Twitter*

Having outlined a theoretical basis, this section analyses how blockchain is understood and discussed in online environments. To provide a first overview of the complexity of blockchain imaginary, at the beginning of my fieldwork (October 2018), I undertook an analysis on blockchain conversations on Twitter (see the methodological chapter for a more detailed explanation of how I used digital methods). Twitter is indeed an interesting digital environment to observe complexities and contradictions surrounding blockchain technology, because it allows to analyze a big number of conversations and discourses among different publics. Since I was interested in looking for a deeper understanding of blockchain in the social realm, I needed to enter the digital scene and look for

meanings by relying on participants' discourses. To do so, I looked at both conversations and actors, trying to make sense of *who* said *what* about blockchain on Twitter.

The goal of this analysis was precisely grasping the, sometimes contradictory, fuzziness that is present in blockchain imaginaries, thus the networks visualizations that I include in the discussion are useful to get an overall picture of the difficulties that I found at the beginning of my research in defining blockchain. This is especially true regarding the need to set boundaries to grasp the meaning of blockchain in the social dimension and as distinguished from the financial sector.

This fragmentation can be seen through the first network that I present, which is a co-hashtag semantic network (Caliandro and Gandini, 2016) that shows a first overall picture of discourses on #blockchain. The network has 292 nodes and 21343 edges. Colors indicate the modularity class of the tags (meaning the connection between nodes that create the clusters), whereas the dimension of each node is given by its degree centrality (meaning the number of connections or edges the node has to other nodes) (for further details, see Caliandro and Gandini, 2016). As showed in the networks' visualizations, two prevalent semantic dimensions exist on Twitter when users discuss blockchain technology:

1- a first dimension (*figure 3*) collects tweets that are more related to cryptocurrencies and Bitcoin (#cryptocurrencies #bitcoin, #ethereum, #ico #token #satoshi) and the cryptocommunity (#crypto #cryptolife #cryptonews). Several tags are associated to different types of cryptocurrencies (#monero #ripple #alcoin). In this cluster, also the tags #finance #investors #entrepreneur #money #trading emerge as relevant, showing a quite immediate association between the imaginary of the cryptocommunity and the world of finance. Finally, some geographical areas also appear: #China #India #Dubai #Malta. These areas are related to big blockchain conferences done in October 2018 (Malta and Dubai) or mining areas (China and India).









latter cluster contains different relevant tags that may become useful concepts to analyze different meanings of blockchain in societal contexts, for example decentralization, privacy, or references to the public social sphere (e.g., education/health). In this regard, these emerging categories are useful for the rest of the analysis, because they anticipate a floating essence of blockchain in the social sphere and a set of blurred interpretations regarding the affordances of this technology.

A second network analysis was operated looking at influential actors who discuss #blockchain on Twitter to delve deeper in the discourses. In this case, the network had 296 nodes and 1582 edges. Color is for modularity, while the node dimension is given by the degree centrality and corresponds to the number of mentions that users received from other actors in the scene. As showed in figure 7, the network contains different clusters which are associated with different kind of influential users. Not only can we spot, in fact, traditionally defined ‘influencers’ and micro-celebrities (Abidin, 2016; Bainotti, 2020) (red and blue cluster), but also independent news platforms (orange cluster) and blockchain pages (purple cluster).

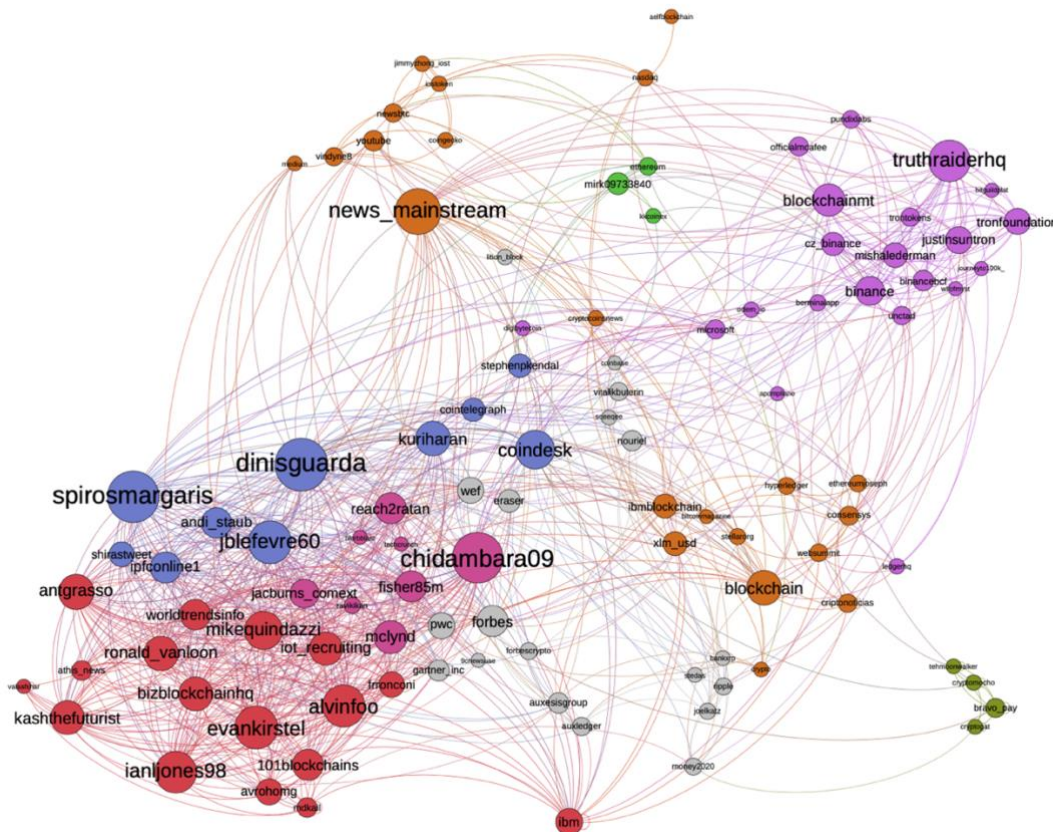


Figure 9. Blockchain ‘influencers’ network

In order to get more sense of who were these actors discussing blockchain, I selected a sample of the top influential 10 of the network and looked at their self-presentation as a methodological tool

(Caliandro and Gandini, 2016) which are resumed in table 4. In the table, I report users' bios, the number of followers and the categorization as an influential actor.

Looking inside the profiles of users, I could notice that generally they discussed blockchain affordances with a positive tone, in a sort of 'evangelism' of the technology. More specifically, influencers and micro-celebrities often promote blockchain affordances using tactics of self-branding and marketing for their own companies, whereas news platforms and dedicated blockchain pages are more oriented towards the dissemination of articles on cryptocurrencies, and particularly, Bitcoin. In the case of the bot account that I spotted, it was mainly used to retweet tweets containing #blockchain often as applied to the financial sector.



User	Bio	Number of followers	Category
@dinisguarda	CEOFounderAuthor <a href="#">@ztudium</a> <a href="#">@citiesabc</a> <a href="#">@intelligenthq</a> <a href="#">@blocksdna</a> <a href="#">@fashionabc</a> <a href="#">@HedgeThink</a> <a href="#">@tradersdna</a> <a href="#">@openbusinesshq</a> <a href="#">@techabc</a> <a href="#">#tech</a> <a href="#">#blockchain</a> <a href="#">#Fintech</a> <a href="#">#AI</a>	41k	Influencer
@chidambara09	Be happy Be healthy Be smile Be cool Be good human	7k	Bot
@spirosmargaris 	<a href="#">#VC</a> <a href="#">#Futurist</a>   <a href="#">@wefoxHQ</a> <a href="#">@SparkLabsGlobal</a> <a href="#">@ai_mediastalker</a> <a href="#">@yieldgrowth</a> <a href="#">@F10_accelerator</a>   No.1 <a href="#">#Fintech</a> Influencer <a href="#">@Analytica</a> <a href="#">#AI</a>   TEDx	100k	Influencer
@news_mainstream	"Mainstream crypto news"	6k	News
@jblefevre60	Consultant <a href="#">@MerkutioCom</a> Influencer Growth-Hacker Socialmedia lover! No1 <a href="#">#Insurtech</a> <a href="#">#fintech</a> <a href="#">#AI</a> <a href="#">#ML</a> <a href="#">#EmergingTechnologies</a> <a href="#">#5G</a> by <a href="#">@Analytica</a> <a href="#">#AR</a> KOL <a href="#">@Huawei</a> "	75k	Influencer
@evankirstel	B2B <a href="#">#Social</a> <a href="#">#Influencer</a> helping <a href="#">#Tech</a> clients w <a href="#">#SocialMedia</a> <a href="#">#Marketing</a> <a href="#">@evirahealth</a> <a href="#">#Telehealth</a> <a href="#">#Telecom</a> <a href="#">#5G</a> & ChiefDigitalOfficer at <a href="http://NYDLA.ORG">http://NYDLA.ORG</a>	290k	Influencer
@alvinfoo	" <a href="#">#Artificialintelligence</a>   <a href="#">#DigitalTransformation</a>   <a href="#">#FutureofWork</a>   <a href="#">#Marketing</a>   <a href="#">#ElectricVehicle</a>   <a href="#">#Tesla</a> "	55k	Influencer
@truthraiderhq	<a href="#">#bitcoin</a> . Surviving the economic collapse. Great American bitcoiner.	80k	Page
@ianljones98	Company Director, publisher, producer & content curator. Ageing sportsman; the older you get the better you were! People, Innovation & HealthTech	13k	Influencer
@coindesk 	Welcome to the conversation on the future of money and Web 3.0.	880k	News

Table 4. Influencers' bio and category



The final part of the Twitter analysis consisted in looking at a random sample of tweets to examine blockchain discourses more qualitatively. For the sake of discussion, I include a mini-sample of 15 tweets which have been selected looking at the most influential profiles (i.e. with highest number of followers) and may serve to orient the rest of the analysis on blockchain imaginaries.

As showed in table 5, the majority of blockchain discourses on Twitter concern finance and cryptocurrencies, making it still the most relevant field of discussion of the technology. Blockchain is discussed in its 'social' dimension as applied to cybersecurity, as a means for decentralization, or in the context of smart contracts. Blockchain affordances are also discussed as potentially disruptive and as 'solutions', but always theoretically and not through practical cases:

User	Tweet	Location	Topic
Teokanistras	#Blockchain Investor Vinny Lingham: 'Bitcoin Threatens Gov'ts' Ability to Make Money' <a href="https://t.co/w8Q0hLhFzp">https://t.co/w8Q0hLhFzp</a>	Athens, Greece	Cryptocurrencies
ENTORNOi	IBM da acceso a estudiantes de América Latina a información sobre #AI Cloud y #Blockchain <a href="https://t.co/MKqZiTgfss">https://t.co/MKqZiTgfss</a> <a href="https://t.co/ktHQd6wcWP">https://t.co/ktHQd6wcWP</a>	Venezuela	Finance
adnagam	Innovative Blockchain Project for Young Football Talents: Interview with Tomasz Krzystek, CEO of Bitcademy <a href="https://t.co/WfPsoOzVI6">https://t.co/WfPsoOzVI6</a> #Blockchain #Cryptocurrency #Sports #Football @TechBullion	San Diego, CA	Cryptocurrencies
LaPublicacion	▲ #Blockchain es la solución a los problemas de identificación y ciberseguridad... <a href="https://t.co/a0H5nSHi8I">https://t.co/a0H5nSHi8I</a>	Comunidad de Madrid, España	Cybersecurity
ReporteActivo	◆ Blockchain, de la red de la información a la red del valor <a href="https://t.co/0R4O9yVxzw">https://t.co/0R4O9yVxzw</a>	Comunidad de Madrid, España	Decentralization
likha2_	RT @CryptoRiyal: CryptoRiyal is about to launch the first ICO campaign, giving a chance to those interested to support the development and success of the megacity of Neom. #cryptoriyal #blockchain Join us: <a href="https://t.co/ZqV7SCqKnx">https://t.co/ZqV7SCqKnx</a> <a href="https://t.co/bF970EheRv">https://t.co/bF970EheRv</a>	لا اقبل المقدم	Cryptocurrencies, ICO
devnullius	HTC's New Blockchain Phone Can Only Be Bought with Crypto <a href="https://t.co/gHgH8xrwFn">https://t.co/gHgH8xrwFn</a>	Altcoinworld	Cryptocurrencies
TheBitcoinNews	How IOTA Might Create Smart Contracts to Crowd-fund Projects on the Tangle - <a href="https://t.co/jQPoMQugdv">https://t.co/jQPoMQugdv</a> #bitcoin #btc #bitcoinnews #cryptocurrency #blockchain #cryptocurrencynews <a href="https://t.co/3MRuX1tT3y">https://t.co/3MRuX1tT3y</a>	The Internet	Smart contracts
machinelearnflx	RT @MikeQuindazzi: 3 disruptive #fintech solutions in 2018 >>> @juniperresearch	CA Toronto, Ontario	Disruption

	via @MikeQuindazzi >>> #AI #DataScience #DataMining #QuantumComputing #Blockchain #Apps #IoT #DataAnalytics #GDPR >>> <a href="https://t.co/IKLl75j1W4">https://t.co/IKLl75j1W4</a> <a href="https://t.co/YxBpCBMc0w">https://t.co/YxBpCBMc0w</a>		
SunnyHoi	Dell Boomi Reimagines iPaaS with Industry-Leading Intelligence, #Blockchain Capabilities <a href="https://t.co/WsGm2jOAt6">https://t.co/WsGm2jOAt6</a> <a href="https://t.co/yp4h2IAvKP">https://t.co/yp4h2IAvKP</a>	Matter Doesn't Matter	Disruption
bitcoinagle	GM's self-driving car reportedly has trouble recognizing pedestrians #blockchain #news #top #autonomous #autonomousdriving #AutonomousVehicles #cruise #delays #gadgetry #gadgets #gear #generalmotors #GM #green #honda #safety #SelfDrivingCar #setback <a href="https://t.co/7qvlhohR2u">https://t.co/7qvlhohR2u</a>	Washington, DC	AI
ConstructionMag	Utilizing blockchain-powered smart #contracts, the #construction industry has the ability to transform projects from a document-centered approach that impairs visibility and speed to a data-centered approach that's visible to all stakeholders in real time. <a href="https://t.co/BW92VDhIS9">https://t.co/BW92VDhIS9</a>	Caracas	Smart contracta
konzapata	RT @alnaviocom: España puede aumentar 3,2% el PIB si sus pymes pisan el acelerador de la digitalización <a href="https://t.co/5mf1Np7Sw0">https://t.co/5mf1Np7Sw0</a> @Telefonica #BigData #Blockchain #Pymes #Madrid #España	Paris, France	Finance
jblefevre60	RT @jblefevre60: Gartner's Top Predictions For 2018 and Beyond ! #CyberSecurity #IoT #ArtificialIntelligence #AI #ML #Mobile #blockchain #innovation #disruption #fintech #infosec #Security #computervision [@Gartner_inc] MT @Fisher85M <a href="https://t.co/tOyDI7wgRT">https://t.co/tOyDI7wgRT</a>	AZ, CA, NJ, TX	Disruption
dinisguarda	RT @TheKeybox: Head of Portfolio Management @RotheBosse from @ProtosFund talks about their tokenised Hedge Fund and ML approach in advisory. @ztudium @dinisguarda @Ericvanderkleij @davidwhite_ai @michaeldacosta @NicolaHorlick @GroteErik #blockchain #ai #ml @Privus_ #meetupwithkeybox <a href="https://t.co/5x5iMD0vYn">https://t.co/5x5iMD0vYn</a>	London / World	Self-branding

Table 5. Random sample of tweets

While the whole Twitter analysis reveals certain homogeneity in imagining blockchain as a disruptive and positive tool, there is a lack of specific definitions on its potential for the social. Drawing from this first analysis, cryptocurrencies and applications in the financial sector remain prominent in the online discourse on blockchain.

Generally speaking, those who participate in the blockchain scene in Twitter seem overall interested in attracting new public around the topic, both to promote the use of blockchain and their visibility. To do so, they operate within different interpretations of the same technology without necessarily seeking a common agreement on meanings. In this sense, the blockchain scene on Twitter seem to mirror the fuzziness and fragmentation that exists around blockchain definitions, with certain implications for political discourses that could be attached to the technology imaginary.

### *3.5. Blockchain antagonisms*

In order to understand further the ways in which blockchain becomes a contested social object, the next section presents the research participants' views and concurrent discourses in which "blockchain" has been mobilized as a signifier for supporting particular political agendas.

At the start of my research on blockchain, I got intrigued by the fact that the absence of a universal definition allowed individuals to build their own interpretations according to their personal aspirations, hopes and interests. Many participants, for example, mentioned that they approached blockchain technology with suspicion and fearing that it was 'a scam', but later on they understood what a 'real' blockchain is and became enthusiastic about it. All this was intriguing because participants always provided their subjective conceptualization of the meaning of this technology, often relating it with personal experiences and desired future work path.

