

Foucault and Digital Technologies of Power

Studying resistance as decentralization

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Contents¹

1. Introduction	1
2. Preface: A brief genealogy of digital technologies of power	7
3. A Foucauldian analysis of digital technologies of power	9
1. Foucault, networks and decentralization	10
2. Disciplinary power in the digital panopticon	14
3. Technological <i>biopower</i> in the XXI century	16
4. Knowledge and power in the digital mirror	20
4. Resistance as decentralization to subvert digital power	21
1. Foucault, neoliberalism and decentralization	22
2. Understanding technological decentralization	26
3. Digital technologies of resistance and decentralization	28
5. Conclusions	31
6. Bibliography	34

Abstract

This thesis aims to leverage Foucault's relational understanding of power to study digital technologies of power. Can we leverage Foucault's theoretical framework to study digital technologies of power as centralized/decentralized network systems? We connect the concepts of centralization and decentralization with Foucault understanding of power as networks of relations. In particular, we will seek to relate knowledge and power, discourse, disciplinary technologies and biopolitics with modern information technologies in the XXI century. In the second part of this thesis, we identify resistance with technological decentralization as a mechanism to oppose and transform power. We will again inspire in Foucault to propose decentralized relational technologies that resist power and provoke social positive outcomes by impacting in the micro-physics of power relations.

¹ In this thesis we employ a hybrid citation model including both direct and indirect citations. In particular, direct citations will be employed to analyze and review important concepts from Foucault works. Indirect citations will be used to reference well-known concepts from other authors that contribute to understand the context of this work.

1. Introduction

Michel Foucault (1926-1984) is recognized as the philosopher of power *par excellence* thanks to his innovative vision of power as a relational force that guides our social interactions. Foucault goes beyond the hierarchical repressive notion of power to a productive one, shaping social relationships, producing knowledge and internalizing power inside individuals. He perceives power as a pervasive web of forces intricately woven into the tapestry of our human interactions. A core contribution of Foucault is to complexify the understanding of power. He clearly acknowledges that we are subject to economic structures² (Marx) and to our unconscious mind (Freud), however, he aims to overcome reductionist approaches that reduce power to a single dimension.

Perhaps the major originality of Foucault is to study power from the edge³, from the periphery, and not from the core as it has been traditionally analyzed. His study can be considered *bottom-up* because he focuses on how power operates at the micro-level through local and dispersed practices, rather than imposed by a single, central authority. Instead of focusing his work on the king or the government like Hobbes or Machiavelli, he studies the margins of society, the mad ones and the hospital, the delinquents and the prison.

Foucault has produced an enormous impact in many fields of knowledge in the XXI century, including social sciences, humanities, philosophy, economy, policy-making, and even technology. The understanding of the complexities of power⁴ have been enriched with Lazzarato's vision of debt (Lazzarato, 2012) as an important subjecting force, or Paul B. Preciado's studies of biotechnologies, pharmacology, and media to build a *pharmacopornographic* regime (Preciado, 2013). In technology, Byung-Chul Han's

² Foucault always recognized the influences from Marx and Freud in his analysis of power. In *History of Sexuality* (1996), he continuously refers to Freud's theories on repression and the psychoanalytical approach. In *Society must be defended* (2006), Foucault also explicitly talks about a Marxist conception of power.

³ In *History of Sexuality* (1996), An Introduction Foucault claims that "We must at the same time conceive of sex without the law, and power without the king" (Foucault, 1990, p 91). This conception of a diffuse power is also elaborated in *Microphysics of power*. (Foucault. 1980).

⁴ We mention here three authors that heavily draw inspiration from Foucault's theory of power. Lazzarato explains how debt became a major subjection for the modern *Homo debitor*. Preciado introduces another subjection related to addictions promoted by the Pharma industry and the Media. Finally, Han's concept of *psychopolitics* elaborates on Foucault's internalization of power, the production of subjectivities boosted by novel technologies.

concept of *psychopolitics* (Han, 2017) is also heavily inspired by Foucault's theories of power, biopolitics and surveillance. Like Byung-Chul Han, we also aim to leverage Foucault's conceptual framework to analyze digital technologies of power. The novelty of our approach is to focus on a networked and relational study of digital power, with special focus on the dialectical understanding of the concepts of centralization vs decentralization, centripetal vs centrifugal forces.

The study of society and digital technologies as networked systems is not new. Manuel Castells presented the concept of *network society* (Castells, 2010) where networks become the primary mode of organization, mainly produced by the digital forces of information and communication technologies. Barabasi presented the concept of *preferential attachment* (Barabasi, 1999), also called *rich get richer*⁵, that describes how nodes in a network are more likely to connect to nodes with a high degree of connectivity. This principle has been demonstrated in real world settings like social networks, citation networks or even the World Wide Web. Barabasi *rich get richer* help us to understand the trend to centralization in social and technological systems, creating superhubs of power and reinforcing dynamics of inequality.

Internet is a large-scale distributed system showing both centralized and decentralized interconnection mechanisms. Internet is everywhere, merging now the real and the virtual, reaching the entire planet. The core idea of this work is to inspire in Foucault's theoretical framework to study Internet and digital technologies as a network of power, showing both centralized and decentralized webs and flows. This takes us to the first research question in this thesis:

Can we leverage Foucault's theoretical framework to study digital technologies of power as centralized/decentralized network systems? It is well known that Foucault always considered power as relational and networked. In this line Foucault states that "Power is exercised, circulates, and forms networks" (Foucault, 2006, p. 30). As we will see in chapter 3, Foucault also employed extensively the concepts of centralization, and of

⁵ *Rich get richer* can be traced back to the Parable of talents in Mathew 25:29 "For to everyone who has will more be given, and he will have abundance; but from him who has not, even what he has will be taken away.". This concept is connected to Barabasi's demonstrations around preferential attachments in scale free networks where a few nodes (hubs) have a very high number of connections, while most nodes have very few. The Web is a good example where a small number of sites receive a large fraction of links while the majority have few incoming links. In sociology, The Matthew effect of accumulated advantage, is the tendency of individuals to accumulate social or accrue success in proportion to their initial level of popularity, friends, and wealth (Wikipedia).

centripetal and centrifugal forces. Nevertheless, Foucault never used concepts such as decentralization or bottom-up to define power. Instead, he always employed the term resistance as an opposing force or reaction to power. In this thesis, we will interpret Foucault's works under the prism of network systems highlighting the concepts of centralization and decentralization of power applied to digital technologies.

Inspired by Foucault genealogic methodology, we will first provide in a preface a genealogy of digital technologies of power in the XX and XXI centuries, focusing on the concepts of centralization and decentralization. This genealogy must help us to trace the historical development of power relations in the digital domain, showing how they evolved over time and how they permeated social practices and personal behaviors.

Another relevant goal is to review Foucault's core concepts: power and knowledge, discourse, disciplinary power, and biopolitics under the prism of networked digital technologies. We will devote efforts to connect disciplinary power to surveillance capitalism, and biopolitics to Big Data for example. If we refer to the relationships between power and knowledge, we will study real life examples that demonstrate how technology is shaping our view of reality⁶. We aim to demonstrate how our knowledge of the world is shaped by digital technologies, and the power of digital platforms to present us non-neutral knowledge of the world. The recent appearance of Large Language Models (LLM) with ChatGPT has also become a turning point for our societies, where artificial entities can use discourse to address to us and answer our questions. Instead of receiving a list of ordered links in a google search, we now use natural language to ask questions that are coherently answered by a machine. As language is our symbolic frontier with reality, the capacity of digital oracles to interact with us directly is shocking and transformative.

Regarding the structure of the work, after explaining the genealogy of the digital character of power in the preface, in chapter 2 we will analyze how power, knowledge, and discourse are centralized and regulated in digital societies. We will here delve on previous texts of Foucault like *History of Sexuality* (1990), *Discipline and Punish* (2012), *The birth of biopolitics* (2008) or *Society must be defended* (2006). Such texts will help us to shed

⁶ For example, the city council of Barcelona forced Google and Apple to remove a bus line to Gaudi's Park Guell (the bus line number 116) from Google Maps to deter tourists from overcrowding it. Since the line disappeared from Google and Apple, it no longer exists for tourists, and now the line is only used by local residents. Google shapes and presents reality, even removing parts of it when needed.

light on the power dynamics of digital technologies to transmit unified and regulated visions of knowledge and discourse.

