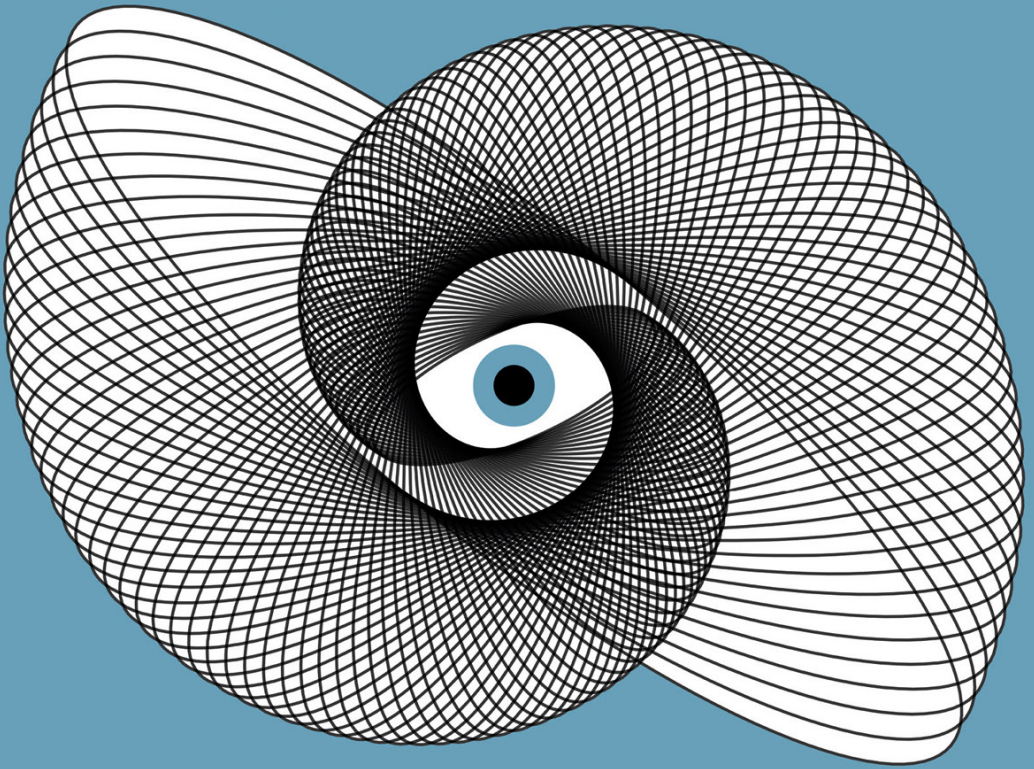


PETTER TÖRNBERG  
JUSTUS UITERMARK



# SEEING LIKE A PLATFORM

An Inquiry into  
the Condition of  
Digital Modernity

Complexity in Social Science



# SEEING LIKE A PLATFORM

Power needs abstraction, to make the unwieldy complexity of the social world legible and manageable. The proposition at the heart of *Seeing Like a Platform* is that digital technology brings new metaphors through which power operates. While industrial modernity saw society as a machinery to be designed according to detailed blueprints, *digital modernity* views society as organic and alive, to be herded and nudged through digital infrastructures, AI, and algorithms.

*Seeing Like a Platform* explores the history, meaning, and far-reaching consequences of this epistemological shift. From social movements to Wikipedia, from digital platforms to city planning, from social science to media, society is being redefined by ideas from complexity science. While complexity offers a vision of a self-organized society freed from hierarchies and overbearing bureaucracies, it simultaneously enables new forms of domination and control.

Through theoretical reflections and case studies, *Seeing Like a Platform* offers an inquiry into digital modernity. Accessibly written and broad ranging, it is an essential reading for scholars, students, and practitioners in fields such as sociology, political science, urban studies, and technology studies. It will also interest anyone keen to understand the profound impact of digital technologies on governance, social organization, and everyday life.

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of Digital Modernity

*Petter Törnberg and Justus Uitermark*

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This book draws upon our earlier work. As we look back, the parable of the blind men and the elephant comes to mind: when doing our research

## x Acknowledgments

for earlier papers, we were observing different aspects of digital modernity but were not yet able to grasp it in its totality. For this book, we retrofitted this earlier work by jointly revising and updating our earlier papers to arrive at a – hopefully coherent – understanding of digital modernity and its epistemology. Chapter 2 includes fragments of an paper published *Big Data & Society* (Törnberg and Uitermark, 2021), Chapter 3 is a revision of a paper in *Urban Studies* (Uitermark, 2015), Chapter 4 is a revision of a paper with Emiel Rijshouwer and Willem de Koster in *Information, Community & Society* (Rijshouwer et al., 2023), Chapter 5 is a revision of a paper in *Media, Culture & Society* (Törnberg and Uitermark, 2022), Chapter 6 is a revision of a paper in *Social Movement Studies* (Uitermark, 2017), and Chapter 7 draws on two papers on the platform economy (Törnberg and Uitermark, 2020; Törnberg, 2023). We sincerely thank our coauthors for their contributions as well as the journal reviewers and editors for the feedback and encouragement.