Whether that was in an institutional, hacktivist or business environment, I was frequently told to be aware of the hype that surrounds blockchain technology and make sure I also created my own definition of blockchain and decided how to relate it to the social sector, as this conversation with an Estonian informant exemplifies:

*"You really have to define what a blockchain is. Maybe you have noticed, Silvia, that there are several groups researching on blockchain that are not confident about the correct final definition. So, it's important that you make your own definition. And if your research is more about social impacts of the blockchain, then you can always say that you looked at a certain impact or influence of the blockchain from a certain aspect."*

(informant 22)

On another note, I would like to highlight that while I was expecting to detect certain differences in blockchain definitions/interpretations that could reflect specific sociocultural context, I found that differences were emerging more by looking at areas of experimentation with the blockchain (e.g., participants who are active in the civic, institutional and political sector vs participants active in the business domain), rather than by comparing local contexts.

Pushed by the necessity to deepen my understanding on contradictory definitions of the same object, I have spotted three different dimensions in which blockchain is articulated, which contain some antagonistic interpretations of its social significance:

- Blockchain becoming a contested *technical* object in discussions regarding distributed ledger technology affordances.
- Blockchain becoming a contested *social* object in conversations about privacy and control on the Internet.
- Blockchain becoming a contested *financial* object in discussions to decide whether blockchain can be considered a technology 'for the social' beyond Bitcoin, or rather as a pure financial object.

As this part of the analysis specifically focuses on blockchain as part of political discourses and antagonisms, ethnographical data will help to delineate the main contradictions in blockchain imaginaries and denote it as a floating signifier.

### 3.6. A contested technical object

As addressed in the first paragraph of this chapter, blockchain is often described as a distributed ledger technology, and most literature regarding blockchain highlights that its main characteristic is that it relies on a distributed open ledger. Since the conceptual interpretation of a distributed architecture is strongly connected with the idea of decentralization, the increasing interest in the use of distributed ledger technologies such as the blockchain needs to be understood in contrast with the high concentration of user interactions and data at the internet's application layer, such as on search engines, social networks and content platforms (Internet Society, 2014). This position was enunciated in a description of permissionless blockchain by Al-Saqafa and Seidler (2017) while discussing blockchain for social impact:

*“In a permissionless blockchain ecosystem, code is written in a way that does not favour certain individuals or groups over others. Permissionless blockchains typically rely on open-source code that does not differentiate between users based on social status, ethnicity or any other non-technical characteristics. They do not give particular nodes special privileges or impose conditions before verifying and executing transactions. This neutrality ensures that all are treated equally and are not abused by a central or more powerful element”*

(2017:6)

In practices and discourses, blockchain exists as public, as private and as ‘hybrid’. During my fieldwork, however, participants mostly distinguished between public and private, and I did not find any practical examples of hybrid blockchains beyond cryptocurrencies applications. Therefore, for the sake of the analysis, I will only compare conversations on public and private blockchains and discuss how the interpretations on the purposes of this technology highlight differences in the conceptualization of the meaning of decentralization.

Considering that blockchain technology arose from the cryptocommunity and the crypto-anarchist ideology, it is interesting to start by looking at motivations and ways in which governmental institutions, such as Estonia, decided to incorporate a distributed architecture to their digital infrastructure. According to official sources (see E-Estonia.com), blockchain is used for two main implementations in e-governance: the first, Digital Identity (ID) and the second, X-Road, which is an open-source data exchange layer solution that enables organizations to exchange information over the Internet (Kalvet, 2012). The blockchain infrastructure for the Estonian government has been entirely built by a private software company.

While conducting conversations and interviews with this company, I asked them to define the kind of blockchain they implemented and helping me to make sense of the reason why they chose this technology for the Estonian government. Although the explanation was highly technical and sometimes kind of difficult to be entirely grasped for a non-computer scientist (figure 10), they made immediately clear that the whole e-Estonia system relies on a private blockchain:

*“We don’t use a public blockchain, because we still control who are those that send us data. We rely on a centralized, controlled system, also called a private, permissioned blockchain”*

(Informant 20)

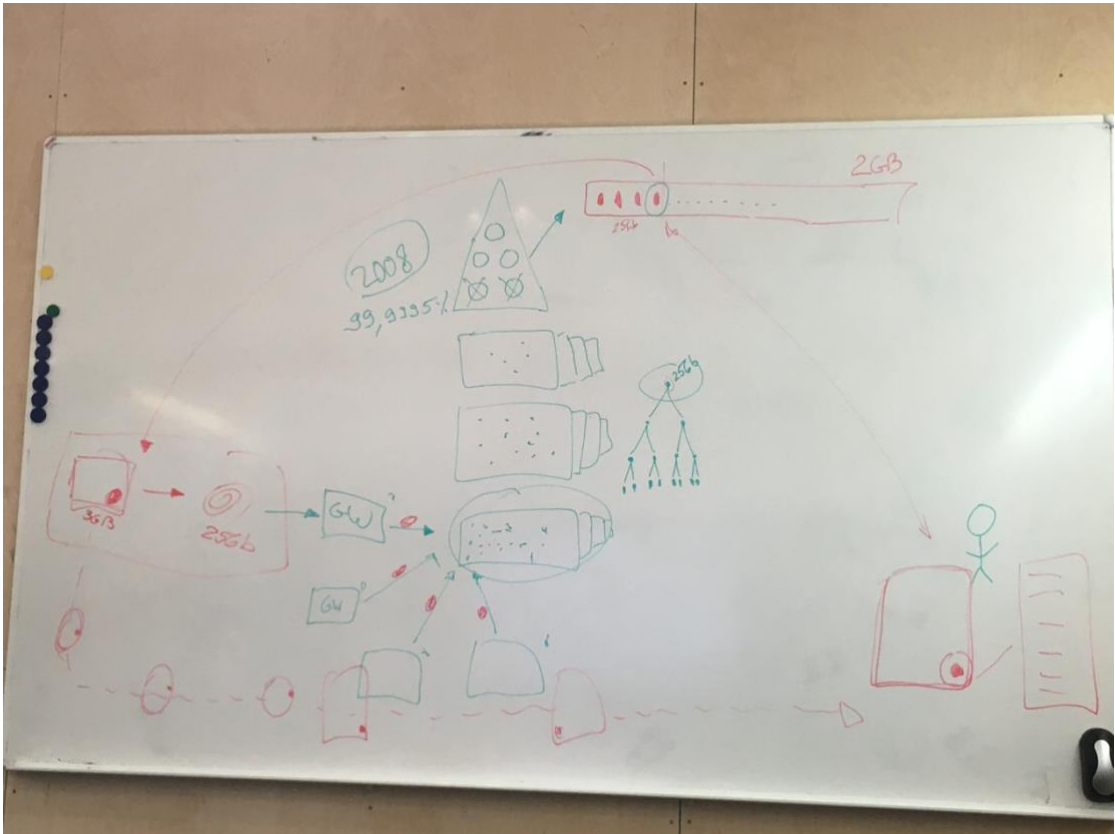


Figure 10. An Estonian informant explaining me how e-Estonia Blockchain works. (Tallinn, September 2019)

The way in which blockchain is being used in Estonia, was also explained to me by an informant working in the Estonian Ministry of Economic Affairs and Communications during an informal lunch in Tallinn:

*“To get straight to the point of how we are actually using the blockchain in Estonia, we do not actually store citizens data or our identities in blockchain. We only store fingerprints. This means that if my fingerprint is stored in blockchain, and my fingerprint changes for whatever reason, we can always validate if my fingerprint is the same. And the same is with data. If you generate the hash of a document and put this hash in blockchain, then you just access that and not the data that are in the document. But you can always use the same formula to calculate the hash of your document and compare it against the one in blockchain. Then you can be sure that your document hasn’t been tampered without you knowing. This is basically how we have been using blockchain: to assure data integrity without storing the actual government data itself in blockchain. And this is what has been data by a company called XXX, and they are using a KSI blockchain.”*

(Informant 18)

The motivations presented for using a private blockchain regard the fact that it is faster and more efficient, since the network is managed by a handful of trusted nodes that maintain 'fairness' and 'remain unbiased'. The sense of this position was also explained to me by an interviewee who was developing a set of blockchain social applications in Milan which only relied on private blockchains:

*"Everybody seems to think that a private blockchain means that nobody will see it. It's not like that: it's still public, but you just have more rules to access it. The fundamental difference between permissioned and permissionless is that the first there is an authority, or a group of people who have an authority, whereas in the other there is not. It's all about having a certification authority that guarantees the real identity of people and companies that participate in the chain. I personally find myself more at ease with a permissioned blockchain because I think it is more apt to solve real problems and I trust it more. I understand the fascination around permissionless blockchains, but that highly depends on your attitude towards technology."*

*(Informant 15)*

In fact, not only institutional actor but also businesses and startups claimed to use private blockchains for practical reasons. In a conversation with a startupper from Milan, he also made clear to me that the debate remains open between 'maximalists' (this is how my interviewees refers to the fringe that do not distinguish the two fields) and other blockchain enthusiasts who look for novel online environments for selling their digital products:

*"What you will hear from all maximalists is that blockchain works only if it's public. However, if you are on a public blockchain, you cannot control the environment because it is complex and requires control. So basically, if your product gets bad you are screwed. From a corporate perspective, going public immediately is wrong because if you spend many on something that contains mistakes it is lost"*

*(Informant 27)*

As this informant reveals, this perspective totally clashes with the traditional libertarian perspective that believes in a total openness and distribution of blockchain systems. Not surprisingly, this lead

some of my interviewees to argue that there is actually no blockchain in the system that the Estonian government is using. While conversating with some experts that were more connected to the world of cryptocurrencies and maintained libertarian positions, they made clear that they did not agree on the definition that the Estonian government was offering of blockchain technology. An interviewee from Milan told me that the Estonian case should be in fact be considered as impure, especially because 'blockchain comes from libertarian cypherpunks, who maintain an anti-institutional vision'. In particular, an Estonian participant who defined himself as a convinced 'anarcho-capitalist', maintained a very critical stand on this 'appropriation' of the word 'blockchain' by the Estonian government:

*"In Estonia there is no blockchain. X Road is a scam. They are lying, I tell you! They started lying saying 'we have the blockchain, we are fully on the blockchain', which is non-sense. When they saw the power of blockchain technology, they though 'we have to cook up some story and do some propaganda articles saying that we are already on the blockchain'. They have time-stamping chains, which is essentially controlled. That uses private-public keys, but that's not the real blockchain! Blockchain is permissionless and uses the consensus algorithm. I mean, that is a small group using it, there is control and no consensus mechanism. it's totally centralized, it's not a blockchain."*

(Informant 17)

This difference in understanding blockchain technology is indeed very tied to opposite political purposes and to the perception of what decentralization means. Libertarian blockchainers who see decentralization and automation as a way to restore the Internet to a free-flowing open market of ideas, information, and autonomy, build narratives that highlight the construction of technology as a remedy for social problems (Dodd, 2017; Karlstrøm, 2014). These social problems usually concern the existence of 'repressive' governmental and financial actors that maintain power and control on citizens, limiting their freedom of action, as the same informant explains:

*"So, you know this Estonian X Road system they are very proud about? It's very dangerous. It's very insecure! As long as the government likes you, it's cool. But if they don't like you anymore, they can partially switch you off. If you live in a country like Estonia and they push you out, you can literally go hunting in the forest. You can't do nothing. Have you read the Republic of Plato? It's about how every nation gets corrupted. Now they are still being nice, but once you'll understand Estonia deeper you will understand that's just not true and that they just want to adopt a social credit*



*system.”*

(Informant 17)

According to libertarian positions, talking about a private blockchain is non-sense, because that just refers to the use of a public ledger or encryption, which does not equate the full structure on the distributed ledger technology. Interestingly, it is not only libertarians who criticize the institutional appropriation of the definition of blockchain. In fact, not even all participants of the e-Estonia scene agreed to call the Estonian project a blockchain, as exemplified by the words of an informant at the head of the e-Health project:

*“We don’t call it blockchain, we call hash-chain. Because blockchain in its nature has no central controlled environment; but in Estonia there is always a responsible body which stores these hashes or timestamps. And in the healthcare context and E-government context, this is important”.*

(Informant 21)

This first section on private and public blockchain distinction is relevant because it already shows how political projects influence the way in which this technology is explained and used. The fact that, to some actors, institutional projects such as e-Estonia have nothing to do with the ‘real’ blockchain is the result of the clash of opposite political views and opposite understanding of the meaning of online decentralization. What clearly arises from this clash of views is that for some institutional and private actors the blockchain should be permissioned because it enhances a better efficiency and rapidity, whereas more libertarian views cannot separate the essence of blockchain from a complete distribution and openness of the architecture. However, they see private blockchain as a risk for ‘re-centralization’ only in relation to governmental activity, and rarely in relation to commercial or financial activity. In this way, we can already start to see how blockchain becomes here a floating signifier used to name different ideas regarding the implementation of decentralized systems.

### 3.7. A contested social object

Once it becomes clear that there exists no such universal agreement on how a blockchain should be used and designed, it is interesting to further investigate the purposes for which it is used and how these purposes do relate with the ideas of privacy and data ownership.

It is not rare to find references in literature that discuss blockchain as a means to increase citizens' privacy (see Zyskind et al., 2015; Tapscott and Tapscott, 2017), arguing that the use of encryption is key to increase chain participants' privacy. Privacy on the Internet, as outlined in the theoretical framework, is normally conceptualized as a right to maintain a private space which is free from external interferences (private and public). Privacy, in this sense, is often tied to the discussion on the accumulation of power in the Internet, as well as to the discussion on citizens' data ownership.

This position was hold also among some of my interviewees, who saw blockchain as a potential tool for retrieving data ownership and privacy of citizens, as explained by a British informant working on a research project on blockchain and privacy inside an innovation foundation:

*“People have a human right to data protection. I think we need to create safe spaces online where people can have social interactions, with the right of privacy online. Another thing is that a lot of profit is being made on the web, but it’s unclear how it is made, using personal data. (...) We need to build public services on the web and civil services where people feel like they are not being surveilled. That’s a prerequisite for any democracy. We don’t really have any public sphere on the web right now, and maybe blockchain can help.”*

(Informant 7)

However, there is a persistent lack of common agreement on which kind of privacy would blockchain enhance. While blockchain literature seems to tie this concept to the idea of encryption and anonymity, supporters of the public blockchains put more attention on the concept of transparency and peer validation. Transparency, however, clashes with the classical concept of privacy because on a public blockchain everybody can see others' transactions and the use of encryption only makes them “pseudo-anonymous”. An Estonian informant, who has worked on building encrypted systems for a long time, explained me that how blockchain technology cannot be considered as a tool for privacy:

*“I don’t see any common point in privacy and blockchain. It’s completely the opposite. Blockchain makes things (data) public, not private. I think that those who talk about privacy and blockchain don’t know what it is at all about.”*

(Informant 16)

Although it is often thought that Bitcoin or other blockchain-based applications are anonymous, some informants told me that this is not always the case. Several interviewees outlined how even in permissionless blockchain, which normally do not require the provision of any ID or personal information to create a wallet and make transactions, personal information might be exposed.

In the case of permissioned blockchain, the concept of privacy overlaps with the concept of cybersecurity. This is again the case of e-Estonia, in which privacy is understood as a means to defend the governmental activities and citizens’ data from external interferences, and particularly Russia, as exemplified in another interview extract with a governmental informant:

*“For things that you mentioned regarding privacy and stuff like that, blockchain could be a tool to solve that. But it’s not that everybody walks around with a blockchain and looks at where they could use it. It’s the other way around: let’s look at the problems we actually have and see where blockchain could be used. And this is what happened in Estonia with blockchain. I don’t know how much you know about the cyberattack of 2007... in 2007 we had a real cultural conflict that happened, because one of the statues of war memorial was moved to one location to another. And this created clashed between Estonian and Russians. This was broadcasted in media a lot, there were riots in the street, on the Internet, and various forms. A lot of this national entities, you know, people who can use computers that wanted to harm Estonia, started to organize cyberattacks towards Estonia government information systems. A lot of those went down because they were unable to stand up to the pressure, and it created a very interesting situation which is not about technology at all, it’s entirely about human things and why we ended up with the blockchain.”*

(Informant 18)

It seems thus that the definition of privacy is as floating as the concept of decentralization. The way in which privacy is conceptualized in relation to the blockchain highly changes based on the different actors who are implementing it and different social and political contexts. This also means that the significance of privacy is interpreted according to different antagonism that determinate

from whom one needs to protect their privacy. Several other interviewees highlight that blockchain does not improve online privacy because of its public, open essence. As one of my participants declared, “at maximum, blockchain can increase the awareness on the management of privacy” (informant 12) because it introduces the basis of encryption and force people to understand how encrypted communications and transactions work.<sup>11</sup> Moreover, the concept of cybersecurity does not necessarily equal the concept of increasing users’ privacy in the Web in relation to surveillance capitalism and governmental mass surveillance. On the contrary, according to some, it may even strengthen governmental control over the flux of information because of transparency. Through this discussion around privacy, we can see again how much blockchain definitions are flexible to subjective interpretations based on different perceptions of external interferences instead of a universal meaning of privacy on the Internet.