Finally, we will study how disciplinary power, biopolitics, and governmentality are useful to explain current technologies including surveillance capitalism, Big Data, AI and algorithmic ruling. On the one hand, we will review how Foucault considers disciplinary technologies as centripetal, as mechanisms to concentrate and normalize power. On the other hand, we will study how *biopower*, statistics and governmentality clearly resonate with Big Data, AI and digital technologies of power. We will analyze how this massive concentration of power (including both computation and data) is a clear threat to our privacy and freedom. Digital technologies of power are ubiquitous and definitely change our perception of reality while constantly acquiring information and knowledge about us.

In this section we also outline relevant texts from Foucault like *Discipline and Punish* (2012), *Control, territory, population* (2007) and *The history of sexuality: An introduction, volume I* (1990). We will compare those works to recent technological books like Zuboff's *Surveillance Capitalism* (Zuboff, 2019) and recent articles connecting Foucault and technology like (Lifková, 2019). Once we understand the challenges and risks of the centralization of digital technologies of power, we will seek to explore how Foucault can inspire us to subvert digital power.

This takes us to the second question of this thesis: Can we analyze technological decentralization as a subversive force to resist power? In chapter 4, we inspire us in Foucault's concept of resistance as a transformative force to change our world. We will analyze recent proposals to resist power like Digital socialism (Morozov, 2019) and technological decentralization (Schneider, 2019). An important goal here is to identify Foucault's notion of resistance with technological decentralization as centrifugal forces that resist digital power. Even if decentralization as a term is not employed by Foucault, we can identify "resistance" as a ubiquitous concept in Foucault writings. Foucault states that "Where there is power, there is always resistance, and the two things are coextensive: As soon as there is a power relation, there is a possibility of resistance." (Foucault, 2006, p 280). For Foucault, resistance is always present as a counterforce to power. Like the ying and yang, we cannot understand power without resistance. And Foucault presents resistance as a liberating and transformative force that may change our own reality.

We will contrast in chapter 4 core Foucault works like *Birth of biopolitics* (2008), *Society must be defended* (2006), *History of Sexuality 2* (1985) and *History of Sexuality 3* (1986) with recent critical interpretations of Foucault contributions. For example, Habermas and Fraser⁷ considered that Foucault approach was too deterministic and it presented subjects as passive to power, lacking agency and autonomy of action. We will confront those ideas trying to connect Foucault concept of resistance to his proposed technologies of the self as transformative and liberating for the individual. One important goal of this chapter is to draw inspiration from Foucault's concept of resistance and his proposed technologies of the self to the study of subversive technologies of power. Foucault's last works focus on technologies of the subject, where he proposed transformative techniques for self-improvement. The goal is to inspire us in Foucault to propose digital technologies that transform the subject and the society and contribute to social coordination, equality and justice. We want to explore the potential of decentralized technologies to help us produce alternative subjectivities that transform power inside us and in society at large.

Finally, the methodology is based on academic philosophy, within the general framework of the humanities. First of all, we want to map and define concepts from Foucault's terminology and theoretical framework to the digital technologies of power in our information societies. The concepts and terminology employed by Foucault around power, knowledge, discourse, discipline, normalization, security devices and biopolitics must be framed and adapted to a technological setting. The major challenge in all of them is to first understand how Foucault treated those concepts, and how we can interpret them under a microphysics of power. We must also try to justify whether Foucault's resistance can be identified with the centrifugal forces that counter react to centralized visions of power.

2. Preface: A brief genealogy of digital technologies of power

The structure of power in Internet has shifted radically from a decentralized and collaborative environment to an increasingly centralized and commoditized platform in the XXI century. Internet is created in the 1960s as a result of a US Department of Defense (DOD) funded project called ARPANET (Advanced Research Projects Agency Network). The project aimed to create a decentralized network topology that could be

⁷ See (Habermas, 1987, p 284) and (Fraser, 1989, p. 32).

resilient to attacks or failures. The network started with the first node in UCLA (University California Los Angeles) and it rapidly spread to a number of universities around the world. Based on academic collaboration, a number of protocols were adopted like TCP/IP routing protocols, DNS (Domain Name System), and Internet mail. In 1991 Tim Berners Lee created the World Wide Web and in 1993 it appears the first Web browser (Mosaic) developed by University of Illinois' NCSA (National Center for SuperComputing Applications). In 1991 Linus Torvalds also created the open-source Linux Operating System.

In 1995 it begun massive adoption of Internet technologies by the general public. On top of all the aforementioned open technologies (Linux, Web servers, web clients) millions of web servers emerged with exponential growth, created a really open medium. Internet was thus not restricted to academic collaboration between universities, and many commercial companies (Amazon in 1994 or Google in 1998) entered the network. Peer-to-Peer (P2P)⁸ technologies flourished in the first decade of the XXI century thanks to improvements in home network bandwidth and better personal computers. Finally, Wikipedia also started in 2001 as an open encyclopedia obtaining rapid success.

Decentralized Internet technologies sparkeded techno-utopian visions (Barlow, 1996) of a virtual freedom space for humanity. Peer-to-peer systems, collaborative creation (Wikipedia), open-source software (Linux), universal shared knowledge, and the hopes for disintermediation contributed to this major vision. Decentralization became an iconic word associated with the freedom and lack of hierarchies of this virtual medium.

Nevertheless, all of this changed drastically with the popularization of the Internet. As more users and companies started entering the network, the breakdown of cooperation arrived. This implied massive spam, security hacks, and increase of congestion and traffic in the network. A network initially controlled by academic and researchers⁹ that created the protocols and run the infrastructure would become a business for private companies with more regulation from governments around the world.

⁸ P2P systems like Napster, Kazaa, and eMule were massively used and only BitTorrent arrived to account to more than 30% of all Internet traffic. P2P inspired many efforts to decentralize the Internet like social networks (Diaspora), search engines (Yacy), music services (Spotify) or storage systems (Wuala).

⁹ A good example of academic-government clash over Internet is the conflict (Metz, 2015) between Jon Postel (researcher in charge of DNS) and the US Government for the control of the DNS important naming infrastructure.

In a few years, important technologies¹⁰ were developed that contributed to the centralization of digital power like social networks and Cloud Computing. In particular, Cloud Computing definitely killed the popularity of P2P, and many streaming platforms started to dominate the market (Netflix in 2007). Cryptocurrencies also became popular in 2012, when Bitcoin reached a valuation of \$770 and new players entered the market like Ethereum in 2014. A decentralization hype around blockchains and cryptocurrencies emerges and investors crowd in Internet Coin Offerings and the creation of new projects like *Decentraland* (Metaverse and blockchains). Here it is interesting to see how worlds and names are colonized by commercial endeavors, associating decentralization to aggressive speculation and cryptocurrencies, and open-source to proprietary business models. There are many more examples of the manipulation of names: OpenAI (which is a closed technology), edge computing (which in many cases refers to master worker centralized models, or federated learning (which in Google means centralized remote instrumentation of our mobile phones). In 2023, OpenAI released ChatGPT as a LLM capable of using natural language. LLMs represent the confluence of massively centralized Cloud Resources, complex Big Data Technologies, expensive hardware (GPUs), and advances in Deep Learning. The cost of training a LLM is enormous, so the centralization of power is inevitable in these technologies that are now the future of the Internet.

The reality is bleak: centralization is reigning in cyberspace, with huge technological corporations controlling our data, and re-intermediation and control are stronger than ever in the so-called "sharing" economy. The Internet is also fragmented by countries, with many states imposing heavy controls to information and communication services.