# 1

## INTRODUCTION

Power is based on abstraction. To govern, reality's unwieldy complexity needs to be slotted in models, categories, and measures that allow for standardization and manipulation. Nature and social life are bureaucratically indigestible in their raw form and need to be pre-processed before they can be seen and shaped. Power needs maps, and maps are only really useful if they reduce reality and leave something out.

When wielded by the state, maps become more than representations. A state registry which designates taxable property-holders does not merely describe system of land tenure but *creates* such a system by giving its categories the force of law; reality is represented so that it can be brought under control. In short, power has an epistemology, and this epistemology is imprinted upon the world. The book from which we derive our main title, James Scott's *Seeing Like a State*, was based on this central insight and traced its far-reaching implications.

The proposition at the heart of *Seeing Like a Platform* is that the digital era into which we are now entering signifies the rise of a new epistemology of power. We argue that digital technology is not only changing capitalism's political economy – as suggested by the notion of “digital capitalism” – but that it is the foundation for a new form of modernity that is defined by distinct cultural logics and *ways of knowing*. Digital technology both develops from and informs a way of drawing the maps that are used in governing – and is thus coming to define a *digital modernity*.

We use the stylized distinction between industrial and digital modernity to capture changes in the way we know, construct, and govern social realities. Schematically speaking, industrial modernity was the age of machines. Seen through the lens of industrial modernity, societies, cities, and organizations

## 2 Seeing like a platform

appear as machineries that may be designed through technological expertise and top-down planning. Digital modernity, in contrast, is the era of code. Its metaphors are organic rather than machinic. Seen through the lens of digital modernity, societies, cities, and organizations appear as organisms that may be grown and cultivated through scripts and algorithms. The technologies at the heart of digital modernity – including digital platforms and artificial intelligence (AI) – have generative and emergent qualities: instead of stipulating individual behavior through rule-based procedures, the systems learn and adapt as they are used for different and often unanticipated purposes.

Every way of seeing comes with its own blind spots: aspects of the world that must be left out to make the world legible. While digital modernity addresses some of the problems inherent in industrial modernity, it brings problems of its own – problems that are often challenging to identify and discuss using the conceptual vocabulary inherited from industrial modernity (Boltanski and Chiapello, 2018). Critique of industrial modernity typically counterposes authoritarian top-down planning with democratic bottom-up self-organization. Although such a critique remains valid for many contexts and cases, it fails to capture the inequities and democratic deficits inherent to digital modernity, for which self-organization and emergence are foundational principles instead of disturbances. It is not that our inherited vocabulary needs to be jettisoned altogether but it does need to be updated to grasp emergent forms of power.

An illustrative example is the withholding of mortgages from groups and areas that are deemed a liability. In the 1930s, government researchers, insurance companies, and bank officials used racial categories to construe a neighborhood typology that told them where they would provide or withhold mortgages (Rothstein, 2017). Predominantly Black and Hispanic neighborhoods were regarded as undesirable, unworthy, and risky: they were “redlined,” and their residents were ineligible for mortgages. The result was racial and spatial discrimination, reinforcing unequal access to housing (Cashin, 2005). While the history of redlining is complex, the abuses of power are clear and well documented: we know exactly who were responsible for the policies, how the maps were construed, and which areas suffered as a consequence.

Although these discriminatory practices have long been outlawed, mortgage markets have continued to be tainted by inequalities (Taylor, 2019). Over time, the algorithms used to assess creditworthiness and liability, as well as to target specific demographics for advertisements and market expansion, have become increasingly sophisticated and automated (Perry et al., 2023). Such algorithms are trained through machine learning and utilize data from a variety of sources, greatly increasing the accuracy of their assessments and moving far beyond the crude distinctions that informed redlining of the 1930s.

While exceedingly complex and sophisticated, these modern-day algorithms are as biased as the data on which they are trained (Benjamin, 2019; Eubanks, 2019). Although they are as likely to perpetuate inequalities as their distant predecessors of the 1930s, now it is much more difficult to pinpoint how this happens or may be redressed (Zou and Khern-am-nuai, 2023). The valuations and assessments emerge from models whose inner workings are opaque even to their designers and users. No single red line is imposed, yet innumerable lines emerge. Every person in the chain of decisions may genuinely feel that they did not discriminate – and yet, they together faithfully reproduce inequalities. As digital data and artificial intelligence increasingly enter into the systems and institutions that shape our lives, automated and emergent inequalities are growing increasingly pervasive. It is becoming clear that these systems are operating under a logic that is undeniably different from that of the world for which our critical and conceptual apparatus was developed. But the exact features of this logic remain obscure.