### *3.8. A contested financial object*

The third and last section of the analysis concerns the essence of blockchain for the social and the extent to which it can be separated by cryptocurrencies. Most of my interviewees mentioned that they discovered blockchain thanks to Bitcoin but hold different positions on whether the term ‘Bitcoin’ should be used indistinctly to talk about blockchain, or whether it should be considered as a much broader term. But as exemplified by this extract of a conversation with an informant from Milan, working in the financial sector, not everybody in the scene agrees that blockchain could work for the social sphere:

*“I would be curious to understand which use cases you found regarding blockchain as applied to the social. Because in my opinion, there is nothing there.”*

(Informant 23)

Since from the very beginning I selected interviewees based on their work with social applications of the blockchain, one of my main goals was understanding what the word ‘social’ meant for them. I was often told that there are a lot of interesting innovations happening deep down the protocol layer and developing blockchain that can provide more than simple financial transactions,

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<sup>11</sup> As I will show in the next chapter, this position recalls the net-determinism of many Internet imaginaries

but many of the people who supported this position, also found themselves in the development of research projects to prove this potentiality of the distributed technology. One of my interviewees in Milan, for example, told me that when he discovered that “blockchain could exist beyond Bitcoin, his life changed”, and this is how he started to implement a social application of the blockchain for the education field. But although among my interviewees there was a general excitement regarding the potentiality of the blockchain, some of them also hold the idea that blockchain is still an immature technology and that we will only see its real potential in the coming years. This was for instance the position of one of women that I interviewed in London during an event organized by the collective ‘Women and Tech’:

*“There will be so many use cases of the blockchain for good... it’s just not ready yet”*

(Informant 6)

Since e-Estonia remains the most developed example of blockchain application in the social sphere (being it the most advanced example of blockchain use at a governmental level), the meaning of ‘social’ in this context translates with the application of blockchain in the public sphere, in relation to the Estonian concept of ‘digital society’. In Tallinn, I collected opinions and ideas regarding the chance that blockchain can exist beyond cryptocurrencies and tried to draw a line between the two different fields. While institutional actors agreed on the idea that there exists such a dimension of sociality in this technology, participants who were more related with the cryptocommunity denied this possibility. An informant from a private company working with the Estonian government, for example, declared that they *“basically have nothing to do with cryptocurrencies and are doing only practical blockchain applications”* (informant 20). According to my governmental sources, this means that blockchain is used for data integrity and digital signature systems. Estonian participants also tended to stress the idea that blockchain existed longer before Satoshi Nakamoto whitepaper:

*“We started to use blockchain before blockchain was introduced to the world with Satoshi Nakamoto whitepaper. We just called it differently. We later knew we were doing that blockchain cool thing. I’m referring to the massive and scalable data integrity proof. This is how Estonia became the first blockchain power. We started to test this technology in 2008 and it went to production in 2012. We built an infrastructure platform”.*

(Informant 20)

According to these interviews with institutional actors, Estonia was indeed in the blockchain area longtime before Bitcoin came in the way. This is why they mostly agree on the idea that blockchain can really be applied to other forms of sociality that go beyond finance. As an informant from the Minister of Innovation explained to me: *“whenever we are talking about blockchain is a sort of telling anybody that’s not just hype”* (informant 18). However, an Estonian cryptographer did not agree that the actual blockchain can be seen as distinguished from cryptocurrencies, and shared his position with other expert cryptographers that I interviewed in London and Milan:

*“Almost nothing has been done in Estonia with blockchain. Yes, there are protected logs and there is a data structure, but it’s not blockchain in terms of cryptocurrencies. It’s not the blockchain that common people say it is a blockchain (...)*  
*Cryptocurrency was always the goal. It’s not an application of a mysterious blockchain technology: it’s actually the engine of technology. There’s no reason why this network should function at all, because it’s completely voluntary and nobody can force anything to execute the bitcoin network. So why do people execute it? Because there are cryptocurrencies. If you call this a blockchain – a totally voluntary network which executes ledger – then you cannot take the cryptocurrencies off the ledger, because otherwise it would not work.”*

(Informant 16)

This debate exemplified by Estonian actors can be resumed as a larger debate that exists between the so called ‘Bitcoin maximalists’ and those trusting the potentiality of blockchain for the social sphere. Maximalists hold the idea that the real functioning of blockchain is given by the reward effect that comes from the maintenance of the integrity of the chain, and therefore it makes no sense to think about blockchain without the financial incentive. Therefore, they criticize those who claim the existence of a purely social dimension of the blockchain and somehow blame them for the existing confusion around the term. In fact, a ‘maximalist’ participant from Milan explained me this position at length:

*“Blockchain does not exist without Bitcoin. Blockchain is a broad umbrella term: to some, it identifies a precise data structure within Bitcoin and in this sense, blockchain does not exist without Bitcoin. On the other side, we see a use of the term blockchain as a jolly for everything. Some of my*

*clients used the word blockchain to talk about open source in general, but open source has been existing since the '60s. Others say that blockchain is every peer-to-peer system, so in this sense Github or Bit Torrent would be blockchains, but they are not. Others talk about blockchain to indicate every encrypted system with encrypted public key, so PGP (i.e., encrypted emails) in this sense would be blockchains. Others call a blockchain every game theory innovation in which it exists an incentive mechanism, so a point card would be a blockchain because there is a remunerative system. In general, Blockchain is still a fuzzy term and we will have to reach a common agreement on what it is. I chose the acceptance of the technical part: none of the projects that call themselves a blockchain have anything to do with a blockchain in reality.*

*Blockchain has some innovative parts, but it is mainly the idea that they make Bitcoin work. If we call a blockchain every innovation which is vaguely decentralized and encrypted, then everything is a blockchain and it was already a blockchain in the '90s. In the future we will need to clarify the term and separate it to the confusion. Today, those who work in the technological level of Bitcoin see that the purpose of Bitcoin is remaining stuck to the definition of blockchain.”*

(Informant 25)

To use a pan, we could say that there is a general agreement on the fact that there is lack of general agreement on the meaning of blockchain. Maximalists tend to think that this is a political choice, as it was for the choice of using a private blockchain. In fact, as the same research informant (I25) later added in the conversation, “blockchain is a word used by people who don't want to talk about Bitcoin because it sounds too disruptive, but still want to talk about it to show they understand innovation. Blockchain is just a marketing word.”

These antagonistic positions can be found also in the way blockchain is conceptualized for the social. While for some it is strictly associated to cryptocurrencies and rewards mechanisms, others think that its features can be used in the social sphere. However, it is not clear which features make a blockchain a 'real' blockchain apt for the social sphere, and neither for how long this technology has existed. According to the majority of the Estonian participants the blockchain was on the run for a long time before it became a buzzword, therefore they also thought that somehow this made it a social phenomenon, more than just technical:

*“This blockchain phenomenon is not technological at all. It's social. And that's why you are in the right place. There's no crypto in cryptocurrencies. It's a social phenomenon. Blockchain is very*

*simple and if you look at the technology, it was there from the 90s at least. Then they started to invent new terms, blockchain, smart contracts...(laughs). We had everything in the 90s, but not many wanted to use it. It's the desire for automation and publicly audit things that has changed. That's why it's not a technological change. There's nothing to talk about the pure technology"*

(Informant 16)

### 3.9. Conclusion

In this first chapter, I have analyzed the heterogeneity of blockchain definitions and interpretations, both in digital and face-to-face conversations, highlighting how its contradictory existence starts from a variety of imaginaries associated to the word. First and foremost, what makes a blockchain a floating signifier is that it moves between a variety of different projects and, because of that, it contains a number of antagonist internal instances. Blockchain becomes then a contested object in three ways: as an economic object, as a social object, and as a technological object.

Both on the online and offline ethnography, blockchain imaginaries appeared fragmented and difficult to define precisely. For this reason, although there exists a specific imaginary related to blockchain for the social, it is always difficult to separate it from cryptocurrencies. The different meanings attributed to blockchain portray different political project participants engage in, and such agreements materialize the floating signifier blockchain in particular and opposite discursive contexts. Blockchain as a floating signifier is used deliberately within a specific hegemonic project. Broad concepts such as decentralization, privacy or 'social' are used to provide definitions of the potentiality of the technology, but they themselves have no universal connotation. Blockchain is in fact a common heading for issues related to concepts like web decentralization, privacy and transparency, a term that seems to explain the common link between them all. Opposite discursive positions indicate a heterogeneous array of conceptualizations of the potentiality of the blockchain and the floating essence of blockchain as a signifier makes it a powerful concept within the public imagination.

As Laclau importantly suggested, "the 'floating' dimension becomes most visible in periods of organic crisis, when the symbolic system needs to be radically recast" (2005:132). Contextualized to the contemporary history of the Western, this makes sense since it seems that we are really going through an organic crisis and, from a theoretical perspective, this implies the articulation of fundamentally different hegemonic projects. What is ultimately at stake within this struggle is who



obtains the power to define what is deemed as a real blockchain and hegemonize the concept to serve their purposes. In this sense, and following Laclau's intuitions, I also argue that blockchain becomes a populist buzzword which often exploits "the rhetoric of empowering the disenfranchised through decentralized decision-making process, enabling anonymous of transactions, dehumanizing trust" (Gikay and Stanescu, 2019), similarly to what Silicon Valley pioneers do (Ferraro, 2020).

For this reason, it is now important to dig deeper in all the shadows of the political discourse that surround blockchain and understand better which type of vision of the world underlie the implementation of this technology.

## 4. *Envisioning futures: blockchain regimes of truth*

*“Blockchain will change everything forever”*

(Artists Re:thinking the Blockchain, 2018)

### 4.1. *Introduction*

Following the idea that blockchain works as a floating signifier, this chapter aims to investigate its performative capacity in discourses by researching shared narratives on distributed ledger technologies and observing the construction of the visions of the world by blockchainers. Since blockchain technology has acquired such significance and power in the public imagination, it is essential to unpack some of the narratives that surround this technology and try to sketch a common ground between apparently very different political approaches, such as crypto commonists and libertarians. In fact, while at first glance their political positions might indeed seem very opposed, they actually converge in the acceptance of certain ‘regimes of truth’ (Foucault, 2007) that tend to overlook the complexity of social relations and the collective level of society.

In this chapter, I ask questions such as: which myths and narratives develop out from the blockchain community who designs and implement the technology for the social? And which are the common grounds that tie together the spectrum of political imaginaries that surround blockchain social applications?

By deploying the concept of regimes of truth, I analyze a number of narratives surrounding blockchain technology in social contexts to understand how the construction of expectations and promises for the future of blockchain social applications occurs. In fact, as a narrative technology (Reijers and Coeckelbergh, 2016), blockchain reinforces the belief in the inherently power of computer networks and their automated capacity for rebuilding democracy and restructuring social relations. These ideas are also combined with the changemaking ethos (Arvidsson, 2019) of the modern society, which encourage individuals to think that, by means of technological applications, they can change the world. Moreover, the belief in the existence of trust-less social relations contribute to shape a shared idea of sociality inside the community that maintains a techno-determinist and individualist approach to social relations. In line with the Internet imaginary, blockchain narratives reveal a limited analysis of societal mechanisms together with a generally shared optimism towards the transformative nature of digital technology.

In conclusion, blockchain regimes of truth could be seen as individualized post-political approaches that help to overcome the uncertainty of the present caused by a general dissatisfaction with party politics and a decrease of trust in mechanisms of representation and collective action, but in so doing, they reinforce a technocratic and neoliberal vision of the world.

#### *4.2. Blockchain narratives for studying imaginaries*

Every technology of communication is a by-product of the society that created it, thus in every society “imaginaries, ideologies, narratives, and myths of technology play a crucial role in establishing a taken-for-granted and yet powerful system of looking at the world” (Balbi in Bory, 2020). Since social imaginaries are always stretched between the past and the future, stories and narratives should be taken into account as expressions of “a tension between an institutionalized reality and the desires for change that result from the projections of individuals, communities and societies” (Bory, 2020:3). Focusing on discourse, in fact, means focusing on the ways in which discourse makes explicit certain political positions and how power relationships emerge from there, particularly considering the centrality of discourse in the production and reproduction of society (Mountian, 2009; see also: Foucault, 2007). According to Foucault (1998), discourse does not only relate to speech, but also to the construction of knowledge and social practices. Discourses also refer to meanings and significations, hence require studying them by looking at mechanisms and structures that produce knowledge, which is, for Foucault, power (1998:92). Just like social imaginaries, discourses are also historically situated and influenced by historical forces, hence they reflect, construct and constitute social relationships, social practices, social institutions and society at large that require analysis (Mountian, 2009). Questioning the role of discourses highlights indeed their performativity and productivity, focusing on its capacity for producing (and reproducing) meaning.

This viewpoint facilitates the investigation on how certain discourses produce social fantasies, or imaginary, and vice versa. The concept of social imaginary as constituted in discourse provides a fluid approach for observing the elements surrounding specific objects, such as algorithms. As we know, algorithms, code and computer networks are in fact deeply implicated in the shaping of narratives and subjectivities, and blockchain technology is no exception. The very essence of blockchain is indeed surrounded by a number of desires and promises for the future which deserve bigger attention.

In particular, the diffusion of blockchain attracted substantial interest from the startup world, where a plethora of conferences, events and symposia has been held on the subject, leading to the emergence of a 'blockchain for social scene' populated by tech entrepreneurs, experts and other stakeholders, all interested in the understanding of the 'disruptive' potential of this new technology. This is because not only the design of blockchain is shaped by different interpretations of the technology, but also because blockchain narratives may shape the vision of the world of people who participates in its use, design and consume.

The blockchain infrastructure may be considered in many ways akin to a digital platform that 're-mediate' the social and economic relations in the context where it operates, allowing new ones to be created (van Doorn, 2017). Like a platform, blockchain provides with a digital infrastructure to organize and coordinate social and economic interaction among users (Marres, 2017); its functioning, like the algorithms of a digital platform, are also the result of 'opinions embedded in code' (O'Neil, 2016) which must be unpacked, investigated and criticized. Building from Gillespie (2010: 349), just like the term 'platform', the term 'blockchain' also "depends on a semantic richness that, though it may go unnoticed by the casual listener or even the speaker, gives the term discursive resonance". Similarly, blockchain culturally prompts a plurality of views, social standpoints and interpretations that must be taken adequately into account.

In this sense, as already argued by Reijers and Coeckelbergh (2016), blockchain should be considered 'a narrative technology' because of its capacity to shape people's understanding of the social world and highlighting how blockchain exists as a socio-technical object.

Latour (2005) suggested looking at the kinds of information provided by objects as they become interpreted by an observer: objects indeed need to "enter into accounts in order to be accounted for" (Latour, 2005:79). Following this idea, Bucher (2016) encouraged scholars to trace accounts entered by algorithms and understanding further narrations and discussions around them.

As stated previously, while narratives often maintain and reinforce the already existing power structures, at the same time social imaginaries are also often influenced by the interaction of actors of different nature. Understanding how different blockchainers participate in the imagination of possible futures is particularly important, as it can lead to differences in power and understandings of the world. In this sense, I ultimately refer to what Foucault called the "authority of expert knowledge" as referred to "an attribute of those people interacting with first-order narrative structures of blockchain technologies" (Reijers and Coeckelbergh, 2016:119). To do so, in the next

paragraphs I will investigate more in depth the type of discourse which are hold as true regarding blockchain affordances and possibilities.

### *4.3. Regimes of truth of the blockchain*

For Foucault (1998), power and knowledge in discourse are two sides of a coin. This means that discourses should not be read only between dominant and dominated discourses, but rather as Foucault argues, “as a multiplicity of discursive elements that can come into play in various strategies” (1980:100). Among the discursive regimes analyzed by Foucault, one is particularly interesting for the analysis on blockchain: the ‘regimes of truth’, that is, the types of discourse that individuals and society ‘accept and makes function as true’ (1980:131). According to Foucault, “truth is a thing of this world: it is produced only by virtue of multiple forms of constraint, and it induces regular effects of power. Each society has its own regime of truth and its ‘general politics of truth’ (1980:131). But Foucault’s analytical goal is not revealing hidden truths; rather, he aims at understanding how norms are established within discourse, and how discourse becomes legitimized and create a normative context for possible thought and action (Olssen, 2006: 137):

*“Now I believe that the problem does not consist in drawing the line between that in a discourse which falls under the category of scientificity or truth, and that which comes under some other category, but in seeing historically how the effects of truth are produced within discourses which in themselves are neither true nor false.”*

(Foucault, 1980: 118)

According to Foucault, in fact, in a given society or community regimes of truth are not “the ensemble of truths” but rather the “ensemble of rules according to which the true and the false are separated and specific effects of power are attached to the true” (1980:131). Once again, the concept is useful to underlie how larger narratives and discourses regulate the construction and maintenance of power relations and influence individuals’ behaviors and beliefs. This occurs through dominant images that are socially inscribed into individual consciousness and subjectivity until they become normative truths, which means that they become accepted as “normal”. In words of Foucault:

*“Truth is a thing of this world: it is produced only by virtue of multiple forms of constraint. And it induces regular effects of power. Each society has its regime of truth, its “general politics” of truth:*

*that is, the types of discourse which it accepts and makes function as true; the mechanisms and instances which enable one to distinguish true and false statements, the means by which each is sanctioned; the techniques and procedures accorded value in the acquisition of truth; the status of those who are charged with saying what counts as true”*

(Foucault, in Rabinow 1991)

In order for a statement to become a regime of truth, it must be accepted as fact by the community in which it exists. Once that happens, the regime of truth becomes unquestionable and its power becomes invisible (Foucault, 1980). In this sense, the existence of regimes of truth points to the idea that when some given assumptions, beliefs, and practices become normalized, they exert a tremendous force upon collective and individual consciousness, thus regulating obedience and making resistance difficult.