3. A Foucauldian analysis of digital technologies of power

In this chapter we aim to leverage Foucault's vast conceptual framework to better understand the digital technologies of power. First of all, we will study how Foucault understands the relational nature of power, as a network of interconnected forces that embrace and restrain individuals. The main question here is: Can we connect Foucault's relational understanding of power with networks, centralization, and decentralization applied to digital technologies? We will delve into Foucault's works to establish

¹⁰ Social networks (Facebook in 2004, Twitter 2006), smartphones (Apple iPhone in 2007, Google's Android in 2008), location services (Google Maps in 2005, Apple Maps in 2012), video streaming (Youtube in 2005) and Cloud Computing (Amazon AWS in 2006, Alibaba in 2009, Azure in 2010).

connections to centralization and decentralization of power, to the centrifugal and centripetal forces that shape our societies.

A second important goal is to study Foucault's disciplinary power and the potential scenario of a digital panopticon. We will study how digital surveillance technologies can provide exhaustive and transparent monitoring of human behavior as a representation of a digital panopticon. Finally, the last important challenge of this chapter is to understand how biopolitics and *biopower* are boosted thanks to Big Data and Artificial Intelligence. We will study Foucault's regulatory security devices over populations and their optimization goals in a neoliberal society driven by technology. We will establish clear links between Foucault's biopolitics and modern technological *biopower*, including modern statistics, psychology and sex in the digital power toolkit.

3.1 Foucault, networks and decentralization

Foucault understands power as a relational force that permeates all interactions in human societies. His original view of power is to depart from the hierarchical, *top-down*, repressive vision power as domination, to a *bottom-up*, capillary and productive understanding of power. As stated by Foucault:

“Power is exercised, circulates, and forms networks [...]. What I mean is this: it seems to me—and this will be our fourth methodological precaution—it is important not to, so to speak, deduce power by beginning at the center and trying to see how far down it goes, or to what extent it is reproduced or renewed in the most atomistic elements of society. I think that, on the contrary—and this is a methodological precaution that has to be taken—we should make an ascending analysis of power, or in other words begin with its infinitesimal mechanisms ...” (*Foucault, 2006, p. 30*)

Foucault understands power as an interconnected network of forces that traverse and restrain individuals in a society. In his vision, power is pervasive, diffused and operating everywhere in all directions. However, to understand power we must first study the edges of the network, the periphery of power, the bottom of society, the outsiders, the losers.

Foucault himself is in the fringes of normality due to his homosexuality¹¹. This tormented him and at the same time facilitated a privileged view of what is understood as “normality” in our society. As other philosophers belonging to persecuted minorities (Jews like Walter Benjamin, Spinoza and many others¹²), this peripheral vision of society is key to perceive reality from a different angle.

It is thus interesting to see how Foucault focuses his studies on the periphery of normality, studying the history of madness and psychiatric hospitals, delinquents and the prison, and finally sexuality. In all of them, he is studying what power is considered abnormal, and what power techniques are employed to separate and deal with them properly. It is also interesting how clinics and prisons are physically separated from the city and the populations, to avoid the infection or even remove them from the public view. Foucault also finds a direct relationship between knowledge and power, where a new corpus of information is required to classify and organize the abnormal. In particular, his historical and genealogical study identifies the XVIII century as the turning point where knowledge is centralized and normalized. As explained by Foucault:

“Throughout the whole second half of the eighteenth century we see a huge effort being made to homogenize, normalize, classify, and centralize medical knowledge. [...] All these projects—and I have cited only two examples—basically had four goals: selection, normalization, hierarchicalization, and centralization. These are the four operations that we see at work in a fairly detailed study of what we call disciplinary power.” (Foucault, 2006, p. 180).

Here, Foucault elaborates on how medicalization and centralization in academia, universities, hospitals allowed knowledge to be controlled, normalized and transmitted to the population. It is also very informative how Foucault considers disciplinary technologies as centripetal forces. Forces that centralize knowledge about subjects and treatments, which push them to behave as the center prescribes, producing docile bodies. Foucault also states that “Discipline is essentially centripetal. I mean that discipline

¹¹ In Foucault’s biography (Eribon, 1991), the author describes how Foucault grows in a society where homosexuality is heavily stigmatized and discriminated. Eribon describes Foucault’s feelings of shame and guilt, and how they influence his intellectual exploration.

¹² Hannah Arendt elaborated on the discrimination of Jews in her works *The Origins of Totalitarianism* (1973) and *The Jew as Pariah: Jewish Identity and Politics in the Modern Age* (1978).

functions to the extent that it isolates a space, that it determines a segment. Discipline concentrates, focuses, and encloses” (Foucault, 2007, p. 67).

Nevertheless, even if Foucault frequently describes power as a network of forces, he never identified “decentralization” as opposition to power, as the centrifugal forces that react against power centralization. The term widely used by Foucault is “Resistance” and it is clearly explained by Foucault:

“Just as the network of power relations ends by forming a dense web that passes through apparatuses and institutions, without being exactly localized in them, so too the swarm of points of resistance traverses social stratifications and individual unities” (Foucault, 1990, p. 96).

Resistance is the core concept analyzed by Foucault that is transformative and positive. Foucault unveils the mechanisms of power in order to enable us to understand our world and then change it. He always showed disgust and rebuttal to authoritarian mechanisms of power, and even involved himself as an intellectual in denouncing and resisting power. It is well-known his critique of Marxism and authoritarian communists, but also his opposition to the judiciary system¹³.

Foucault is inviting us to resist power, to use our agency to contest and subvert power. For him, there is a complex dialectical relationship between power and resistance, which in this master thesis we will relate to the dialectical opposition of centralization vs decentralization, centripetal versus centrifugal forces. He claims that there is not a single point of resistance and revolt, that in a network, there is a myriad of resistance points, in the microphysics of power, that oppose centralization and discipline in multiple ways. His work also identifies micro-practices of resistance in every-day forms of disobedience, or evasion of unjust social norms. He also elaborates on the concept of “counter-conduct” techniques that individuals or groups may exert to resist surveillance, disciplinary or regulatory techniques imposed to them. For example, he states that:

¹³ Foucault criticized authoritarian communism in many of his works like “*Society must be defended*”, “*Discipline and Punish*” and “*The birth of biopolitics*”. In (Foucault, 2006) he describes how communist totalitarian states exert disciplinary power over individuals. The last Foucault was really critique and distant with marxist doctrines, and even some authors like Daniel Zamora found him sympathetic with neoliberalism in (Foucault, 2008).

“And it is precisely because the word dissidence is too localized today in this kind of phenomena that it cannot be used without drawback. After all, who does not have his theory of dissidence today? So, let’s give up this word, and what I will propose to you is the doubtless badly constructed word “counter-conduct” – the latter having the sole advantage of allowing reference to the active sense of the word “conduct” – counter-conduct in the sense of struggle against the processes implemented for conducting others; which is why I prefer it to “misconduct (inconduite),” which only refers to the passive sense of the word, of behavior: not conducting oneself properly. And then maybe this word “counter-conduct” enables us to avoid a certain substantification allowed by the word dissidence.” (Foucault, 2006, p. 268).

In the previous text Foucault identifies counter-conduct as active opposition to the processes implemented to conduct people, what he calls the pastoral power that guides people. He wants to extend counter-conduct to the myriad of resistances to power exerted by people, including the delinquent, the mad, or even the patients to the health system. Dissidence is a word that can refer only to political counter-conduct, which Foucault aims to generalize to more cases in a widespread network of forces.

In this thesis, we aim to study the enormous transformative forces of resistance and decentralization to oppose power. Foucault evolved from his interest in knowledge, to power, to finish with the subject. In his final phase, he studied how the technologies of the self may be used to change and transform ourselves. Foucault devoted his career as philosopher to understand the world first, to then be able to transform it. To unveil technologies of power to be able to resist them and transform our world. We will leverage Foucault vision to understand the digital technologies of power, and how they can be resisted and transformed.

3.2 Disciplinary power in the digital panopticon

In *Discipline and Punish* (2012), Foucault describes how disciplinary technologies can render bodies docile¹⁴. We will describe here how his adaptation of Bentham's Panopticon¹⁵ is a good instrument to understand the power of digital technologies.