When it comes to technology, “myths and power, narratives and political and economic forces, feed each other” (Bory, 2020:32). For this reason, looking at blockchain discourses and imaginaries through the lens of the Foucauldian regimes of truth, is helpful to unwrap specific conceptions of sociality, ethics and politics that blockchainers inscribe in the technology. Here, I use the concept of regime of truth to indicate that blockchain imaginary is constructed over some basic assumptions that constitute the foundation of a certain vision of the world.

#### *4.4. Looking for a common thread to connect antagonisms*

As outlined in the literature review chapter, finding a common thread to further analyze blockchainers visions of the world is often a difficult task. This is because blockchainers may come from antagonist political environment, such in the case of anarcho-commonists and anarcho-libertarians, or crypto-anarchists and crypto-institutionalists (Husein, 2020).

The blockchain startup scene is a highly heterogeneous social context, inhabited by stakeholders with a plurality of different interests and sometimes opposing visions. On the whole, my experience confirmed the existence of two main constituencies. The largest and most conspicuous one is composed of entrepreneurs, tech experts and other actors who are interested in the innovative and impactful potential of blockchain in business and society. Animated by a broadly libertarian ethos, these see blockchain as a ‘revolution’ and a tool that will radically change societal processes; a fair degree of techno-solutionism (Morozov, 2013) characterizes their views. This translates in a variety of entrepreneurial endeavors, largely operating within the traditional

framework of Silicon Valley capitalism, mostly in the form of apps, that use blockchain as the underlying technological infrastructure – mainly, but not exclusively, in the context of finance. This group coexists with a smaller but tightly connected set of actors, who are interested in socio-economic models that are alternative to traditional forms of capital accumulation and come to be interested in the blockchain scene from a variety of cultural and subcultural contexts. These are researchers, artists, hackers and other intellectuals or practitioners who see blockchain as a tool which has the potential to enable the development of more egalitarian social and economic relationships.

During the analysis, I attributed my research participants a political orientation. I have done so collecting their answer to the question “have you ever felt close to any particular political orientation/political party/political movement?” and compared them with Husain’s suggested categorization (Husain, 2020). Part of my interviewees answered the question mentioning that in the past they were affiliated to political parties (e.g., Labor party (UK), Tea party (IT); Movimento5Stelle (IT); Green Party (EU)); but that was before knowing about blockchain. However, a significant other part of research participants refused to identify into fixed categories and either stated that they did not want to ‘be put in a box’, or that they were ‘apolitical’. Many indeed argued that “they did not believe in politics” and distrusted political institutions. Yet, most research participants considered their project as potentially political, because blockchain could drive new changes in the political realm (e.g. power decentralization, e-voting, bigger transparency, etc.). In this sense, I had the feeling that their political imaginaries mostly fluctuated between crypto-anarchist positions and crypto-institutionalism, working more as ‘hybrid’, flexible imaginaries rather than fixed political categories.

This could be seen as a result of blockchain existence as a floating signifier, but it may also be due to the rise of post-political (Mouffe, 2005; Rancière and Corcoran, 2010; Žižek; 1999) and individualized approaches to politics and power. In fact, Husein as well argued that blockchain imaginaries should be seen as post-political (see Husein, 2020). Particularly, the individualization of political identities (Flichy, 2004; Fraser, 2019) which is growly widespread in Western societies, also seems related to an individualized perception of technology and digital society, an emerging of social relationships that Wellman (2003) called ‘networked individualism’. This condition is caused by a disintegration of networks, in which individuals no longer have a place in society, and “by gradually linking up to multiple networks, they end up in a situation of social isolation” (Flichy, 2004). In this regard, I argue that we should look at blockchain imaginaries as a spectrum that elapses different extremes.

Nevertheless, blockchain imaginaries are especially studied in relation to anarcho-libertarian ideology (Golumbia, 2016), pointing to an explicit desire for cutting off the middleman and striving for bigger individual freedoms. This may represent a standpoint, since according to Ferrari (2020), this kind of ethos is still the dominant technological imaginary and often overlaps with the Silicon Valley's Californian Ideology. As I will show, in fact, the regimes of truth that surround blockchain technology present many points of contact with myths and narratives that accompanied the origin of the Internet, and that nowadays are embodied in its most extreme form by the Californian Ideology. This is why it is crucial to challenge certain assumptions on digital technology that are increasingly believed to function as 'true' and that might be held responsible for the lack of a data-justice-oriented approach in digital environments. As Bory states, in fact:

*“Solutionism and faith in technology are forms of exploitation of myths and of the social imaginary. For instance, they can act as a powerful instrument to reassure people through the idea of the supposedly ‘neutral’ role of actors such as digital media companies. At the same time myths can be used to hide economic and political processes aimed at promoting some economic actors while other are cut off from the market.”*

(Bory, 2020:32)

The Californian Ideology draws on a dominant narrative that promotes an imagination of networks as a means to empower democracy, a narrative that Bory called 'the Internet myth' (2020). The correlation between the structure of the Internet and the belief in its inherent power for promoting democracy is crucial for analyzing blockchain imaginary, because it created certain social expectation for the future and projections towards social change (Hu, 2015). Although the Internet has never been inherently democratic (Bory, 2020), and lately actually converged in strong hierarchical structures, the dominant narrative of Internet history persists today in part precisely because it rarely shows how decentralization has actually converged in an oligarchy of preferential nodes – the so-called platform capitalism (Snircek, 2017). The internet myth, instead, remains seductive as “it explains the dispersion of power through the formal qualities of the computer networks that supposedly enable it” (Bory, 2020:26). As discussed in the literature review chapter, the extent to which the Internet has been seen as an instrument for horizontality and equality is directly linked with the models of networks that have been imagined and designed by Internet pioneers (Bory, 2020:25). Building from these assumptions, in the next paragraphs I will present three



regimes of truth that constitute blockchain imaginary and that could be considered as shared among the spectrum of political imaginaries: the distributed myth, the trustless myth, the changemaking ethos.

#### 4.5. “Decentralized technology creates decentralization”

Many see blockchain as a technology that offers a ready-at-hand solution to issues of data power and ownership, sometimes echoing a sort of ‘*power to the people*’ motto, as well as to counter online privacy concerns more generally. The underlying principle that keeps these conversations together is that the distributed ledger technology allows to get rid of central and intermediate authorities, automating online transactions and empowering individuals by giving them more freedom of action. As already outlined in chapter 3, the conceptual interpretation of a distributed architecture is strongly connected with the idea of decentralization. The imaginary that is attached to distributed networks is often bond to the idea of power decentralization in the digital sphere, something that Bory (2020) called the ‘distributed myth’. The distribution discourse explains the dispersion of power on the Internet through the formal qualities of the computer networks that supposedly enable it (Hu, 2015 in Bory, 2020). The Internet itself, despite the fact that it has never really been distributed, has mostly been represented in terms of a distributed system (Bory, 2020:26). According to Bory, this is explained by a sort of net-determinism that is deeply invested in the idea that networks themselves are agents of change and liberation (2020:27). In this sense, the distribution myth is a regime of truth that surrounds digital technologies and computer networks at large.

Already after the first interviews with my research participants, I was starting to observe how the distributed myth played a role in the construction of blockchain affordances imaginary. Although most of my interviewees were aware of the current imbalances in the Internet society, they tended to see the return to the origins of the Internet as the only possible solution for creating fairer online conditions. Seen through these lenses, blockchain become the technical instrument to make this wish come true and enhance the original promises that accompanied the birth of the Internet, such as decentralization and horizontality. One of my informants, for instance, who was working as a developer for a blockchain platform for charity in the global south, discussed with me the idea that blockchain becomes a tool to end with Silicon Valley’s monopolies and retrieve the ‘real’ Internet:

“Internet was made to make connections between people. The problem is that all those big organizations, like Google, very smartly depredated the internet interface, so the only way we now have to access the internet is through those guys, but people don’t realize they are not actually using the real internet! The real internet is... well, you have these bloody people that use the dark net for frauds and stuff, but there are always people using technology in a bad way. The real Internet is just Internet.”

(Informant 3)

This position can be somehow problematic since “the myth of the Internet is seen as a recurrent self-fulfilling prophecy, a self-determining destiny that prevents any critical thinking about the actual condition of democracy and culture in the information age” (Bory, 2020:27). While the necessity for a fairer redistribution and decentralization of Internet power is becoming more and more urgent, in fact, a truly distributed network is impossible to create only by technological means, because there is always a need for economic, political and even geographic consideration (Hu, 2015). The problem of imagining that computer networks (which, not less importantly, are also material infrastructures) necessarily overlap with the concept of social ties is misleading, because it tends to overlook the complexity of social organization and social inequalities. As pointed out by the theory of the distributed myth, computer networks do not in fact automatically create more democratic and representative systems when they lack broader political and social reflections. Yet, this position was hold by almost all my research participants and can be exemplified by a quote from a Londoner woman who I met at a meeting called ‘Women and Blockchain’:

“I define blockchain as a database that’s connected with chains of cryptographic blocks. I think the value is the distribution of data not in a central part, but in distributed nodes. This means that everybody in the network could potentially have a say in what happens in the network. It’s the ability to create a more democratic system.”

(Informant 6)

Blockchain technology resembles the original promise of the Internet as a free and horizontal technology disregarding the current power imbalances of the digital sphere. In the same way, while narratives of blockchain imaginaries reveal a genuine desire for community and democracy, they conceal certain ingenuity towards the solutions for ending with the concentration of power and wealth of digital monopolies. In fact, most of my interviewees offered a quick conceptual jump from

the technicalities of the blockchain to the imagination of new social and political organizations, often holding techno-determinist and techno-utopian (Brody, 2019) positions.

During my fieldwork, one of my informants told me for example that “*blockchain is beautiful ‘cause you don’t need to work on centralized servers and the beauty of immutable data mitigates corruption*” (informant 9), revealing a widespread position among developers: the idea that using a blockchain could automatically provide more transparency in social and political systems. This view comes from trusting that “the collective relationship between individuals and the State can be fully or partially automated by instant, atomic interactions” (Buterin, 2014), thus encouraging a more individualistic approach to collectivity and social structures. Moreover, this interpretation builds upon a certain tendency to see social relations in rational, economic terms, where the ability to disintermediate financial transactions does equate the ability to create more horizontal social bonds. See, for instance, how an interviewee from London describes his view on blockchain, with a generous dose of techno-solutionism:

“The blockchain is the 4<sup>th</sup> revolution: it removes the middleman and allows anyone to transact money or value between each other. That’s why for me it is interesting: it’s a way to distribute the internet society.”

(Informant 3)

The problem of believing in the inherently neutrality and efficiency of computer networks is tied to the neutrality myth (Airoldi e Gambetta, 2018) that surrounds digital technology. The same neutrality-myth that underpins data, algorithms, digital platforms and technology at large, seems to underpin blockchain technology too. In fact, blockchain promises a decentralization on large-scale in which human factor is minimized, and trust shifts from the human agents of a central organization to an open source code (Aztori, 2015). In such distributed architecture, “code is law” (Lessig, 1999), and mathematics is the real provider of trust and neutrality. But since neutrality is not an inherent feature of technology, we should not operate in a determinist way; rather, we should ask questions such as to what extent might technology reinforce or challenge existing power structures.

Many in the “blockchain for social” scene share the view that blockchain is a neutral technology and a tool that levels inequality. With the exception of a couple of interviewees, all my participants liked to describe technology as ‘a knife’, which can be used for different purposes depending on individuals, not dissimilar from previous major scientific and technological discovers:

*“Technology can help people, but also do bad stuff. If you use technology... it’s like nuclear energy. Nuclear is useful in many senses! It’s all about how you use it.”*

(Informant 6)

Of course, this position downplays the importance of the cultural and political opinions embedded in code and technology, as well as their imagined affordances and encoded algorithmic bias. However, as neutral, blockchain applications are also often considered as inherently “inclusive” and open to everybody. In one of the last conversations I conducted during the ethnographic fieldwork, a locally-known female participant from Milan, who is the head of a project which seeks to improve awareness on Bitcoin and blockchain, in fact argued that:

*“Blockchain, as every technology, is neutral. Therefore, blockchain is an extremely inclusive network: it doesn't matter if I am a woman, a man or something else, as long as I have internet access, I am not asked for any of these parameters. With pseudo-anonymity I protect myself from who I am, and I am not excluded.”*

(Informant 30)

But the fragility of the myth of distribution and decentralization becomes more evident as we look better inside the Bitcoin community of miners, who according to Atzori is already showing a number of recentralizing tendencies in the form of “colossal mining operations...with risks of collusion or cartelization” (Atzori 2015:16). As Dodd explains, in fact, “Bitcoin’s ‘social life’ is characterized by asymmetries of wealth and power that are not dissimilar from the mainstream financial system” (Dodd 2018:35). For what concerns blockchain for the social, Husain (2020) has looked into at crypto-institutionalists and argued that something similar is occurring. The recentralization of power relations ultimately seems difficult to overcome. The fall of the decentralization promise became evident in my research especially when participants were asked about the internal organization of their projects. Most of them, after declaiming the natural push of blockchain towards creating horizontal and decentralized webs, told me that they however decided for having hierarchical structures inside companies and projects. This idea is exemplified by this interview extract from a Venezuelan participant from Madrid, who was working with three different blockchain social applications:

“A year ago, I would have told you: down with the hierarchy! I would have told you that we have to decentralize everything, that we should use technology for that. I would have told you that we could even change company’s hierarchic models, that vertical hierarchy is useless... however, my experience today tells you that all that stuff is really nice, but for carrying out a project practically, you need a head that takes decisions and takes the reins of the company in critical moments”.

(Informant 4)

The regime of truth of the distribution myth looks more like a utopia than a reality, and actually, many blockchainers seem to maintain the idea that social hierarchies are more efficient ways to deal with business and projects. On the same line, another research participant from London told me that:

“We try to have a mentality shift to what are the best way in which we can operate as humans and help others essentially. And that’s my view. As human beings we need hierarchy, not in the sense of being imposed things, but we need to have someone that leads and take decisions, someone we respect, and we admire. Hierarchy exists from the chimpanzee times, showing that we are as species.”

(Informant 9)

Despite these reflections, the distributed myth, as a regime of truth, is rarely countered by blockchainers and largely participates in creating a shared ethos within the scene. However, the fact that it is difficult for blockchainers to have a solid recognition of what decentralization is and how it can be achieved, makes decentralization a floating signifier, in which people with very different visions of the world can inscribe their own ideas and interpretations.

#### 4.6. “Don’t trust, verify”

That blockchain revolutionizes trust-building processes is a widely shared beliefs among participants of the blockchain scene as a given. During meetings and events, discussions on blockchain commonly revolve around the political and economic scenarios that might result from the large-scale diffusion of distributed ledger technology in society. Although conversations were often characterized by a technical, computer-science jargon, social imaginaries and visions of the world

regularly emerge as prominent during the course of these events. The tone of the conversations I engaged with was generally very optimistic towards a future where blockchain would 'disrupt' the status quo; in most cases, keynotes and participants concurred that blockchain "will change everything forever" because "every sector in the world is being disrupted by Blockchain". Working as a regime of truth, in the context of these conversations, the disintermediating nature of the blockchain architecture was regularly mentioned as a key component in this disruption. The distributed myth, in fact, intersects with another myth: the myth of a 'trust-less' society. This myth underpins the whole existence of blockchain technology and was largely shared among my research participants. In this extract of an interview, an informant explains to me how this trust-less environment works:

"Decentralized means that all the actors within the network, despite having conflicting, opposing or otherwise no trust interests, have found a way to communicate in complete safety. The blockchain transforms a natural characteristic of man, that is, greed, into something positive that is a safe and secure environment".

(Informant 28)

Trust in the blockchain community was often conceptualized as "proof over trust". This position assumes that this 'greed' human nature leads naturally to a society in which technology will be used to control and 'verify' our trust in social relationships and exchanges. This is exemplified by a quote from an interview with a blockchain 'evangelist' in Milan:

"Trust is never mentioned when it comes to blockchain, I even give it a negative connotation when we talk about blockchain! Why do you trust that your boyfriend behaves well? Because you can't follow him 24 hours a day and verify that this is the case. If you had this chance, you would no longer need to trust, because YOU KNOW. As we said before, everything in the blockchain is transparent so everyone knows everything, or everyone can still check everything. So, the concept of trust disappears and is replaced by verification. In fact, one of the mottos that runs in the community is 'don't trust: verify', because there is this possibility. Partly because the idea of making checks exempts you from the concept of trusting, the concept of trust is very close to the concept of faith: faith means believing something true without the possibility of having elements to support this vision. Here instead you have all the elements of the case, and the trust disappears. And this is

a dangerous element, because every time you hear someone tell you that blockchain increases trust it is not true, very wrong: it does the opposite, it completely eliminates it from the game because you no longer need to trust.”