Foucault describes how disciplinary technologies make individuals both a subject of knowledge and a subject of power. On the one hand, the disciplinary *apparatus* includes surveillance, reporting, examination and monitoring technologies that can capture individual knowledge about user behavior and attitudes. On the other hand, such knowledge is then used to mold and manipulate individual behaviors to follow well-established norms established by power. In fact, individuals internalize and follow norms just by understanding that they are under constant and transparent supervision. This is how discipline normalizes individuals to behave and follow the rules of power. Foucault claims that "A body is docile that may be subjected, used, transformed and improved" (Foucault, 2012, p. 136). In particular, the prison organizes space and time to control individuals and make them docile. Foucault also explains that "prison must be an exhaustive disciplinary apparatus: it must assume responsibility for all aspects of the individual, his physical training, his aptitude to work, his everyday conduct, his moral attitude, his state of mind" (Foucault, 2012, p. 235).

Disciplinary mechanisms become a totalizing instrument addressed to individuals that achieve the so-called "normalization" according to the norms of power. Foucault uses Bentham's panopticon to analyze disciplinary technologies. The Panopticon is a circular prison design with a central observation tower that can control the surrounding ring of cells. The Panopticon is designed to hide the observer, so that prisoners never know if they are being observed. This transparency of the surveillance technology is what makes prisoners internalize norms of power, and follow the rules. The psychological effects of such observation are more efficient than previous coercion techniques. Another interesting use of the panopticon is that of a laboratory for experimentation. An

¹⁴ In the Docile bodies chapter in *Discipline and Punish* Foucault states that "Thus discipline produces subjected and practised bodies, 'docile' bodies" (Foucault, 2012, p. 138).

¹⁵ In *Discipline and Punish* Foucault heavily inspires in Bentham's panopticon. This word comes from greek panoptes which means "all seeing". Foucault describes it as "The Panopticon is a Discipline machine for dissociating the see/being seen dyad: in the peripheric ring, one is totally seen, without ever seeing; in the central tower, one sees everything without ever being seen" (Foucault, 2012, p.202).

environment in which it is possible to evaluate different disciplines and punishments to optimize the system and extract information about individuals. As stated by Foucault:

“The Panopticon functions as a kind of laboratory of power. Thanks to its mechanisms of observation, it gains in efficiency and in the ability to penetrate into men's behaviour; knowledge follows the advances of power, discovering new objects of knowledge over all the surfaces on which power is exercised.”
(Foucault, 2012, p. 204).

Disciplinary environments treated as laboratories can be thus self-optimizing like a feedback control system. Such systems are designed to monitor the output of a process and compare it to the desired output. The difference, called the error signal, is then used to adjust the process inputs to optimize the system. Differences between individuals also provide valuable information to the disciplinary apparatus, which can be trained and improved constantly.

It is surprising how Foucault's description of disciplinary technologies perfectly matches the current state of the art of digital technologies of power. For example, Lifkova explicitly analyzed self-tracking technologies under the lens of Foucault (Lifková, 2019). She studied how wearable devices like Fitbit trackers (a health monitor capturing heart rate, walking steps, or sleep patterns) can become disciplinary techniques. In this case, the norm is established by an algorithm, which decides the healthy behaviors that individuals must follow, like the number of steps per day, and they are internalized by the user (individual). This paper also studies how corporate companies like insurance providers can now enforce correct behaviors thanks to exhaustive monitoring and monetary incentives (or punishments).

The Digital Panopticon is fully realized in Zuboff's *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power* (Zuboff, 2020) in digital platforms such as Google or Facebook among others. Those platforms are based on business strategies designed to extract information from users to then sell this information to advertisers willing to sell their products. It is interesting here to outline how these modern panopticons are designed as laboratories that continuously learn and experiment with their users. Facebook researchers published a controversial paper (Kramer, 2014)

where they recognized how data scientists at Facebook manipulated the emotions of 689000 users with their consent.

We live in a world where every connected device (smartphones, smart TVs, home devices, cameras) can be designed to eavesdrop on user behavior. Their goal is to create a complete model of individual preferences, habits and desire to facilitate commercial transactions with advertisers. Digital technologies of power go far beyond of what Foucault described the past century. The potential for exhaustive monitoring and algorithmic rule is clearly a big threat to our freedom. This becomes even worse if we now combine them with Big Data technologies and Artificial Intelligence to boost *biopower*.

3.3 Technological biopower in the XXI century

In *Birth of biopolitics* (Foucault, 2008), Foucault analyzes how power shifted from focusing on the regulation of individuals to the management and optimization of entire populations. He concluded that disciplinary technologies of power were inadequate in handling the life of the population as a whole. For example, he states that:

“The theme was to have been "biopolitics" by which I meant the attempt, starting from the eighteenth century, to rationalize the problems posed to governmental practice by phenomena characteristic of a set of living beings forming a population: health, hygiene, birthrate, life expectancy, race ... “(Foucault, 2008, p. 317).

In this line, he explains how in the XVIII and XIX centuries, the government aims to rationalize power thanks to statistics, economics and social policies. This introduces the concept of *biopower*, focused on governing life processes associated to the body, involving the regulation of health, reproduction and labor. *Biopower* encompasses both disciplinary power, which regulates individual bodies, and regulatory power, which governs populations. This entails a smooth and natural transition from surveillance technologies focused on the individual, to aggregated gathering and statistical analysis of the behavior of entire groups. The study and regulation of groups through rational

methodologies enacts what Foucault calls *governmentality*, the rational government of the population. As stated by Foucault:

“So, we have-been trying out this notion of governmentality and, second, seeing how this grid of governmentality, which we may assume is valid for the analysis of ways of conducting the conduct of mad people, patients, delinquents, and children, may equally be valid when we are dealing with phenomena of a completely different scale, such as an economic policy, for example, or the management of a whole social body, and so on.” (Foucault, 2008, p. 186)

Security regulations applied to entire groups are more subtle and flexible than the rigid mechanisms of discipline and punishment of the individual. Instead of maintaining order using coercion and punishment, Foucault describes security devices as regulatory mechanisms devising novel strategies of prevention, surveillance, and risk management of the social bodies. As a fine example, Foucault explains a security device designed to manage scarcity of grains, which produced revolts in the past. The problem was that coercive policies that tried to limit prices just impoverished producers, reduced investment and provoked scarcity and crises. Governments introduced a security device that monitored the production of grain, ensured high prices even in good harvest years, and precisely detected bad years and reduction of grain, to proactively seek foreign import of grain to alleviate the problem. The economic regulatory device combined surveillance, risk management and proactive policies to avoid scarcity problems.

Another example of security devices described in (Foucault, 2008) would be the regulation of delinquency and crime in an area. Since governments cannot afford perfect information due to high costs of surveillance, they must apply cost analysis of the regulatory policies and tolerate a percentage of crimes while applying certain disciplinary enforcements (patrols, checkpoints) at a desired level. It is also very interesting how security is normalized in our societies through devices and surveillance that control our everyday lives and blur the boundaries between our public and private spheres.

Foucault analyzes how neoliberalism in the XX century has redefined biopolitics to focus on economic rationality. Accordingly, Foucault states that “Homo economicus is someone who is eminently governable. From being the intangible partner of *laissez faire*, homo economicus now becomes the correlate of a governmentality which will act on the

environment and systematically modify its variables” (Foucault, 2008, pp. 270-271). After the second World War, Foucault describes how neoliberal ideas in Germany and US promoted market-based forms of governance focused on individual autonomy, competition and market inefficiency. The *laissez-fer* approach of neoliberals such as Hayek and Friedman¹⁶ advocated for limiting government power that should be restricted to shape or guarantee rules and competition. While the German ordoliberalism acknowledged that competition is divisive and should be compensated by social protection, the American strand just focused on unrestricted market competition.

Neoliberal ideas and globalization have also provoked the appearance of powerful transnational corporations with more power than many states. In particular, the appearance of technology giants like Google, Amazon or Facebook is now showing a new decentralized *biopower* that transcends state boundaries. In the work of Vitoines *Foucault and Beyond: From Sovereignty Power to Contemporary Biopolitics* (2020) several authors describe biopolitics as “the transition from single locus of power to a decentralized form of power” (Vitoines, 2020, p. 163), or “from a single and highly visible operating power to a less visible but more efficient control and regulation” (Vitoines, 2020, p. 163). They identify biopolitics as a technology of power linked to *biopower* where a new economy of power achieves maximum efficiency with minimum expenditure. They also link the recent transnational-capitalist corporate power named Empire by Hardt and Negri (Hardt, 2000), as the novel incarnation of decentralized and deterritorialized *biopower* in our modern societies.

We have seen revolutionary advances in computing and networking technologies in the XXI century. Smartphones appeared in 2007 (Apple’s iPhone) and Cloud Computing in 2006 (Amazon AWS), provoking ubiquitous networking and massive adoption of online platforms like social networks (Facebook, Instagram) and streaming services (Netflix, HBO, Apple, Spotify). As explained in (Zuboff, 2020) a novel form of surveillance capitalism has emerged with business models based on user data extraction and profiling and the marketization of that information to advertisers and commercial companies. The potential of biometric devices (wearable devices, image recognition, voice recognition, iris recognition, optical sensors) combined with ubiquitous networking have boosted the

¹⁶ Both Friedrich Hayek and Milton Friedman are prominent figures known for advocating limited government intervention in the economy. In particular, we can outline Hayek’s *The Road to Serfdom* (1944) or Friedman’s *Capitalism and Freedom* (1962).

surveillance and monitoring capabilities over individuals. The potential for omniscient and perfect information reduces the friction and cost of surveillance in a digital panopticon.

However, the real danger for our freedom is the coupling of biopolitics with Big Data technologies and Artificial Intelligence. Big Data technologies enable the analysis of massive amount of structured (databases, event records) and unstructured data (text, image, video) to cluster and classify user populations using many data points. The Federal Trade Commission (FTC) already raised concerns on the multibillion-dollar industry of Data Brokers which analyzes billions of data points of citizen-consumers. Big Data is statistics on steroids for biopolitics, when all the information about each user (location, movements, habits, economic profiles, health, age, sex, preferences) can be clustered and indexed. Artificial technology and in particular machine learning employ statistical algorithms to learn from massive data sets in order to classify or identify information (vision recognition) but also to predict or infer about novel data.

Cloud, Big Data and AI together facilitate data crunching and analysis in an unprecedented way, providing highly sophisticated tools for biopolitics and *biopower*. A first goal of enterprise *biopower* has been to optimize capitalism and connect more efficiently consumers and producers through targeted ads. Nevertheless, the fight for attention in this ecosystem is generating adverse effects, like the generation of fake news provoking polarization, the manipulation of elections in democracies (Cambridge Analytica¹⁷), stress and depression in teenagers, and a general loss of focused attention due to digital interferences. Governments are also starting to grasp the enormous potential of those technologies for biopolitics. In particular, in the last COVID pandemics, we could see all the foucauldian medicalization of life and the control of the bodies, but facilitated by digital tracking technologies. Mobile phones could then be used to track precisely the location of users and even forbid their movements or control their access to spaces. In Western democracies the use of those technologies was more limited, but China employed mobile apps to restrict movements not only to infected patients but also to dissenters. The danger of exhaustive information and omniscient technologies is high for

¹⁷ Cambridge Analytica was a british political consulting company that is responsible of the “Facebook–Cambridge Analytica data scandal” where the company employed unethical methodologies to harvest personal information from users in order to use it in targeted political advertisements.

our democracies, when so much power is concentrated in the hands of a few. They could enforce algorithmic ruling and create dystopic futures for our societies.

3.4 Knowledge and power in the digital mirror

The mirror is a powerful metaphor to represent digital technologies as presented by (Varela, 2020). In this text, the author explains us how digital technologies, like a mirror, provide a reflection of ourselves, an image of the self. However, the mirror can just reflect the waves in the opposite direction, or it can alter, magnify or deform the image that is projected. Digital technologies nowadays mediate our interaction with reality, creating a symbolic layer that alters reality, blurring the virtual and the real, making it indistinguishable from each other.

The digital mirror, as a symbolic frontier with reality, embodies both knowledge and power in intertwined threads that surround us constantly. On the one hand, power is based on knowledge in the digital realm, as information becomes the new oil, where Big Data is analyzed in unprecedented ways to extract useful knowledge. On the other hand, power produces and shapes knowledge according to its intentions. The deforming mirror that we perceive is the result of a transformation of knowledge that alters our perception of reality. Foucault explains that:

“one would have to speak of bio-power to designate what brought life and its mechanisms into the realm of explicit calculations and made knowledge-power an agent of transformation of human life. (...) But what might be called a society's "threshold of modernity" has been reached when the life of the species is wagered on its own political strategies” (Foucault, 1990, p. 143).

Digital *biopower* combines knowledge and power to show information that is not neutral, but filtered, prioritized, and presented in an order prescribed by algorithms. PageRank and the internal algorithms that Google use to rank information are essential to guide our navigation in the digital and in the real world. This is the so-called “Algorithmic rule”, knowledge created by machines that in turn influence our vision of the world and our behavior, which again feeds information to the system that will generate knowledge in the closed system feedback loop controlled by algorithms.

Foucault also studied the concept of discourse to explain how power operates through language. As discourses include knowledge that shape our understanding of the world, power must regulate and control such discourses. As studied by Wittgenstein, language is our fundamental symbolic barrier to understand the world, and discourses are essential to comprehend the world that surrounds us. In 2023, the public release of ChatGPT and the potential of Large Language Models (LLMs) to produce language and discourse changed the game entirely. Instead of getting links in a list from Google, we can now use language and ask questions to an entity (AI) that will use language and discourse to transmit knowledge to us.

ChatGPT and the LLMs that will arrive (Google's Gemini, Facebook Llama) are much more than statistical parrots. In (Bender, 2021), authors enumerate the considerable risks that entail the use of such chatbots, including stereotyping, denigration or even increases in extremist ideology. When humans can use language and discourse with an omniscient AI that provides coherent responses, the incorrect knowledge can severely damage and alter the vision of the world of many people. This deforming mirror now talks our language, but is guided by the economic interests of large corporations. The problem with LLMs is the centralization of power in a few big players due to the enormous technical complexity of cost of training, managing and running the required computational infrastructures. LLMs combine the technical complexity of Cloud Computing, Extreme Data Analytics and Artificial Intelligence with the expensive cost of large clusters of GPUs (Graphical Processing Units). This means that the oracles who will mediate our experience between the digital and real worlds will be controlled by few giant corporations focused on economic profit.

4. Resistance as decentralization to subvert digital power

While in the previous chapter we focused on understanding digital technologies of powers using Foucault's theoretical framework, in this chapter the focus is on resisting or subverting power. We will first analyze Foucault's concept of resistance and how technologies of the self may become a transformative force for society. We must first consider recent objections to Foucault's theory of power as excessive neutral and not providing arguments and proposals for resistance to domination. We will also review recent studies of *Birth of Biopolitics* (2008) that even suggest certain affinity to neoliberal

ideas in Foucault's discourse. Can we overcome all those critiques and still leverage Foucault's vision for transformation?

We will then study the elusive concept of technological decentralization as analyzed by (Schneider, 2019) and (Zhang, 2018). Our objective here is to compare ideas from both distributed systems and social sciences to analyze if decentralization can become a useful approach to resist digital power. We will evaluate here concrete examples like cryptocurrencies and blockchains, opensource governance and recent decentralization initiatives in the Internet. Finally, we will also evaluate Morozov's *Digital Socialism?* (2019) and *Socialize the Data Centres* (2015) as emancipatory proposals to resist digital power. Finally, we will try to propose or at least imagine digital technologies of resistance and decentralization of power. We will draw inspiration from Elinor Ostrom or Pierre Proudhon to sketch relational technologies that build social capital and produce subjectivity based on positive incentives that avoid domination.