(Informant 13)

Essentially, blockchain is commonly understood by blockchainers as a system in which trust resides in the technology, and individuals are disincentivized to cheat because of how the technology works. This echoes the views of journalist Morgen Peck (2015), who maintains that we should trust the technology that makes Bitcoin possible because “it assumes everybody’s a crook, yet it still gets them to follow the rules”. For some of its proponents, blockchain startups foster the development of social relations whereby the burden of building trust among participants is replaced by a technology-enhanced process of validation. In this sense it may be said that ‘trust-less’ actually means a system where trust is envisaged to be ‘automated’. As the technology that ‘automates’ trust, blockchain is seen a flawless machine which can only be ruined by individual behavior. In other words, the automation of trust appears to be fictional: the blockchain technology does its ‘magic’ only if users do not betray how the technology works:

*“The confusion that there is on the blockchain today stems from people who think that everything that is recorded on the blockchain is true. Actually, if I write bullshit on blockchain, it remains bullshit written in blockchain”.*

(Informant 1)

Rather than a ‘trust-less’ environment, blockchain experimentations are purported to generate systems in which the neoliberal logic of individualization and singularization seems to be repurposed and emphasized in a new kind of technological mediation.

However, the automation of trust is easier said than done. The practical implementation of this ‘trust-less’ vision clashes with a variety of social and cultural constraints, revealing a generalized lack of understanding of social organization and a certain naivety about how trust-building processes actually work. Beyond the mere description of this process as another example of ‘technosolutionism’, the view of trust that underpins blockchain startup experimentations seems to be connoted by an understanding of trust as operating in a vacuum, delinked from social dynamics and cultural logics. As, instead, sociological research has widely demonstrated, trust is a multi-dimensional process whereby a number of micro and macro dimensions intervene, relating to how

social capital is constructed and notions mutuality and reciprocity (see for instance Khodiakov, 2007). However, this is not the vision blockchainers seem to hold. They instead believe in the individual potential and inner power of DLT, as this Londoner interviewee argues:

*“Blockchain is like an instrument to challenge old paradigms, old systems of political, economic and social beliefs. It’s a lot about to stop depending and trusting authoritarian and centralized entities and starting to believe in your own capacities and create value from there”*

(Informant 4)

This ultimately reveals a competitive and meritocratic approach to social relations. In this sense, the ‘trust-less’ regime of truth is composed both by techno-determinism and a neoliberal ethos. Only few interviewees seemed to be aware of the fragility of computer machines, and to me this was an important data, since it revealed a lack of understanding of the power of ‘authority experts’ among blockchainers. At the end of my fieldwork, I was chatting with an Estonian well-known cryptographer for hours, sitting on an elegant rooftop in Tallinn, when he finally told me:

*“There is no technology behind blockchain. It’s all a social phenomenon, it’s just a belief. This is the society just wanting to trust the machine. But I’m skeptical. There’s no flawless machine.”*

(Informant 16)

#### *4.7. “Technology will change the world”*

The last dimension of the regimes of truth that surround blockchain technology draws from the techno-solutionist approach but expands towards a general ‘changemaking ethos’ (Arvidsson, 2019) that transversally crosses other entrepreneurial sectors, such as social enterprises (Bandinelli, 2017) or food tracking (Arvidsson, 2019). The changemaking ethos can be resumed as a push towards the hard-entrepreneurial work, in which individuals get motivated by the idea that, by creating their own companies, startups and so on, they are doing something meaningful and impactful, something that essentially will “change the world”. In this sense, doing enterprise not only becomes an economic project, but an existential one, shading light on a plurality of existential inquietudes that are rooted in the “golden cage of the industrial modernity” (Arvidsson, 2019:86).



When this ethos is deployed in the digital entrepreneurial world, we often come to hear the concept of “disruption”: this idea echoes the Silicon Valley’s positions and refers to the belief that a powerful idea can change the world with technology (Arvidsson, 2019:92). Blockchain has been claimed to have “the potential for reconfiguring all human activity” (Nathan and Scobell 2012:8), and many among scholars, technologists, governments, banks, hackers, entrepreneurs are becoming interested in its disruptive and transformative potential. Being it advocated as a ‘disruptive technology’ for a long time, blockchain fully embodies this idea and the changemaking ethos. When I was in London, I took part to a conference held at King’s College on “Blockchain and the future of work”, and the first speaker opened up the debate by stating that he “*wakes up every morning thinking about how to fix the world*” and finally arrived to blockchain as the ultimate answer. This position also revealed a certain disillusion and distrust towards economic and political institutions, because blockchain is depicted as an agent of “hope” and change in a world in which politics is rotten. Most of my interviewees, indeed, declared that they completely distrusted politics and politicians as a way of changing the world; rather, they believed more in their technological applications. This hope in future changes in society driven by technology was present in many of the conversations I conducted, such as this excerpt of interview with an Italian participant shows:

*“Blockchain gave us back the hope that in the future we won’t have to trust external entities anymore. (...) My project can revolutionize many paradigms of society. We can reach political parties that look at new revolutionary approaches. With blockchain, we are talking about a decentralization that can really destabilize the whole modern political establishment”*

(Informant 12)

The vast majority of those who participate in the blockchain scene ultimately share the aspiration of ‘changing the world’, building on the common assumption that existing socio-economic arrangements are no longer sustainable and new ones must be created, whether that’s more from a leftist, institutional or far-right position. Blockchain thus represents for all constituencies a tool that materialize the shared changemaking ethos. Here again, technology is conceived as a flawless machine that can enhance social change only by “pressing a button and making it work”:

*“The blockchain is difficult to understand and is often forced on things that are useless, there are many people who speak ill of it because they have not understood what it*

*is, there are many people who talk about it as fundamentalists without explaining how to use it. We instead believe that to make a technology work it must be a closed box, you press a button and it works, you don't have to care what's behind it, you need to know that it gives you guarantees, just like a car: you turn the key, press the pedals and you don't have to know how it works (sic). So, it is technology for us. All our work is focused on simplifying technology for the user, as well as on complicating our work. This is the only way the blockchain can become a commonly used technology, we won't talk about it anymore because it will be taken for granted that the blockchain is there.”*

(Informant 27)

This ultimately shows how blockchain ‘power to people’ motto tends to overestimate societal complexity and ends up offering a populist vision of technology and social change. The conception of ‘people’ and ‘masses’ was often used in contraposition with the existence of powerful central actors, such as banks and government, but was never developed in terms of a broader understanding of social classes, social inequalities, social necessities, etc.

As Ferrari (2020) stated, the dominant technological imaginary of the Silicon Valley is at the same time technocratic and populist: *“it is populist because it builds on the anti-elite ethos of the Californian Ideology and provides a new definition of “the people,” solely predicated on the access and use of digital technologies. But it is also technocratic because it blends technosolutionism and neoliberalism”* (Ferrari, 2020:3). Blockchain builds precisely on this imaginary. My research participants in fact usually offered a broad conception of “people”, rarely elaborating further on *who* would need to participate more in society, *which systems* would need more transparency and fairness, and *how* that would happen. This position could be resumed with the words of one of my interviewees:

*“Blockchain will be the instrument that will give back the power to everybody to collaborate in a system. If something is in blockchain, you cannot prevent anyone from participating”*

(Informant 1)

Regardless they politically identified as leftist, right or ‘moderate’ individuals, almost all of my research participants thought that they would have changed the world with technology, often downplaying economic, social and political obstacles to the realization of their projects. Several of

them hold for example the conviction that blockchain will help overcome global problems such as of poverty and anger, corruption, migrants' identity, etc.

In short, also in this case, the changemaking ethos was widely shared among the spectrum of the different blockchain political imaginaries, working as a regime of truth embedded into the development of blockchain applications. This is particularly relevant for the analysis as it allows us to elaborate further on the conception of the 'social' that blockchainers generally hold.

#### *4.8. Conclusion*

This chapter has showed how blockchain interpretations acquire a performative capacity to construct shared narratives and social imaginaries and investigated how blockchain imaginary builds on discourses on technology accepted as true by blockchainers, known as regimes of truth.

Blockchain regimes of truth are post-political individualized approaches that build on a "depoliticization" of citizens and social movements and see online distributed networks as means to intervene in the democratization of society. However, blockchain regimes of truth are in fact immersed in the discursive and material dispositives of power of neoliberalism and technocracy: they insist on seeing the power of the self and the power of technology as a means of individual expression and social change. Blockchain regimes of truth are also constituted by an individualized notion of trust, for which individuals are conceived on the basis of competition. Generally, there is a shared belief around the power of individualized networks, in which the concept of computer networks frequently overlaps with social ties. At the same time, a conception of technological tools as ethically neutral and therefore potentially appropriate for the achievement of the most diverse ethical objectives, make blockchain technology able to 'change the world'.

Taken as a whole and despite the relative heterogeneity of political and cultural views which can be observed in this context, the vast majority of blockchainers ultimately build a vision of the world that crosses technocratic, neoliberal regimes of truth. These regimes of truth contribute to shape a shared idea of sociality inside the community, which maintains a techno-determinist and individualist approach to social relations. In this sense, blockchain imaginaries tend to offer a limited analysis of societal mechanisms together with a generally shared optimism towards the transformative nature of digital technology.

Generally, blockchain regimes of truth thus contribute to reinforce the capitalist hegemony of the Silicon Valley developers and startupper, where hegemony is understood in the Gramscian

terms of describing a process by which a ruling class makes its domination appear natural by installing the presuppositions of its own worldview as the common sense of society as a whole (Fraser, 2019). This is relevant considering the power of platforms to influence institutions, individuals' preferences, and society at large.

This said, in the next chapter I will dig into the meaning of 'social good' for blockchainers, highlighting how, because of these regimes of truth, social justice is becoming increasingly understood as an economic practice, instead of an all-round concept based on solidarity and collectivity.

## 5. Blockchain for social good

*“They (other blockchainers) always focus on the money.  
But what I really want to do is showing people that AI and Blockchain can actually do good.  
You can use this technology to change the world and society!”  
(A Londoner startupper)*

### 5.1. Introduction

This chapter aims at investigating the performativity of regimes of truth in the design of the technology and its applications in specific contexts, such as the social realm. In fact, when blockchain regimes of truth are put into practice in societal contexts, the encoded assumptions that the technology offers on sociality become evident.

One of the most intriguing discourse on blockchain technology is that it is often advocated to ‘do good’, and accordingly, several projects and institutions are becoming interested in the potentiality of blockchain ‘for social good’. But despite the fact that DLT are growingly attracting the attention of different kind of actors, almost no literature on blockchain technology has tried to unpack the notion of ‘good’ which underpins its implementation or understand it in relation to social justice theories. However, this is a quite essential task to undertake.

As long as we assume that blockchain discourse contributes to the design and functioning of its applications, as well as deeming that blockchain discourse is built upon certain technocratic, neoliberal regimes of truth, it becomes necessary to analyze which notions of sociality, social justice and social change are generally uphold inside the blockchain community. In this chapter, I argue that the concept of ‘social’ in blockchain technology is not conceived as related to traditional concepts dear to social justice theories such as distribution and recognition, but rather in terms of meritocracy and financial inclusion which do not properly take into account existing social bias and inequalities.

For the discussion, I present Growbit as my main case study and use it to dig deeper into the societal visions hold by blockchainers. As introduced in the methodological chapter, Growbit is a blockchain application that aims at intervening in the educational context by using blockchain affordances. Growbit’s main goal is to create better opportunities for students’ career after school and is built upon the idea of incentivizing a collaborative approach by rewarding the performative trend of the class. However, although Growbit’s main aim is implementing a collaborative and collective approach (thus maintaining certain ‘social’ premises), the project often assumes a tokenized vision of school and education, while creating a tool that empowers meritocracy and

competition.

For this part of the research, I did an eight-months ethnographical shadowing with Growbit's founder, Alessandro, who became my main research participant and helped me to reach a deeper understanding of blockchain discourses. One of the most striking result of my research activity with Alessandro was certifying that, while he quite strongly identified as leftist and thus very often agreed with my social analysis and political positions, the encoded regimes of truth of blockchain technology often translated his project into a neoliberal, meritocratic vision of education that only marginally provided a sociological understanding of social bias in education (e.g., digital, gender, and social class gaps). By analyzing Growbit from the beginning of its implementation and integrating the views of Alessandro with the ones of my other interviewees, this chapter shows that blockchain discourse tends to legitimize the neoliberal myth of meritocracy and performance. This discussion is particularly relevant when discussing the role of technology in education and the urgency of implementing 'restorative data justice' (Salehi, 2020), and points to the importance of adopting a serious multi-disciplinary approach when discussing new frameworks of technological action in the social sphere.

## *5.2. Scratching the meaning of Blockchain for 'social good'*

When literature looks at ethical issues surrounding digital technologies, it usually focuses on what constitutes "better" and how that might be evaluated, including the impact of technological progress on society (Martin & Freeman, 2004) and the influence of technology on the development of virtuous interactions (Benkler & Nissenbaum, 2006). But although this has been richly done for other technologies and platforms, so far, almost no literature has looked into blockchain technology to unpack what it ultimately means that it can be 'social'.

To date, several projects are emerging in the context of blockchain 2.0 and blockchain technology at large is not only claimed to be the "new big thing" for financial technologies, but also seen as able to transform organizations, democratic governance and human culture as a whole. In this sense, blockchain is claimed to be a technology 'for the social', opening up to a set of initiatives and open calls for blockchain projects, and attracting the attention of international institutions such as the United Nations (Forbes, 2020) and the European Union, which in 2018 even constituted the

EIC Prize on “Blockchains for Social Good” by the European Commission<sup>12</sup> with the goal of exploring blockchain technology “to address sustainability challenges” (EU Commission, 2018).<sup>13</sup>

When this research started, I became increasingly interested in understanding what ‘social good’ meant for blockchainers and institutions which are pushing blockchain innovations. Particularly, I wanted to delve deeper into the notion of ‘doing good’ that underpins the attention of different actors for blockchain who are growly experimenting with the implementations of decentralized ledger technologies in the social sphere. According to the European Commission, for example, the decentralized applications of blockchains for social innovation are covering areas such as traceability and fair trade, financial inclusion, decentralized circular economy, transparency of public processes, participation in democratic decision-making, and management of public records (see EU Commission on Blockchain for Social Good). Further on, a report redacted by the Stanford Graduate School of Business (2017) shows that most initiatives in the panorama of blockchain social applications are related to the health sector, followed by governance and e-democracy which are also popular sectors. In this sense, looking at all the different fields of applications, blockchain social applications seem to be intended as applied to the public and social sector.

The same Stanford’s report highlights how among the different social applications, overall, more than 60% of the initiatives catalogued are for-profit, where the sectors with the most for-profit initiatives are those with the greatest commercial opportunity: energy (94%), health (87%), and financial inclusion (78%) (Galen et al., 2017). Conversely, the sectors driven by nonprofit or public funding activity are mostly philanthropy, social aid (76%) and democracy and governance (33%). Interestingly, blockchain initiatives dedicated toward social impact are still in the early days: 34% were started in 2017 or later, and 74% are still in the pilot or idea stage, such as research projects and whitepapers. This means that it is still hard to tell to what extent blockchain technology does work in its social application, because these applications still remain largely experimental and quite theoretical. The aim of this work, however, is not discussing whether blockchain social applications are effective in their practice and neither measuring the kind of impact that its design and technicalities may have in social field. Instead, I argue that it is sociologically relevant to make sense of what is ‘social’ in blockchain technology and what definition of ‘social good’ do blockchainers seem

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<sup>12</sup>See more on the EU Commission page: [https://ec.europa.eu/research/eic/index.cfm?pg=prizes\\_blockchains](https://ec.europa.eu/research/eic/index.cfm?pg=prizes_blockchains)

<sup>13</sup> The winning applications were announced in September 2020. There were six winner projects: WordProof (timestamps for increasing cybersecurity); PPP (supply chain and traceability); GMeRitS (financial inclusion); OXBUU (aid and philanthropy); CKH2020 (decentralized circular economy); PROSUME (energy). *Source*: European Commission, 2020

to hold, since the visions of the world embedded in blockchain can reveal which kind of change is desirable for developers and startupper involved in the scene.

Blockchain is indeed not only understood in terms of applications unfolding in the social sphere. It is also claimed to be a technology ‘for good’, where this ‘social’ dimension points to a kind of ethical drive and positive collective impact of the application. This position is made clear for instance by a growing literature on ‘blockchain for good’ which argues that blockchain can substantially change the way in which social good can be enhanced, claiming that blockchain would be able to tackle global challenges such as sustainability, financial exclusion and humanitarian issues (see for example Kewell et al., 2017). The adjective ‘social’ communicates then the inner motivations of the entrepreneurs and developers, and the core business of their projects. The latest EU Joint Research Center report understands blockchain for good in terms of “what projects can do to strengthen civil society and reinforce elements such as public and social commons, while also opening up new or renewed collaboration paradigms and alternative forms to generate and distribute value” (Polvora et al., 2020:14).