4.1 Foucault, neoliberalism and decentralization

It is interesting to outline that the major critiques of Foucault (Nancy Fraser, Habermas) interpret his studies as a relativist, negative and pessimistic vision of power, emphasizing domination and control without really questioning it or proposing alternatives. In this line, Fraser states that:

“Because Foucault has no basis for distinguishing, for example, forms of power that involve domination from those that do not, he appears to endorse a one-sided, wholesale rejection of modernity as such. Furthermore, he appears to do so without any conception of what is to replace it”. (Fraser, 1989, p. 32).

As we can see, some authors criticize the apparent neutrality used by Foucault about technologies of power, without positioning himself one side or the other. Even more, they accuse Foucault of lacking a proper alternative to power as it is described by him. Habermas goes further accusing Foucault of not explaining the reasons to resist power. As he states: “but why fight at all? Why is struggle preferable to submission? Why ought domination to be resisted? Only with the introduction of normative notions of some kind could Foucault begin to answer this question.” (Habermas, 1987, p. 284). The main

concern here expressed by Habermas is that Foucault framework does not provide a clear normative basis for opposing power. Habermas also questions Foucault for being neutral and ambiguous and not providing a clear discourse of emancipation of power.

More recently, Zamora and Berhent (Zamora, 2015) interpret in *Birth of biopolitics* a certain sympathetic engagement of Foucault with neoliberalism. In particular, in many of his works Foucault exhibits a critical stance towards state power and authoritarian centralized power. This is in part aligned with neoliberal goal of minimal state intervention for regulation and ensuring competition and free market. This can be perceived in his statement: “Given a relatively free market economy, how should the state limit it so as to minimize its harmful effects?” (Foucault, 2008, p 116). Foucault also points to the trend towards concentration and centralization of power in the state and the increase and continuous expand of its powers. He develops around state phobia:

“the unlimited growth of the state, its omnipotence, its bureaucratic development, the state with the seeds of fascism it contains, the state's inherent violence beneath its social welfare paternalism (...) The second element which it seems to me is constantly found in these general themes of state phobia is that there is a kinship, a sort of genetic continuity or evolutionary implication between different forms of the state, with the administrative state, the welfare state, the bureaucratic state, the fascist state, and the totalitarian state all being, in no matter which of the various analyses, the successive branches of one and the same great tree of state control ill its continuous and unified expansion.” (Foucault, 2008, pp. 186-187)

Neoliberalism, and its german version in ordoliberalism aims to avoid the perils of centralization of a state based on planned economy that ends with freedoms, but also in the capitalist trend to centralization of capital. The goal of the state is to ensure the functioning of the decentralized market and the competition by regulating these forces. This is expressed as:

“At this point, social intervention, the Gesellschaftspolitik, legal interventionism, the definition of a new institutional framework of the economy protected by a strictly formal legislation like that of the Rechtsstaat or the Rule of law, will make it possible to nullify and absorb the centralizing tendencies which are in fact immanent to capitalist society and not to the logic of capital. This is what

will enable us to maintain the logic of capital in its purity and get the strictly competitive market to work without the risk of it ending up in the phenomena of monopoly, concentration, and centralization observable in modern society” (Foucault, 2008, pp 178-179).

According to Foucault, neoliberalism imposes a new governmentality that regulates society to optimize the market, imposing a rationality that compensates the excesses of competition. Nevertheless, Foucault clearly identifies the dehumanizing and negative effects of pure competition. He states that “a policy which presents itself or seeks to be a kind of *Vitalpolitik* with the function of compensating for what is cold, impassive, calculating, rational, and mechanical in the strictly economic game of competition” (Foucault, 2009, p 242). We can observe here how he clearly associates adjectives like cold, impassive, calculating and mechanical as negative for social life. He also mentions that:

”competition is a principle of order in the domain of the market economy, but it is not a principle on which it would be possible to erect the whole of society. Morally and sociologically, competition is a principle that dissolves more than it unifies. So, while establishing a policy such that competition can function economically, it is necessary to organize a political and moral framework” (Foucault, 2008, p 243).

We observe again how Foucault clearly shows that competition dissolves society and promotes individualism and selfish behaviors. If it is not possible to erect the society based on competition, but competition is necessary for the economy, then it is necessary to establish a moral framework enforced by policies that compensates or attenuates the worst consequences of competition and cold individualism. This cold individualism is also expressed as defining the individual as “entrepreneur of himself” seeking to optimize his own economic goals. Whereas Foucault has publicly shown aversion to pastoral state management and centralized authoritarian power, it is also true that Foucault clearly positions himself in the left, against domination of any kind. For example, Foucault states that:

“The major enemy, the strategic adversary is fascism... And not only historical fascism, the fascism of Hitler and Mussolini—which was able to mobilize and

use the desire of the masses so effectively—but also the fascism in us all, in our heads and in our everyday behavior, the fascism that causes us to love power, to desire the very thing that dominates and exploits us." (Foucault, 1983, p. xiii).

While Foucault is not directly aligned with any single political ideology, his skepticism towards centralized authority and his emphasis on decentralized forms of power and resistance align with some aspects of libertarian and anti-statist thought. For example, his involvement with the *Groupe d'Information sur les Prisons* (GIP) reflects his support for direct action and localized resistance against state power. Here, we can infer some alignment with anarchist or libertarian socialism, who always positioned themselves in favor of decentralization of power through non-hierarchical, stateless forms of social organization. In any case, Foucault was not against the idea of power, which is a necessary force in our societies, but against authoritarian domination restricting our freedom. In fact, when he was asked if the role of philosophy is to warn of the dangers of power, he answers:

“This has always been an important function of philosophy. In its critical aspect—and I mean critical in a broad sense—philosophy is that which calls into question domination at every level and in every form in which exists, whether political, economic, sexual, institutional, or what have you. To a certain extent, this critical function of philosophy derives from the Socratic injunction ‘Take care of yourself’, in other words, ‘Make freedom your foundation, through the mastery of yourself’” (Foucault, 1997, p. 301).

Foucault always positioned himself against domination of any kind, and his concept of resistance is the transformative force that can change the world, starting with ourselves. In this thesis, we aim to connect the Foucauldian concept of resistance with that of decentralization as centrifugal force resisting power at all levels, and moving power to the edge and away from the center. To that end, we must first understand the elusive concept of decentralization.

4.2 Understanding technological decentralization

According to Wikipedia¹⁸, the worlds centralization and decentralization appear associated to the French revolution in 1794. Tocqueville wrote that the French revolution began with a “push towards decentralization ... [but became] in the end, an extension to centralization” (Pasquier, 2021). The concept of decentralization has been publicly endorsed by anarchists like Pierre Proudhon which stated that “All my political views may be reduced to a parallel formula: political federation or decentralization” (Proudhon, 1979, p.48). Both examples are clearly aligned with Foucault’s concept of resistance to centralized power. A more recent author like Zhang explains that:

“Today, decentralization is the dominant paradigm through which we think about systems. [...] If the systems approach offers a conceptual schema for how the world works, then decentralization offers a political theory for how it ‘should’ be organized. [...] If decentralization describes the nature of a global system without a single source of control, self-organization can be understood as the interactive local dynamics by which global order is constituted” (Zhang, 2018, p 3).

This idea of local self-organization to avoid centralized control has been popular in many fields, ranging from geology (Gaia as a self-regulating organism), politics (federalism, anarchism) to computer science and Internet technologies. In the Internet, decentralization always had a special aura that went beyond the architectural design of the network, to even suggest novel ways of governance in this virtual space (Barlow, 1996). Nevertheless, as argued by many critical works (Zhang, 2018) (Schneider, 2019) technological decentralization does not imply direct social benefits against centralized power. Schneider says that “decentralized technologies do not guarantee social outcomes” (Schneider, 2019, p 23) and Zhang states that “Rather, it is to reject the implication that technological decentralization in our ever more informatic world is inherently aligned with a more progressive trajectory for society as a whole” (Zhang, 2018, p 9).

¹⁸ As stated in Wikipedia:” Decentralization or decentralisation is the process by which the activities of an organization, particularly those regarding planning and decision-making, are distributed or delegated away from a central, authoritative location or group and given to smaller factions within it.(...) The word "centralisation" came into use in France in 1794 as the post-Revolution French Directory leadership created a new government structure. The word "decentralisation" came into usage in the 1820s.”

Even if decentralized technologies are not designed for changing society, we can expose clear advantages of them for social life like data privacy or censor-resistant communication. For example, a decentralized computing architecture with more nodes controlled by users can prevent surveillance and ensure user's privacy. When Tim Berners Lee advocates for a decentralized Web¹⁹ for user-controlled data in his Solid project. We could really fight surveillance capitalism if all user's data would be located in protected repositories controlled by users. This means decentralizing control, since data could still be stored in centralized encrypted repositories. Another example is censor-resistant and anonymous communication. In this line, P2P networks like Freenet, Tor or blockchains offer censor resistant data stores that can be used to share information against authoritarian regimes. Decentralized communication also helped dissenters to communicate and organize in events like the Arab spring or occupy movements.

The major hype about decentralization in the Internet has emerged in the past years around cryptocurrencies built on top of blockchains like bitcoin or Ethereum among others. In particular, the Web3 initiative proposed in 2014 by Gavin Wood (Ethereum co-founder) advocates for a next iteration of the Web incorporating concepts such as decentralization and blockchain technologies. Nevertheless, cryptocurrencies and blockchains do not clearly provide social outcomes. On the one hand, authors such as (Schneider, 2019) or (Zhang, 2018) question the social benefits of these technologies. On the other hand, blockchains²⁰ are questioned for their inadequacy of providing a decentralized computing platform for the web (Garcia-Lopez, 2019). It seems that decentralization proposed in Web3 is comfortably integrated within the regime of contemporary capitalism. Again, in a language game, the term decentralization has been associated with aggressive financial speculation by market forces.

In any case, what is clearly dangerous is that core information technologies are controlled by a few giant corporations with dubious business models. In this line several solutions have been proposed, like increased regulation from Jamie Susskind in *The Digital*

¹⁹ Tim Berners Lee is the creator of the Web, and one of the advocates of decentralization in the Internet. He defends that user must retake control of their data in the Solid (Social Linked Data) project (Berners-Lee, 2009). Solid advocates for decentralized personal repositories controlled by users that avoid centralized surveillance over our data.

²⁰ Critics like Tim Berners Lee, Jack Dorsey or Elon Musk also argue that Web3 is a biased proposal from Ethereum founders that come with serious dangers such as fraud or security flaws. Tim Berners Lee states that "he doesn't view blockchain as a viable solution for building the next iteration of the internet" and that "In fact, Web3 is not the web at all" (Browne, 2020).

republic or even socialization of the computing infrastructures from Morozov (Morozov, 2019). Maybe the question that we must raise here is: Can we devise novel decentralized technologies that subvert digital power and at the same time provide social outcomes? Coming back to Foucault, the focus of the next section is to inspire again in Foucault to devise decentralized technologies that subvert and resist power, technologies of the care of ourselves and the society.

4.3 Digital technologies of resistance and decentralization

The goal of this section is to imagine novel digital technologies of resistance designed to produce social transformations that decentralize power. In this line, Zhang claims that “As Karl Marx understood over a century ago, the worth we attach to technological progress is not intrinsic: it is only as valuable as the relations amongst people that they produce.” (Zhang, 2018, p. 9). For Marx, the central aspect of a society is how production works, which includes not just the technology used but also the relationships between different classes and groups of people that are involved. This means that technological progress can change these relationships, altering the balance of power, including how labor is organized, and finally the social structure.

Another important goal derived from Foucault works is to focus those technologies on the weakest part of society, in the periphery, the edge. Foucault always studied groups in the margins of society, like the delinquents, the mad, and even the so called “boat people”²¹. Foucault was really visionary regarding migration in the article entitled *Le problème des réfugiés est un présage de la grande migration du XXIe siècle* (The problem of refugees is the presage of large migrations in the XXI century”) (Foucault, 1994, pp. 798-800). We aim to first focus our efforts on isolated and fragile members of our communities: the immigrants, the old, the women, the young.

First of all, we propose relational technologies to increase social connectivity in human communities. Neoliberalism has exacerbated individualism and has produced an important loss of social capital²². Social capital is enacted through interpersonal

²¹ In the context of the Vietnam war, within a press conference, Foucault reflected on the plight of the boat people. Foucault defended that individuals and non-governmental organizations have the right and duty to intervene when states fail to provide necessary care and protection. (Foucault, 1994)

²² Social capital is defined in Wikipedia as “the networks of relationships among people who live and work in a particular society, enabling that society to function effectively”.

reciprocal relations that create trust in communities, facilitating cooperation and shared values. In neoliberal societies driven by competition and economic values, individuals normally establish less strong connections with members of their communities. Even more, connections tend to be highly clustered around wealth or ethnicity, complicating the relationships among groups. In particular, immigrants tend to be segregated in poor neighborhoods, and they establish fewer connections to the rest of the population. Another example is elderly and retired people whose health declines due to lack of social networks and bonds.

Inspired in graph theory “clustering coefficient”²³, the idea is to create applications that facilitate social connections to disconnected individuals willing to participate in communities. This idea is not new, and we are inspired by two apps created by Barcelona’s city mayor for elderly citizens: VinclesBCN and BCN+65. Avoiding paternalistic or “pastoral” approaches, public institutions like cities or regional governments could promote such relational technologies to reinforce their communities. Resistance requires cooperation, community and shared values. Without healthy communities showing enough connectivity to collaborate and mobilize, individuals are alone and powerless against large centralized powers. Furthermore, the arrival of large immigrant populations requires special efforts to integrate and help the newcomers.

A second idea is to develop a digital system of solidarity based on digital money. As stated by Simmel: “Money... brings into relation elements of the most diverse kind. It is, in fact, the most general form of the concept of relationship, the purest form of the tool of interaction.” (Simmel, 2004, p. 176). Since money captures relations and digital money can be algorithmically manipulated with smart contracts, it is thus possible to enforce decentralized distribution goals. For example, the Rawls difference principle (Rawls, 1971, pp. 557) states that inequalities should be arranged so that they are to the greatest benefit of the least advantaged members of society. An idea could be to create micropayments for business that distributed small percentages to disadvantaged members of the community. Such economic instruments could streamline local microdonations that reinforce and provide cohesion to communities. Again, examples of local currencies promoted by cities or regional governments have been experimented in the past. One

²³ In graph theory, a clustering coefficient is a measure of the degree to which nodes in a graph tend to cluster together.

example is BristolPound, a local currency that aimed to localize supply chains and to keep money circulating in their city. Unlike those local currencies, focused on keeping the money circulating in local businesses, our goal is to redirect economic flows to the weak with micropayments, to increase redistribution and provide emergency help. Again, the involvement of public institutions like cities could boost the adoption of such instruments. In particular, solidarity flows could go to immigrants and disadvantaged newcomers to facilitate their integration. These economic flows (redistribution) could be complementary to social relations (recognition) facilitated by the aforementioned social connectivity applications. The idea would be to rapidly integrate newcomers in social and economic flows within the community.

The third proposal is the creation of a socialized computing infrastructure offering both storage and communication services to local citizens. Morozov already proposes in (Morozov, 2019) the idea of socializing the data centers and the feedback infrastructure. However, we are not proposing here end-user applications for citizens, but instead we propose a communication infrastructure that enables third-parties to develop applications and services on top of it. By guaranteeing such basic digital communication services to citizens, it is thus possible to construct a myriad of open-source applications that respect user-privacy like instant or asynchronous communication, social networks, matchmaking (online stores, discovery portals) and even Tim Berners Lee's Solid-like decentralized data management models. These applications may follow an edge-centric design (Garcia Lopez, 2015) that ensures trust and control for digital citizens. The core contribution of such socialized platforms is that the public sector provides the underlying infrastructure so that many applications may emerge focused on citizens and avoiding surveillance business models. The goal is not to create public-sector controlled digital services, but instead to provide the communication infrastructure for citizen-controlled services.