However, one question that I asked myself while researching on blockchain social applications was to what extent could we consider ‘social’ a technology that seems to maintain certain attachment to the profit sector, as well as a strong link to the neoliberal Californian Ideology. Asking how blockchain can actually ‘do good’ is important because it might reveal certain assumptions that developers of the cryptocommunity hold on social change and social justice that they aim to promote. Considering the individualized post-political approach of blockchainers, we can suppose that interpretations of social justice might differ from case to case; yet, I will show shared beliefs on society and social good to make a broader sense of blockchain in the social sphere.

In the next paragraphs, I will present how social good is traditionally defined in sociological studies and highlight its link with social justice studies, arguing that these definitions need to be taken into more serious consideration when implementing and designing technological applications ‘for good’.

### *5.3. Social good and social justice*

Arguing that blockchain technology is beneficial for social good participates in building a certain imaginary around blockchain affordances. To understand how this imaginary is constructed, it is necessary to delve deeper into the academic debate on social good and social justice.



Social good broadly refers to services or products that promote human well-being on a large scale (e.g., Business Dictionary, 2017; Law Dictionary, n.d.), which may include access to healthcare services and educational programs, public access to clean water, as well as equality and civic rights. In the background of critical leftist theory, the term 'social good' is typically defined as a practice or action that provides benefit to the collectivity. Social, in this sense, normally indicates responsibility towards the collectivity, and values of solidarity and cooperation. A more specific definition of social good has been suggested by Barak (2018) in her work on practices of social good for social impact:

*“Individual, community and society well-being related to (a) domains such as environmental justice and sustainability, diversity and inclusion, and peace, harmony and collaboration; (b) engaging unconventional systems of change such as grass roots and business collaborations, national and international NGOs, and social entrepreneurs; and (c) utilizing innovative technologies and approaches, such as design thinking, big data driven models, and harnessing social media for social change, all aiming to promote social justice.”*

(Barak, 2018:2)

However, this definition is still too broad to understand the boundaries of practices of social good, thus allowing the incorporation of traditionally opposed concept such as private gain and business to the social field. In recent years, literature around social good has steered towards a conception of social good as detached from private profit to a general acceptance that neoliberal activities can also 'do good' to society (see for example Gordon et al., 2016; Barak, 2018). In this perspective, several fields have started to be rebranded using the prefix 'social' pointing to the growing existence of ethical consumerism inside the private sector. Examples of this are the increasing presence of concepts such as 'social marketing', 'social return on investment', 'social valuation', 'social analytics', or 'social entrepreneurship' (Davies, 2015; Bandinelli; 2017). This conceptualization of the social often passes through the idea that, in order to produce social change, individual behaviors can be influenced by using marketing and commercial strategies that would “benefit individuals and communities for the greater social good” (Gordon, 2016 in Bandinelli, 2017). According to this position, social good would draw on resources from disparate systems such as grassroots organizations, businesses, and social entrepreneurs (Barak, 2018). In this line, Adam Arvidsson, in his book *The Ethical Economy*, discusses the tendency towards a mode of economic production that is oriented towards and motivated by ethical values and social conduct (Arvidsson and Peitersen, 2013).

This has taken many to increasingly address social good in terms of economic freedom and competition, converging traditionally opposite concepts such as private and public good, leaving room for the subsumption of social battles and social justice by capitalist system.

In opposition to these views, I argue that social good should be framed in terms of 'common good', where common good represents a way of overcoming private and political interests by working towards collective goals of public value (Beerbohm and Davis, 2017). In this sense, the concept of the common good should not privilege the interests or values of some members of a society over others and thus should remain free from any kind of external interferences such as economic and political power. Common good, in fact, is strongly attached to the concept of justice, and in particular in terms of distributive justice (Rawls, 1971) and has been widely debated inside social justice literature.

One of the most relevant contribution to social justice literature has been given by Nancy Fraser's work. For Fraser, injustice and justice and historically co-dependent concepts that require an understanding of what is unequal, who is unequal and how inequality is inscribed in different institutions. Fraser claims that a valid theory of justice should recognize the interrelation between the 'what', 'who,' and 'how' of justice, because all these questions interfere with the capacity of social actors to participate equally and meaningfully in a given society (Fraser, 2010). Social justice is conceived in the dimension of three different concept: recognition (who deserves rights), distribution (who deserves income) and, more recently, representation (who becomes visible). The corresponding forms of injustice are maldistribution, misrecognition and invisibility (Fraser, 2019). Fraser's theory is particularly relevant because it highlights how "a new spirit of capitalism" (see also Boltanski and Chiappello, 2005) is causing a progressive reduction of equality to meritocracy strengthening neoliberal hegemony. As Fraser puts it, "the discourse of social justice, once centered on distribution, is now increasingly divided between claims for redistribution, on the one hand, and claims for recognition, on the other" (Fraser, 2009:3). It is like the two kinds of justice claims are being increasingly dissociated one from another, causing a progressive focus on recognition while leaving aside the focus on redistribution. According to Fraser, however, all dimensions of social justice need to be taken into consideration to reach equality and social good. In this sense, claims for equality do less and less effort to abolish social hierarchy, asking conversely to 'diversify' and 'empower' minorities in order to let them rise the social ladder (Fraser, 2019). However, for Fraser this idea is strongly misleading: it's the idea that 'under-represented groups' can reach and attain positions and

wealth of straight white rich men, disregarding all the social, political and economic inequalities and gaps that individuals may face from the beginning of their lives.

The problem of believing that meritocracy means equality has been addressed also by Amartya Sen, who argued that growth is a bad indicator of life quality because it fails to show how deprived people are doing (Sen, 1980; 1995). Amartya Sen has made a major contribution to the theory of social justice by arguing that “capabilities are the relevant space of comparison when justice-related issues are considered” (Sen in Nussbaum, 2003), especially considering that they always intertwine with rooted discrimination of different kinds (Sen, 1980). Capabilities, for Sen, have a very strong relation with human rights: political liberties, the freedom of association and occupation, economic and social rights, etc., are all examples of capabilities that provide goals for development and social/common good. But the myth of meritocracy remains an evergreen in capitalist societies, often advocated as a means of ‘doing good’, and research in the field of social psychology has also shown how especially those higher in the social hierarchy tend to embrace the ideology of meritocracy (Knowles et al., 2014). This is quite problematic since, as nicely exemplified in the work of Fraser, the belief in meritocracy legitimizes existing status differences among individuals and groups and helps to justify the status quo (see also: Jost & Banaji, 1994; Sidanius & Pratto, 2003). It seems thus that the concept of meritocracy is increasingly substituting the concept of solidarity, which is the foundational basis for social justice. In conclusion, while the definition of ‘social good’ has normally been attained to a conception that primarily looks at social justice and redistribution as means to do ‘good’, this is not always the case. As Arvidsson points out in his latest book “Changemakers?” (2019), neoliberalism has almost entirely uprooted this notion of the social from discourses on society, substituting it with discourses on market which is populated by entrepreneurial individuals.

Inside the blockchain community, something similar seems to happen and blockchainers tend to adhere to a neoliberal view of ‘social good’. In the next paragraph, I will show how my research participants frame blockchain’s social impact and argue that their conceptualization is very much linked to a meritocratic and competitive vision of the world.

## 5.4. What is social in blockchain social applications?

### 5.4.1. Social good is value

In line with neoliberal views on social good, blockchain for the social shows a strong link with the financial world by advocating the creation of value as a means for social justice. This position is firstly made clear in the “Blockchain for Good Manifesto” (2018), redacted by blockchain experts and developers, where the notion of social good is clearly delinked from the concept of non-profit, thus highlighting the propensity to the changemaking ethos of ‘doing good while making money’ (see Arvidsson, 2019; Bandinelli; 2017):

*“We are living in a world where ‘for good’ has become zeitgeist and is often interpreted as “social good”. However, to set the scene of the discussion it is really important to note that “for good” is not limited to non-profit activities or the third-sector. Business that will continue to thrive tomorrow, will be those with a clear purpose which is underpinned by a commitment which balances the triple bottom line of people, profit and planet.”*

(Blockchain for Good Manifesto)

When considering how blockchain can be used for good, it seems that its relationship with creating new value becomes the central changemaker element, disregarding all the issues that the current neoliberal economic system causes to global inequality and social exclusion. In this sense, blockchain affordances are principally seen to “do good” by resolving longstanding obstacles to profitability and value capture (Walport, 2016 in Kewell et al., 2017). This ethical push remains blurred, while blockchainers maintain a focus on the profitable nature of their projects:

*“I am going for the social, I am business smart and I like to build businesses, but I also like to do good.”*

(informant 3)

In the same line, Kewell et al. have stated that “when considering how blockchain can be used for good, it is important we look at its relationship with creating new value” and that “DLTs represent a fundamental change in the way in which humans can exchange value” (2017:431). Value is a concept that is really tied to finance, but in blockchain discourses almost every human

transaction is conceived in terms of value. One of my interviewees (3) from London exemplified this position talking about Bitcoin telling me that *“Bitcoin is actually value and in society value is everything. Everything is value in society”*. This view leads to a tokenization of social relations, in which metric power becomes visible and every human relation can be conceptualized in terms of economics:

*“Even vote is a value transaction, and blockchain is there to emit value transactions with all the privacy that it might be necessary”*

(informant 4)

While conversating with my research participants, this position came out very often. The idea that money empowers people was commonly shared among all participants, disregarding their political position in the spectrum of blockchain imaginaries. For instance, an informant from London, who identified himself as an anarcho-libertarian, told me that *“money is a basic tool to give back power to the people”* (informant 1). This position was of course in line with a political ideology that identifies market freedom as the ultimate goal for enhancing social good, and can be exemplified in a quote that I collected during the participation to a conference called *“Blockchain and anarchy”* at the Imperial College of London, which was hold by a well-known crypto-libertarian. During his presentation, he stated: *“Private property is the only right that should exist. Human rights are just a consequence and extension of it”*.

While I was expecting to find this kind of statement inside the right-wing part of the cryptocommunity, I was quite surprised by discovering that, even when interviewees identified themselves as part of the commonist and peer-to-peer community and thus in theory more strongly related to practices for enhancing common good, this position was still somehow shared. In an interview with a Londoner artist who defined herself an anarcho-leftist, she told me that she only recently came across with the market theory, but that after the encounter she changed her mind on the role of economy for helping disadvantages communities. In fact, she extensively explained to me that in her opinion we should accept that the market is central for empowering cultural activities such as art and music, drawing to a sort of capitalism realism (Fisher, 2009) in which blockchain was depicted as the final instrument to create alternative and more horizontal market economies. Discussing how blockchain could help the world of art, she stated:

*“We needed to start to think of alternative economies. We kind of have of problem in art if we think we are kind of autonomous, if we think we are separate to the rest... I think we really need to have a relationship with economy. I think the art world has got a massive wealth owned by a tiny number of people. Meanwhile, in the richest cities around the world artists are struggling to get a living... this is a real problem. I think we need to look at money and economy as a means themselves and shift our position in order to become more empowered. And this is important to me, because if artists do this, it will make them more available to other people. Using Blockchain as a reward to think about this stuff, to put artists in a network and in a conversation with unintuitive, really uncomfortable conversations on putting market first... we can't afford remaining in a bubble.”*

(Informant 2)

In this sense, common good is mostly conceptualized upon the economic concept of commons (Arvidsson, 2020). This position was also restated during a roundtable organized in London by artists working with the blockchain ‘for good’. The whole panel concerned the role of blockchain in art and in the conclusion the same informant above stated that “art is not separated and autonomous from money. We need to look at money and economy as a means itself” (informant 2).

The aspiration of living a decent life, in substance, cannot be fulfilled anymore by public funding and public institutions. In this way, the role of collectivity is diminished, and social change is let in the hand of individuals that can play with technology and finance. In this sense, blockchain becomes a tool of hope and change to rebuild a more just society, showing a dejected surrender to the logics of the market.

In blockchain discourses, value is also said to be the measure of goodness. This does not come without consequences, because this view of the world ties with the tokenization of social relations and the legitimation of metric power. As a well-known Bitcoin evangelist and entrepreneur from Milan also puts it:

*“Unlike words, purchases are worth more. I can tell my boss how healthy I am, but the insurance payment is worth more. I can tell my girlfriend how much I love her but paying for a pendant to my lover is worth more. I can tell the party leader how loyal I am to the party line, but if I make a payment to a group of opposing activists that speaks more. So, payment is something that speaks more than we do: while it is possible to send us messages directly peer to peer, before Bitcoin payments could not be peer to peer. (...) Money is essential when we have to exchange value with*

*strangers, with people we don't trust. Maybe they are enemies, maybe they are tribes that fight and have to exchange, or international powers that have to trade: money takes over which must be fungible as a characteristic "*

(Informant 26)

As previously discussed, social justice theories point to the very necessity of understanding justice, equality and social good as political goals, which should be delinked from any kind of private and political interests. For this reason, the relation with the concept of value with property rights and market economy always embraces capitalism realism, avoiding a structural critique of social hierarchies and an imagination of new social and economic structures. Once again, it becomes evident that these entrepreneurial individuals do not see economic enrichment and capital accumulation as radically opposed to 'doing social good' and 'change the world': money become instead a way to change the things they do not like, reaching personal fulfillment and "impose their very personal vision of the world on the others" (Arvidsson, 2019:90).

#### 5.4.2. Social good is meritocracy

The idea that money and value are central features for enhancing social change 'for good' is taken even further by blockchainers. During the conversations we conducted, in fact, they tended to stress the idea that economic rewards are useful to incentivize the good in people. This view comes from a competitive view on society, in which individuals are bad and selfish by nature, thus monetary incentives become the ultimate means to enhance solidarity among people. This position is exemplified by a quote from one of my informants from London:

*"You cannot stop people from acting badly, but you can actually incentivize people to behave in a good way. Humans are not good by nature. They are actually selfish and think about themselves. So, for me... I don't like the concept of NGOs because the money they receive is actually for the people in the system, people inside get a lot of money and have nice lives. So, we need to focus on incentivizing the good in people."*

(informant 2)

On the whole, a conception of competition and meritocracy foregrounded by a neoliberal culture of individualization seems to characterize the blockchain experimentations in the social

arena.. Blockchain is seen by many as a tool that would unleash the potential of the individual, as it creates social systems whereby one does not need others to be successful. This replicates the startup culture of meritocracy by which the onus of success and failure falls firmly onto the individual and their hard work: blockchain technology is seen as able to remove those intermediaries that impede meritocracy to actually affirm. See for instance how this blockchain expert from Milan, who works at a start-up that provides blockchain solutions for companies, describes his view of blockchain:

“I dream of a meritocratic world. For me, the blockchain was exactly the element I expected. Clearly this is only in my head, without the world becoming aware of it it becomes difficult. But even without resources, here I am in a position where I can showcase everything I have in my head. I'd like to create platforms where various actors, for example musicians, can emerge from below without intermediaries, without forms of corruption. I put meritocracy first. And since we have the blockchain it is possible to create a distributed environment in which these actions take place without someone directly controlling them, I stand up for it.” (Interviewer: and what does the blockchain have to do with it? What do you mean by meritocracy?) Respondent: “That any actor has the same chance as others to emerge.”

(Informant 29)

This belief in meritocracy as a means to promote equality is very related to the hacker community. Studies on hacker ethics have broadly shown how the concept of meritocracy is central in the developers' community, in which effort and passion for work are elements to measure the value of work (see Himanen, 2010; Coleman and Golub, 2008). Levy (1984) also explained how this ethical principle that underpins computer scientists' practices was present since the beginning of the Internet network, in which hackers wished to be judged on their output only. In this sense, computer scientists tend to adopt a vision of the world in which everybody can be a hacker and gain access to computer networks power just by studying coding and learning it in a DIY perspective, often downplaying social inequalities that might be related to Internet access and knowledge. Generally speaking, hackers strongly believe that success is a reflection of hard work and talent, and they easily forget “external” help that may explain their own success. In the blockchain world, this vision is applied both to the idea that everybody can learn the code and, by doing so, individuals get empowered and financial freedom by eliminating third actors:



*“So, in a way blockchain decentralized fortune, investments and money making, and brought it to the masses. Basically, you do not need to come from a wealthy family, and you don’t need to know anything about investments. If you’re lucky enough to be a geek or hipster, you will use a blockchain to distribute the money to the masses like that. This is an advantage for me on a personal level. I really think it empowers the masses that way.*

*This is no longer the case as it really became massive. Now the price dropped down.”*

(Informant 9)

This quote from the CEO of a startup in London is particularly interesting for the reflection on meritocracy and equality because it shows that, on the one hand, this informant identifies “geeks” and computer scientists as kind of pioneers of an economic revolution based on coding skills; on the other hand, she claims that using a blockchain can empower individuals and masses, unless it becomes massive, hence highlighting a strong contradiction between the desired effects and the actual result of the use of blockchain and cryptocurrencies on a large scale that jeopardizes the profit of miners and individuals who participate in the crypto community.