It is important to understand that the aforementioned proposals do not fall in classical digital solutionism. We need here an active collaboration of humanities and technologies to create a next generation of systems designed to obtain social outcomes and benefits. The idea that public institutions collaborate or provide support to self-organized social structures is not new either. Elinor Ostrom explains in (Ostrom, 2015) how local and regional governments have supported and boosted the creation of cooperative self-organizing and self-governing CPRs (Common Pool of Resources) in fisheries, irrigation

communities and forests around the world. Why cannot we involve local, regional or even European governments in digital technologies of resistance and decentralization?

5. Conclusions

The goal of this thesis is to analyze digital technologies of power under the conceptual framework provided by Michael Foucault. It is surprising how alive and modern are the reflections of a philosopher that could not live the explosion of IT technologies (ubiquitous internet networking, smartphones, Cloud platforms, Artificial intelligence). that are radically transforming our lives in the XXI century.

The first question of this thesis is: Can we leverage Foucault's theoretical framework to study digital technologies of power as centralized/decentralized network systems? To answer this question, we started analyzing the relational understanding of power proposed by Foucault, where he directly referred in his works about power as networks. In Foucault's words: "Power is exercised, circulates, and forms networks" (Foucault, 2006, p. 30).

Under this network analysis of power, we also wanted to connect the concepts of centralization and decentralization, top-bottom versus bottom-up understandings of power. Here we put special attention in how Foucault always studied power from the edge of the network, from the extremes. He directly refers to an "ascending analysis of power, or in other words begin with its infinitesimal mechanisms ..." (Foucault, 2006, p. 30). And the extremes also mean the weak, the abnormal, and the excluded from the network. To understand reality, to understand power, he does not look at the center, at the powerful who dominate, he studies the abnormal, the mad and the hospital, the delinquent and the prison. And in part this study of the fringes of the network is rooted in his own personal experience as a homosexual excluded from society, which gives him a privileged outsider perspective. In his biography (Eribon,1991), Eribon describes how Foucault suffered feeling of shame and guilt which strongly influenced his intellectual research.

As an outsider, he aims to understand how normality is defined, as a centralization of knowledge to construct reality. For example, he states that: "Throughout the whole second half of the eighteenth century we see a huge effort being made to homogenize,

normalize, classify, and centralize medical knowledge (Foucault, 2006, p. 180). We mention in this thesis numerous quotes from Foucault where he also refers to centralization and centripetal forces when he refers to normalization, discipline and power. For example, he states that “Discipline is essentially centripetal. I mean that discipline functions to the extent that it isolates a space, that it determines a segment. Discipline concentrates, focuses, and encloses.” (Foucault, 2007, p. 67).

If discipline for Foucault is centripetal, the concept of resistance is clearly centrifugal. Although he never used the term decentralization, the concept of resistance is ever present in his works. He stated that ““Where there is power, there is resistance, and yet, or rather consequently, this resistance is never in a position of exteriority in relation to power” (Foucault, 1990, p. 95). Resistance is also associated by him to counter-conduct to domination or “counter-conduct in the sense of struggle against the processes implemented for conducting others” (Foucault, 2006, p. 268). Foucault is an intellectual that was involved in the society, pushing for resistance to change the system, like in his participation in the *Groupe d'Information sur les Prisons* (GIP). His stand to resist and transform power is part of his life and the discourses he produced.

Once that we clearly identified this relational understanding of power as network of forces, our work tried to connect these ideas to the digital technologies of power. In the preface, we explained how the Internet shifted from a decentralized network system that sparked utopian emancipatory proposals (Barlow, 1996), to a highly centralized structure of power where major technological corporations control the information flows. We then started mapping Foucault concepts to digital technologies. In this line, centralized disciplinary technologies and the panopticon metaphor used by Foucault were connected to nowadays digital surveillance technologies. Foucault explains that vigilance is internalized by the prisoners in the panopticon, because they know that they can be observed. Nevertheless, the dystopia of exhaustive digital vigilance goes beyond what Foucault could imagine at that time. As explained by (Zuboff, 2019), we are now immersed in a digital society that has accepted a pervasive and ubiquitous vigilance by connected devices. This vigilance is complemented now by the enormous biopower accumulated with the convergence of Big Data and Artificial Intelligence. If Foucault studied how statistics enabled a new kind of power to control and regulate entire

populations, the aforementioned digital technologies put statistics on steroids, opening unprecedented mechanisms of manipulation and regulation.

However, what is really worrying, is the centralization of knowledge and discourse through the mediation of digital technologies. In 3.4, we used the metaphor of the mirror to represent this mediation with reality that is produced by screens and technology. As this mediation is growing every day, our perception of reality can be altered and transformed radically by those technologies. The centralization of discourse is now possible when we interact with LLMs like ChatGPT, those statistical parrots (Bender, 2021) that will explain and interpret the world for us in the next years.

In the first block of this thesis, we have been able to leverage Foucault's conceptual toolkit to analyze digital technologies of power as network systems of forces. The current centralization of those technologies is pointing now to a bleak future based on pervasive surveillance and control, but also potential manipulation of discourse and knowledge by few powerful partners. Fortunately, where there is power there is always resistance, and this takes us to the second question: Can we analyze technological decentralization as a subversive force to resist power?

To answer this question, we first study how Foucault understands decentralization of power and resistance as subversive forces to change society. He states that "philosophy is that which calls into question domination at every level and in every form in which exists (...) this critical function of philosophy derives from the Socratic injunction 'Take care of yourself', in other words, 'Make freedom your foundation, through the mastery of yourself'" (Foucault, 1997, p. 301). In this statement, like in others we identified how Foucault aims to fight domination in every form. We opposed other previous critiques to Foucault like Habermas (Habermas, 1987) or Fraser (Fraser, 1989) claiming that Foucault's vision of the subject is passive, lacking agency to oppose power. We also presented arguments against recent works (Zamora, 2015) who perceived Foucault as affine to neoliberalism for his position in *Birth of biopolitics* (2006). Foucault was visionary in his description of neoliberalism as an ideology that is shaping our societies in the XXI century. The evolution of digital technologies, their focus on the individual with the smartphone and the digital platforms, the commoditization of all aspects of life, the competition as dissolving force in society, the homo economicus or the entrepreneur of himself described by Foucault help us explain the society today.

In 4.2, we then analyze technological decentralization as a potential subversive mechanism to fight domination. We show how recent authors question those decentralized technologies as lacking any subversive potential or social impact. For example, Schneider states that “decentralized technologies do not guarantee social outcomes” (Schneider, 2019, p 23) or Zhang that “As Karl Marx understood over a century ago, the worth we attach to technological progress is not intrinsic: it is only as valuable as the relations amongst people that they produce” (Zhang, 2018, p 9). They tell us that if decentralized technologies aim to change society, they must impact in the distribution of power, in the relational forces that connect people. And unfortunately, commercial endeavors always know how to manipulate language and discourse. We explain here how Web3 discourse using blockchains and cryptocurrencies as a decentralized revolution do not imply any kind of subversion against the system. This vision is also shared by Tim Berners Lee (Berners-Lee, 2009) (Browne, 2022), creator of the Web, who pursues a digital decentralization that really moves control of data to users, changing relations and forces in the society.

Finally, this thesis proposes some ideas for truly transformative decentralized technologies. We propose digital technologies to increase the connectivity of disadvantaged or disconnected citizens (migrants, elderly, youth) in order to combat the isolation produced by individualism and competition. We propose decentralized digital currencies devoted to redistribute or provide solidarity to the weakest members of society. And finally, in line with Morozov (Morozov, 2015), we propose socialized communication infrastructures that may help build decentralized digital services that do not rely on extractive surveillance models. The overall idea of these proposals is to increase trust in society by fighting inequality and centralization of power of any kind. Our final open question is: can decentralized digital technologies of power help realize the idea of solidarity and resistance as presented by Foucault?

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