Finally, it is also important to see how this emphasis on meritocracy as a way to enhance social participation creates a biased vision of the world, which lies on the Weberian spirit of capitalism (see Max Weber, “The Protestant Ethic and the Spirit of Capitalism”) that identifies work as the most important aspect of individuals’ life. Seen through these lenses, everybody deserves a decent life as long as they prove to be motivated enough to find a job and participate in the economic system. In the next quote, one of my informants shows this position by explaining that the ultimate goal of her blockchain application is intervening into marginalized communities by “empowering” homeless people:

*“A\*\*\* is for making the world a better place. (...) I think we need to be able to see problems and not to deal with poverty in a way of giving stuff away. Helping the shorter will help poor people to get empowered and become like us, have a job and become autonomous. That’s fighting poverty, not giving free shoes, that won’t have them having a job, they will just receive free stuff. They are not different to us.”*

(Informant 10)

The idea that poverty and inequalities can be solved by “empowering” individuals is at the edge of the neoliberal ideology. This view embodies a capitalist way of thinking according to which poor and disadvantaged people are mostly lazy individuals who do not care about working and remain at the margins of society for a personal choice. The identification of a “them and us” creates a patronizing distance between rich and poor people, and goes in opposition with theories on solidarity, equality and social good that rely on a broader sense of community and structural fights against social inequalities. Blockchain embodies this view and aims at intervening in the social sphere by means of philanthropy and individual empowerment.

#### 5.4.3. Technological accountability for good

Another aspect that is claimed to be efficient in terms of social good is that blockchains’ underlying capabilities provide data confidentiality, integrity and availability. Blockchain technology is designed as a transparent and open technology, in which every participant maintains a copy of the chain of blocks making it hard to tamper and hack. This is particularly interesting in terms of data justice, since blockchain is often advocated as the ultimate technology that will solve problems of data privacy or ownership, thus pointing to an inner capability for promoting fairness and equality on the web. During conversations with blockchainers, I asked questions related to data justice issues trying to understand how my research participants interpreted the arrival of DLT as a means to face new social challenges arising from the incorporation of digital technology in society. Several of them highlighted the idea that blockchain may give back power and data ownership to citizens, often providing an informed and critical view on the actual power imbalance on the Internet. The transparency of the network and its potential for accountability was often advocated as a solution to problems such as mass surveillance or data monopolies by digital platforms, as this informant explained:

*“We need to build public services on the web and civil services where people feel like they are not being surveilled. That’s a prerequisite for any democracy. We don’t really have any public sphere on the web right now. (...) D\*\*\* is interested in understanding how people share data for the common good. D\*\*\* doesn’t just want to create a tool where people lock their data down from anybody else: we want to create tools by which you can actually share data, in a trusted way.”*

(Informant 8)

This view is expanded broader by a number of my informants, who claimed that this inner feature for transparency and accountability would be also useful to fight political corruption and to solve humanitarian crisis. In the area of 'bitcoin maximalists', this idea was mostly attached to the idea of giving back power to the people by providing them with the possibility of becoming financial independent, as this informant from Milan explained:

*“Bitcoin will be extremely useful for outsiders, those who are underprivileged and underserved by the financial system: a woman in Afghanistan who cannot own a bank account, Wikileaks which sees its payments denied by Paypal, a Chinese man who wants to transact with a friend from Switzerland, people who are cut out from the system because they live in underdeveloped countries, sex workers and migrants. Look at the case of Venezuela: there are already people using bitcoin to escape dictatorship. So first and foremost, blockchain will help unprivileged and unbanked people. It sounds like a fringe category, but it’s actually the majority of people on planet earth. Poor people.”*

(Informant 27)

In this example we can see how geopolitical issues and global inequalities are thought only in terms of financial exclusion, in a way in which blockchain becomes like a magic wand for empowering people. But this position was not only shared among anarcho-capitalists: in fact, I found similar ideas among both crypto-institutionalists and crypto-commonists. This was particularly true when I was conducting interviews in Estonia and had the chance to talk to the developers of the X Road system. Estonian informants explained to me that the reasons why their application of blockchain could be considered 'social' was that they were implementing blockchain solutions for situations of inequalities, such as helping migrants to get an ID or helping women to denounce domestic violence<sup>14</sup>. The underlying idea of this kind of statements is that, by converting social relations into measurable and accountable transactions, social problems can be fought and denounced more easily. This position is also quite common inside the hacker community and originates from the conviction that when something becomes metric, it can be more easily verified and controlled: it is precisely the metric power that Beer extensively studied and explained (Beer, 2016).

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<sup>14</sup> To know more about how blockchain scholars and experts are suggesting to see blockchain as a feminist defensive tool, see for example: “Blockchain applications for collective defense against sexist actions” (2021), available at <https://p2pmodels.eu/blockchain-application-for-collective-defence-against-sexist-actions/> (Last accessed 21/03/21).

Conceptualizing social good in terms of measurability leads in fact many blockchainers to think about solutions in terms of efficiency, and although blockchain has also been claimed as a solution for problems such as the algorithmic black boxes, many participants shared the idea that blockchain solutions should be simplified to the general user in order to become scalable. Only in this way, blockchain will be useful 'for good'. When social impact and social good are understood in terms of measurement, they also become something to achieve and track.

The problem of interpreting every kind of social relation in these terms becomes more visible when we look at projects that aim at using blockchain applications to intervene for example in the social aid sector. Again, blockchain is advocated as a way to limit corruption and to make sure that money is used properly by NGOs and social workers, always starting from the idea that humans are greed by nature:

*"We only track what has been achieved. And the more you achieve and the more you can prove it, the more money you will get because donations and investments should be based on whether the project is delivering well, and whether those beneficiaries are indeed being helped. (...) It's not about money making money, like private sector, banking. It's more about measuring the efficiency. And with the social sector, why would it be different? It's people money. And it's people's life. Like you really need to prove that you helped."*

(Informant 9)

While insisting on the necessity to achieve results and make sure not to waste money on inefficient services, the very nature of solidarity act is denaturalized and conceptualized only in terms of generous philanthropy instead of pointing to the existence of structural problems.

### *5.5. The case of Growbit: Blockchain in education*

To provide a deeper understanding of the application of blockchain in social fields and get a practical example of how blockchain regimes of truth come embedded in the design of the technology, I will now present the main case study of this work: Growbit. Growbit is a blockchain app that aims at intervening in educational contexts to provide students more career possibilities.

When I met Alessandro, the founder of the project, he contacted me because he was seeking academic help to make sense of the extent to which his idea was valid for been used in the

educational field, so I asked him to use Growbit as a case study and doing a eight-months shadowing ethnography in exchange for my personal views on blockchain technology in the social sphere.

Alessandro always showed enthusiasm for our conversations, and, although we did not always agree on the utility of blockchain technology, over time our relationship developed from one between ethnographer and participant to the dimension of friendship, and some cases, I also ended up helping him with preparing the drafts of the projects for applying to national and European grants.

I used to meet Alessandro in Milan for lunch and coffee breaks, and I always enjoyed his presence and his liveliness, especially because we shared many questions and values that brought both of us to attend hacktivist events and meetings in Milan, such as cryptoparties or hacker reunions. Alessandro was also extremely helpful for making me reach a deeper understanding of the crypto community in Milan, especially because of his constant name-dropping and invitations to different events and informal meetings that allowed me to conduct several conversations in the blockchain scene.

Although Alessandro has always identified as a green-leftist, during my fieldwork I started to realize that we had quite different views on the origin of social problems, particularly those concerning data justice. As a sociologist, I always stressed the necessity to look at social, political and economic structures as intertwined to understand data imbalances of the web, while Alessandro, as a developer, tended to emphasize more the role of technology for both creating and solving social problems. This divergence of opinions became more visible as I delved deeper into the analysis of Growbit which represented a sort of life project for Alessandro, who told me to feel deeply moved by his social inquietudes and by a genuine interest for “making the world a better place”.

### 5.5.1. Project and mission

Growbit is an Italian application of blockchain technology for education which has already been tested in a few schools in the area of Florence. The project was born from a group of friends with the aim of designing a system that *“encourages high school students to pursue good results during their studies, while stimulating collaboration and teamwork among the students. Growbit also aims at creating a tangible connection between the students and their future academic or business developments”*<sup>15</sup>. The underlying idea of Growbit is intervening into the problem of school

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<sup>15</sup> To know more about Growbit, visit: <https://log.growbit.xyz/> (Last accessed 21/03/21).

abandoning and the growing disinterest towards culture and knowledge by young people, using a blockchain-based incentive that, according to founders, would provide students with the motivation to follow with their studies and strengthen their possibilities to find a job after diploma. In their view, stimulating teamwork with blockchain incentives might enhance the opportunity of doing career. Blockchain is the central actor technology of the project, because its open architecture and the possibility of creating smart contracts “give students a unique possibility to valorize the achievements gained during their studies and make them transparent and globally accessible” (Growbit.xyz). Growbit is constructed upon a specific formula that, by looking at students’ grades, calculates a monthly scholarship that can be sent to students’ Bitcoin portfolio. This is particularly interesting because Growbit originates from the social aspiration of “fighting social inequalities and individualism”, which, according to founders, it is embedded in the code of the project: as we can read from the project presentation, in fact, “the formula does not reward the best student; instead, it evaluates the class growth as the main KPI and will be based on teamwork between students”. According to founders, distributing scholarships based on the students’ achievements as a whole will favor teamwork instead of individualism, as exemplified by this quote and figure 11:

*“The important message we want to convey to students is that their classroom is a projection of the bigger society in which they will be launched into at the end of their studies. Thus, it is vital for them to realize that they must take care of each other in order live in a fair and equal society”*

(Growbit.xyz)

01.

Society as we know it is dreadfully **inequal**.

02.

This won't **change** if we don't **do something** about it.

What we **can** do is encourage **team work**.

The right place to do this is in the classroom with **high school students**.

Figure 11. Growbit statement on social inequality

Using Growbit, students would also get familiar with coding and interact through algorithmic intermediation: founders are moved by the idea that, by educating and convincing students to use the blockchain, and allowing them to use that knowledge to demonstrate the existence of the Open Badges in their possession, Growbit may lay the foundations for a paradigm shift in the way we handle metadata. As we can see, Growbit is built upon big promises: not only founders aim at reducing school abandoning and increasing students' performativity, but also, to a broader extent, they aim at promoting a collectivist culture and encouraging social equality while fighting social inequality.

When I met Alessandro, I was particularly intrigued by the project and the vision of the world he held. He always mentioned that he was seriously worried about the lack of interest for collectivity and culture, and that his vision of the world was based on social and cultural growth. However, as soon as I delved deeper into the comprehension of the project, I started to acknowledge a number of simplifications and biases regarding society that I will further discuss in the next paragraphs. Those are related with blockchainers' view of blockchain for social good that I have discussed above. Using Growbit as a case study, I will show how value, meritocracy and accountability become central in the construction of blockchain projects that aim at changing the world.

### 5.5.2. Value, meritocracy and accountability in Growbit

Growbit makes a good case study for the understanding of blockchain for social because of different reasons. The project lays its foundation on the idea of encouraging teamwork and a more collaborative approach to educate students to be more responsible and worried future citizens. But while the ultimate aim of Growbit is certainly valuable, it also presents a number of social interpretations and beliefs that may contain biases which have their roots in the neoliberal techno-approach of the Californian Ideology.

I discussed this point in depth with Alessandro during the ethnography, because I wanted to understand better how he conceptualized the social good of his project. First of all, I delved into his idea of equality and collectivity focusing on his preoccupation for fighting individualism. While this idea complied with the elaboration of the project, I quickly noticed that, similarly to other interviewees, he identified equality with the affirmation of meritocracy. In fact, the whole idea of awarding students with scholarships did not distinguished between getting an educational scholarship out of need or out of merit. Growbit claims to look at the general performance of the class awarding deserving students with scholarships emitted in Bitcoin. For Alessandro, this was the crucial part of the project: since it was the class to be rewarded, and not the individual student, the application of blockchain was not based on a competitive approach, rather it was deeply collaborative. However, in the slides of the presentation of the projects, the same founder also state:

*“The best way to learn is competing. Competition has its roots in the game, and we play to learn how to code”*

(Growbit.xyz)

Competition is understood as being ‘part of the game’: it is not inherently problematic as long as results are distributed. However, when discussing education, it is necessary to understand that scholarships are born with the aim of helping disadvantaged individuals to complete their studies, not just to award performativity. Using performance as a means to evaluate merit and participation may also have negative implications. In fact, research demonstrates that meritocratic beliefs may have negative consequences on individuals, such as decreased self-esteem and blaming oneself for failure, especially for members of disadvantaged groups (McCoy and Major, 2006; Foster and Tsarfati, 2005). In this sense, Growbit does not address the meritocratic myth, but it actually reinforces it. This



originates from the same vision of the world, shared among blockchainers, in which humans are naturally competing. In words of Alessandro:

*“P2P systems are cool and are good ideas, because they require users to understand the importance of remaining in the network without asking back. This is not what happens normally, otherwise we would all engage in voluntary work! Instead, the basic functioning of blockchain systems involves incentives to remain in the network, to actively participate and to do teamwork”*

Put in this way, the economic incentive acquires centrality in encouraging collaborative and ‘good’ behaviors. Giving rewards becomes the most effective way to push students to pursue their studies and think about their future, as Alessandro explained to me during an interview:

*“In the past years, we often wondered which was the best way to encourage and incentivize students to follow us and to carry on the studies even when we were not there... basically, I was wondering how to make them curious. After studying Bitcoin, I put two and two together and I said: maybe we should use a cryptocurrency to incentivize students! But at the same time, let’s also use blockchain to verify their results”*

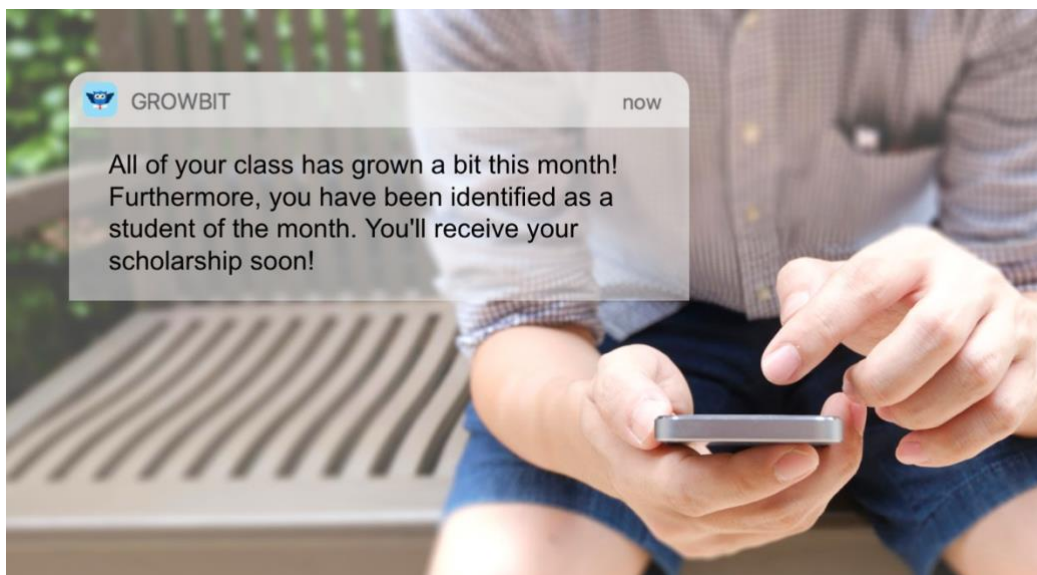


Figure 12. A diapositive showing how Growbit works

The belief in the power of the economic incentive is attached to the belief in utilitarianism and rational choice theories (see for example Coleman, 1986) in which individual behaviors is always understood as an instrumental act to maximize individual benefit in line with economic logics. However, this theory has been criticized for being quite limited for a sociological understanding of human behaviors, because it downplays the influence of social and cultural structures and tends to financialize social relations using the lens of methodological individualism (Boudon, 1998).

By conceptualizing individual behaviors in rational terms, Growbit's founders accept in fact that creating value is essential to provoke interest and inquietudes in students. This becomes clear also in their understanding of what young people like to do: according to them, "having fun, having rewards and having a sense of achievement" are key factors to encourage social good and social growth.

Beside the rational understanding of human behavior, a tendency to a belief in techno-determinism underlies the design of Growbit as well. In fact, it is often mentioned by founders that Growbit is thought also as a way to educate students and their family to collaborative values, in which solidarity and cooperation are understood as a 'skill' to learn. As Alessandro stated:

*"The student will be incentivized to help other students to get better results - maybe not the best results but certainly better- and we think that this could enhance the formation of teamwork, which is not only related to studying because the same principles of collaboration can be reapplied to the life of a citizen. We could have people who have this skill of collaborating and could maybe create new initiatives; they could stop resonating as individuals and perhaps bring something to collectivity"*

In line with this conviction, Growbit would also be useful to educate citizens to the principles of hacker ethics such as privacy and encryption because, once students have learned to code with blockchain, they would automatically get closer to certain positions and even educate others, as Alessandro points out:

*"The fact that the tool is complicated and not very user-friendly may bring people who before used their phones and apps without understanding their functioning, to make a step further. This step increases the technological culture of people, which is very important because it reflects the awareness on how we use our data and how we interact online. Maybe from there, a critical though can also arise... this takes them closer to encryption, which goes hand in hand with the*

*understanding of privacy, because if I know the encrypted techniques to keep my privacy safe, maybe when I use a service such as Facebook and Whatsapp I ask myself more questions. So, in my opinion, this is a technology that perhaps it is still not mature, but since it is not immediate, it may force users to make a bigger effort increasing culture and bringing social change. If I understand the importance of encryption because I use bitcoin, maybe I also start to evangelize it with friends, colleagues, family, and together we really start reasoning about how privacy works in the digital world.”*

As for other blockchainers, and more generally hackers, discrimination and inequalities can be fought using math formulas and coding. The understanding of code as inherently neutral and free from bias and discrimination is exemplified in the famous quote “code is law”, that has also been incorporated in the presentation of Growbit to the general public (figure 13).



Figure 13. Growbit and 'code is law'

Generally speaking, this belief in the inner capabilities of code and algorithms to change the world often derives from a poor understanding of social mechanisms. There is a tendency to apply mathematical simplifications to complex social dynamics, which often does not take into account existing bias and inequalities. In the case of Growbit as a blockchain application for education, this becomes quite visible: Alessandro and the other founders do not address the nature and causes of social injustices and their relationship to educational processes. For example, Alessandro stated:

*“We do not plan to overlap with the scholastic evaluation, so we would let that untouched and would not discuss how school is currently evaluating students. We basically start from already produced data on students’ evaluation and try to incentivize teamwork”*

This position does not consider the existence of social inequalities in terms of access to education, experiences of education and differences in outcomes after formal education (Hart, 2019). Education inequalities may also be related to social background, ethnicity, gender, and social and cultural capital (Bourdieu, 2010). Following Sen’s reasoning on capabilities and Bourdieu’s reflections on cultural capital, a project that aims at intervening into educational discrimination should be drawn upon a pluralistic framework of evaluation that goes way beyond the pure performativity and measurement of achievement. In substance, it should necessarily take into account the fact that many factors intervene in the educational process and the career outcome of students. However, this vision is not embedded in Growbit.

Finally, founders also seem to think that young people are somehow alienated from individualistic dynamics of society because they are not still involved in the market labor and political system:

*“Young people are the future. Since they are not yet in the market labor or institutions, they are not yet polluted by individualism and selfish behaviors. They evolve from a subset of society that is protected from the worries and concerns of adult life. That means that they have the time to learn how to help one another.”*

(Growbit.xyz)

Again, this vision downplays the influence of cultural and social factors on individuals and over-simplifies the solution that should be adopted to generate a more inclusive and equal educational system. However, this reflection is more than necessary when discussing the future of education and its relationship with technological tools.

## 5.6. Conclusion

This chapter has looked at the meaning of blockchain for social good, trying to outline shared patterns of understanding of the social and embedded biases.

In general, blockchainers tend to think of social good and social justice in terms of creating value, reinforcing meritocracy and providing actions accountability. As I have tried to show by analyzing conversations and more specifically the case of Growbit, this vision of the world is very attached to neoliberal logics and does not provide a critical stance of existing inequalities and social discrimination. In fact, it shows that blockchainers interpret sociality from a competitive and rational ideology.

In this sense, in the blockchain community individual (and collective) freedom cannot be reached by rebelling against the 'system', but rather by subordinating to 'natural laws' of free market and technological progress. This 'capitalism realism' tends to legitimize a vision of the world in which culture, art and social relations are being commodified and subsumed by financial logics of blockchain technology. Despite the fact that blockchainers seem to be moved by a genuine push to change the world for the better, their social vision is simplified and modelled on a mathematical and rational understanding of society. This becomes visible as we acknowledge that this position seems to be shared among the whole spectrum of political ideology of the blockchain community. While an informant from London once told me, *"I would create a world with no wealth divide and equal and amazing education for everyone"*, the way in which this happens is often let to the features and affordances of blockchain technology which is believed to be inherently apt for the good because of its open, transparent and decentralized structure.

The case of Growbit has showed more in depth how social justice is often conceptualized in individualized and tokenized terms and exist in so far as an individual obtains the examination results that they deserve on the grounds of ability and merit. This implies that 'fairness' plays the dominant role in determining an individual's performance within a competitive scenario and reflects a deep-rooted commitment to the ideology of the meritocracy in assuming that an individual's personal achievement (or failure) in educational settings is down to individual efforts and abilities. In this sense, it is important to re-define the concept of common good in terms of social justice. Indeed, if we accept too broad definitions of what 'doing good' means, we may end up merging the idea of equality with meritocracy and only see redistribution as a means to democratization. Instead, we need to focus on recognition, representation *and* distribution to discuss social good in the digital society.

## *Conclusions and future steps of research*

This work has analyzed blockchain imaginaries by exploring narratives and discourses of experts, developers, entrepreneurs and enthusiasts that participate in the blockchain scene, asking which visions of the world underpin the implementation of this technology in ‘the social’. Rather than looking at blockchain only in terms of technology, I have approached the subject in terms of its political and, above all, cultural nature, exploring narratives, myth and hopes that concur to the application of this technology to the social sphere. Particularly, I was interested into the specific understandings of social good and social justice that blockchainers hold and imply in their discourse to understand how visions of the world become encoded into technology.

Based on an understanding of blockchain as a narrative technology (Reijers and Coeckelbergh, 2016), I developed an ethnographic analysis of blockchain conversations and representations accessing the blockchain scene in multiple ways and contexts. In so doing, I was able to argue that when blockchain is imagined for the social sphere by its developers, experts and entrepreneurs, it largely lacks a solid understanding of social organization processes and its implementation ultimately tends to reinforce neoliberal aspirations. Generally, blockchainers’ vision of society particularly in the startup world seems in fact to be connoted by an understanding of social relations that overlooks social dynamics and cultural logics, embedding a notion of the social based on metrics and competition.

This argument has been developed analyzing blockchain imaginaries in three stages: by looking at its contradictory interpretations, by exploring common narratives and regimes of truth, and by contextualizing blockchain meaning for ‘the good’ looking at a specific social context, i.e., education.

Firstly, I have explored the meaning of blockchain and its contradictions starting from existing definitions on ‘distributed ledger technologies’, trying to dig deeper into its imagined affordances (Neff & Nagy, 2015) and looking at blockchain as a contested object. Blockchain technicalities, in fact, are often transposed to more conceptual definitions of its potentialities, giving rise to a number of expectations regarding how society should be structured, which are often contraposed. Effectively, a universal definition of what a blockchain is still lacking and this opens up to a set of antagonist claims concerning the way in which blockchain becomes a disruptive technology.

Blockchain is surrounded by different imaginaries on the same affordances, which indicate certain interpretation flexibility and the capacity to collect different ideologies under a unique

umbrella concept. Considering the importance of signifiers in building discourse, I have argued that blockchain should be considered as a floating signifier in which different political projects coexist and strive for hegemony.

This became clear as I looked better into definitions provided by my research participants, which showed that the buzzword “blockchain” is constantly mobilized as a signifier for supporting particular political agendas. In this way, blockchain becomes a contested object in three dimensions: the technical, the social and the economic. The first dimension refers to a dispute on which technicalities define a blockchain, starting from the concept of ‘decentralization’, which is itself a floating signifier and which is understood in strongly different ways based on ideology and political positions. The second category of analysis concerns the debate on the extent to which blockchain can be used to provide greater privacy and data ownership, which presents interpretative distinction depending on the external entities that participants understand as a threat. Finally, the third dimension shows that blockchain is still disputed as being separable from the world of cryptocurrencies. In this sense, blockchain ‘for the social’ is also highly interpretable and debatable.

The fact that blockchain can be seen as a floating signifier entails a particular vision of the world that, I have argued, should be observed as technocratic, populist and neoliberal, in line with previous studies on the Silicon Valley’s Californian Ideology (Ferraro, 2020).

To elaborate further this argument, in chapter 4 I delved into an analysis of the shared ideas that blockchainers hold as true on blockchain, despite their antagonist political project. This served to answer to initial questions regarding data, power and hegemonies. In fact, by analyzing in depth blockchain meanings and discourse, I found that blockchainers envisage the diffusion of systems that ultimately reinforce neoliberal processes of individualization, singularization and meritocracy.

To dig deeper into blockchain discourses and analyze myths and narratives that surround blockchain implementations in the social sphere, I have deployed the Foucaultian’s concept of regimes of truth (Foucault, 1980). This concept refers to discourses that blockchainers hold as true regarding the potential of the algorithmic technology for building futures, and that participate in constructing blockchain imaginary. Starting from the idea that blockchain imaginary should be considered as individualized and post-political, I have argued that there are at least three regimes of truth that participate in the construction of blockchain social imaginary: the distributed myth, the trustless myth and the changemaking ethos.

The first essentially refers to a generally accepted idea among blockchainers that using a decentralized technology can create decentralization. This regime of truth arises from a myth that

surround the whole Internet, which sees the distribution of digital networks as capable of enabling political decentralization, greater democratization and horizontality. However, I have argued that decentralization is also a floating signifier, thus the concept remains abstract and highly interpretable. Moreover, this myth lies the belief that technology is a neutral object that can drive direct desired effects on society; hence, it overlooks the important notion that technology is always embedded with visions of the world and the complexity of social organization.

The second regime of truth conceives the shared conviction that blockchain could create digital 'trust-less' environments. This belief grounds its roots in the claim that algorithms can enable and ensure trust thanks to mechanisms of validation encoded in blockchain's architecture, however, I showed how blockchainers' understanding of processes of social truth is delinked from social and cultural dynamics. Instead, the vision of society that arises from this regime of truth appears as metricized and competitive social perspective, in which algorithms can substitute human beings following the imperative that 'code is law'.

The third and last regime of truth looks at a particular ethos that conceive technology as a means to change the world, something that Arvidsson (2020) called the 'changemaking ethos'. Following to this belief, blockchain becomes an existential project that recalls Silicon Valley's in which everyone can become an entrepreneur and make a difference in society through the implementation of digital technology, in line with previous studies of social entrepreneurs' ethics (Bandinelli, 2017). This position reveals a deep distrust in institutions and conventional forms of doing politics, hence technology becomes the ultimate instrument to empower 'the people' and change the society following the rational rules of algorithms and mathematics.

These narratives reveal a techno-determinist and reductionist approach to society that downplay the complexity of social organization, social relations and social change. Despite the fact that blockchain might gather very different political views, the presence of these regimes of truth reinforces indeed the Californian Ideology's hegemony by encompassing a competitive and meritocratic vision of the world.

The existence of neoliberal and technocratic regimes of truth within the blockchain imaginary have a number of consequences on the interpretation of blockchain 'for the good', that I have analyzed in chapter 5. In this section, I have focused on the social values that underpin blockchain implementation in the light of social justice theories, arguing that the concept of 'social' in blockchain technology is conceived in rational mathematical terms that do not take into account already existing social bias and inequalities. Through a closer analysis of the shadowing observation of Growbit, I have



showed that when regimes of truth are put into practice in a social field such as education, blockchainers tend to conceive social good in performative and competitive terms.

Building on Fraser's theory of distribution, recognition and representation, in fact, I have argued that blockchainers' conception of social justice involves mainly the possibility for creating value, enhancing meritocracy and providing transactions accountability. By looking at Growbit, I have appreciated how blockchain imaginary often entails a notion of solidarity that is subsumed by neoliberal mechanisms. Indeed, by making social good match with financial inclusion, blockchain imaginary is able to absorb even the anarcho-leftist wings, showing that capitalism realism is more alive than ever and dominates the field of technological innovation. Moreover, for blockchainers, economic rewards become useful incentives for the good and for promoting equality, because in their view, structural social inequalities could be solved just by empowering individuals and applying the myth of meritocracy. Finally, following logics of 'metric power, blockchain is also claimed to 'do good' to society because it provides more transparency and accountability, and thus is advocated as a means to make up also to social problems such as datafication.

In other words, that 'fairer and prosperous' society imagined by the blockchain enthusiasts of 'Blockchain for Good' manifesto, ultimately looks set to reproduce some of the most critical dimensions of neoliberal society, of which remains an important byproduct not only technically, or economically, but above all, culturally. Blockchain hence becomes a tool for reviving the neoliberal vision of meritocracy and wealth, among a tech scene mainly composed by young middle-class individuals.

As it continues to make its way into 'the social', blockchain configures itself to be a very specific kind of platform, that connects social and economic relations in original ways and which larger implications remain to be discovered. Throughout the analysis, I was able to show that the ways in which blockchain is conceived and discussed consequently present important bias and shortcomings. In a rational interpretation of society and social relation by blockchainer, social good is in fact delinked from traditional notions of common good and social justice and is instead conceptualized according to the imperative of competition and 'code is law'. This translates in a number of individualized notions of the social that do not look at structural problems as such, and therefore, when social aspirations of blockchainers are inscribed in their applications they may reinforce existing prejudices and misconceptions.

Indeed, when we acknowledge that blockchainers tend to reduce society to metrics and tokenization, we can easily appreciate how blockchain becomes a source of data power. Blockchain

interpretations, regimes of truth and narrations in the social sphere are then just another side of the coin of the Californian Ideology: in disseminating and contaminating society with blockchain imaginary and discourse, blockchainers contribute to strengthen the algorithmic culture (Striphas, 2015) and the hegemonic cultural values of the Silicon Valley.

In this sense, the fact that an actual understanding of ‘the social’ does not play a central role in the development of blockchain, somehow confirms the hypothesis that those who engineer and build the technology seem to care about blockchain more as an intellectual challenge (Herian, 2018). In this sense, coders and experts of the blockchain do not seem aware of their authority power, and rather believe in math’s neutral power as bearer of substantial changes for the better.

However, the risk of not challenging a technocratic, neoliberal approach to digital innovation is that platform capitalism will be increasingly reinforced with adverse consequences for social and economic inequalities and human rights. Instead, following data justice reflections, we should look to ways to ‘decolonize’ data power (Couldry and Mejias, 2019) and break down with centralization on the Internet. In this sense, it would be extremely urgent that coders started to be held accountable of their power and start to embed notions of distribution, recognition and representation into technological implementations and design.

But although we surely need to design more inclusive algorithms, this is still not sufficient to face the challenges of the digital society. By looking at blockchain technology, we have acknowledged that technology alone does not democratize or create fairer and more horizontal conditions. This power, in fact, lies in the hands of human beings and their cultural structures. In this sense, future debates on the political culture of technology should necessarily include more reflections on the humanization and ‘decentering’ of technology (Peña Gangadharan, 2019), acknowledging that digital innovation is first and foremost a human creation embedded with ethics and politics. To do so, we should start facing the existence of regimes of truth within the implementation of technology and make an effort to deconstruct them. Appreciating that technology is not neutral, and that developers’ positions participate in the creation of social imaginaries and technological infrastructures, is essential to renovate discussions on the future of digital societies.

To conclude, what seems at stake here is the urgent need for more transparency, fairness and accountability to digital platforms and their use of users’ data; however, this is more a political task rather than technological. In fact, breaking up the monopolies of social media giants and recognizing data as a common good will require active mobilization from citizenship and political institutions; in

no way, we can think that a distributed technology will make up with such problems of power centralization and social inequalities.

The urge for a data justice and human-rights approach to data and algorithms is one of the biggest challenges of our times of crisis. Nowadays, the huge power of monopolies and Silicon Valley's developers is not sustainable anymore, because inequalities are being encoded and expanded while the polarization of society is growing also because of algorithms. Although social media platforms are often considered as a form of civic space, they are not free and unbiased environments. Indeed, Silicon Valley's developers are individuals with very specific backgrounds and very specific visions of the worlds. Generally, they are white rich male individuals living in the American territory who believe in the power and neutrality of technology. Their vision of the world is tied to a position of great privilege, thus cannot fully appreciate minorities and discriminated groups' necessities. For this reason, the inclusion of more diverse and critical voices in technological environments is an impellent necessity if we want to build a fairer and more respectful society. This ultimately means ensuring the marginalized and poorest wings of our societies have access to solutions and justice when their data is misused, or when they are subject to discriminatory decisions from automated decision-making processes. For this reason, future steps of action and research should also move towards the understanding of how we can challenge data power and demand greater accountability to what happens with our data and contents.

Arrived at this point, I would like to conclude my dissertation with some final remarks and suggestions for the future of research on blockchain technology and socio-technical imaginaries. Although I have certainly done my best to elaborate a solid research work, this will inevitably present some limitations and weaknesses that could be solved by expanding the research further and involving more interdisciplinary approaches to the study. In fact, one of the limits of this research is that it focuses on imaginaries in the neoliberal Western societies, thus the repetition of a similar ethnography in other areas of the world could perhaps lead to new insights regarding the imagination of blockchain for the social sphere. In this sense, I believe that using qualitative methods to study blockchain can be an enriching approach to access technological regimes of truth and understand the way in which they contaminate society, and vice versa.

Considering that this research does not tackle the effectiveness of blockchain as a technical or financial tool, future research could also focus on the understanding of how blockchain becomes an efficient instrument for solving more technical problems in certain specific groups, such as activist

and grassroots circles. This may serve for instance to deepen the understanding on already existing practical implementations of blockchain and their practical utility for issues, e.g. cybersecurity (PKI).

Finally, despite the fact that I was eager to include more reflections on gender, this research could not tackle in depth the role of women inside blockchain community. For this reason, I suggest that future steps of research should look better inside the work of women in the cryptocommunity, asking for instance why they are interested in decentralized technology and whether blockchain enters into any special political agenda. This would be also very useful to fill the debate on inclusivity and recognition regarding digital technology.

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