To understand digital modernity, we must first situate it historically, and this is the task we take up in this introduction. As the book from which we derive our subtitle, David Harvey's *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change*, we locate the rise of new ways of seeing and organizing in the contradictory historical transformations of capitalism. While acknowledging that we have little to say about the vast global majority of places and people outside of the Global North, we still paint the historical development of digital modernity with a broad brush. Our purpose is to bring out changes in the organizing logics of social life through the stylized distinction between industrial and digital modernity. While this means our analysis will not neatly fit any particular case, we hope it brings out some of the fundamental shifts that occur across a wide range of cases.

### Seeing like a Fordist

Scott argued that the premodern state was partially blind – it knew preciously little about its subjects, their holdings, and their whereabouts. It had no map through which to navigate. It lacked a way to measure and translate the complexity of the world into something legible and manageable. The rise of the modern state was thus centrally defined by its capacity to render the world legible through scientific methods. Economics, statistics, demographics, mathematics, and the survey – what Allen Barton (1968: 1) referred to as the “sociological meat grinder, tearing the individual from his social context and guaranteeing that nobody in the study interacts with anyone else in it” – helped make the social world legible and amendable. Scott traces a range of phenomena to the modern state's particular way of rendering reality legible

#### 4 Seeing like a platform

– from the standardization of weights and the design of forests to the introduction cadastral surveys, population registers, and urban planning.

Seeking to impose a world that matched what its means of representation could describe, the modern state fought against diversity, mobility, and local traditions. Its science, data, and geometry, backed by state power, transformed the real, diverse, and chaotic reality into a more uniform one, which at least superficially resembled the administrative grid of its techniques. Cities and forests were organized as rows and straight lines. Citizens were given permanent surnames, ascribed categorical identities, and segregated in space so as to reside be among their category. The state made legible by taking complex and diverse local practices and slotting them into a standard grid to facilitate centralized registration and monitoring.

While this way of rendering legible emerged with the formation of modern states in the 18th and 19th centuries, it reached its zenith with the rise of Fordist mass-production and mass-consumption that started in the early 20th century and climaxed in the 1950s and 1960s. Western societies during this era were characterized by “high modernity”: a heightened confidence in the capacities of the state to design the world according to its plans through top-down organization and large-scale projects. By facilitating massive investments in the construction of houses, highways, and factories as well as education, health care, and defense, governments spurred demand and triggered a period of growth not seen before in the history of capitalism. For about 30 years – *Les Trente Glorieuses*, or the three glorious decades – sustained economic growth lifted large parts of the working class out of poverty and into the middle-class. Fordism was a compromise, or at least a temporary truce, between capitalism and democracy, enabling their competing interests to be temporarily aligned by leveraging rapid growth to hold at bay the tendency toward growing inequality. The economy was organized as a closed and circular system: public investments stimulated national economic growth which in turn generated funding for more public investments and so on.

At the heart of industrial modernity was the factory. The factory not only *created* machines, but was also itself a giant machinery, with humans as components in the assembly line. The central focus of the form of capitalism that dominated the Western world in the post-war era was *scale*, achieved through the insight that productivity could be dramatically increased by de-skilling labor and severing the design of products from their manufacture – a form of production requiring workers to function as practically identical cogs in the machinery of production. This mode of production, however, needed to overcome two immediate challenges, the solution to which came to shape society in important ways: workers must be persuaded to engage in hard and repetitive labor, and consumers had to be made to purchase the massive amount of practically identical goods

that could now be produced. Henry Ford is credited for finding a combined solution to these problems, bringing both workplace control and consumer demand. Ford recognized that control in rationalized production did not end at the factory gates, bringing the explicit recognition that mass production meant mass consumption, a new system of the reproduction of labor power, a new politics of labor control and management, and a new aesthetics and psychology.

By increasing salaries, Ford simultaneously mollified the workforce and shaped consumers that would want to consume the mass-produced goods. In return for the Five Dollar Day, he demanded not only workers acquiescence to the dehumanizing conditions of mass-production, but also stable home life centered on the consumption that made them dependent on their high-paying jobs. The daily five dollars were half pay and half bonus, with the bonus being contingent on a number of character requirements enforced by the Socialization Organization, whose officials would perform home visits in which they ensured that things were done the “American way,” e.g., speaking English, avoiding gambling and drinking. This became part of shaping an era of “mass individuality” in which consumers choose from products superficially differentiated by aesthetics and accessories. As Antonio Gramsci noted in the early 1930s, “In America rationalization has determined the need to elaborate a new type of man suited to a new type of work and productive process.”

The Fordist factory at the center of industrial modernity, Zygmunt Bauman (2013) argues, was more than just a way to organize production. It was “an epistemological building site on which the whole world-view was erected and from which it towered majestically over the totality of living experience” (Bauman, 2013: 56). The Fordist factory epitomized the pursuit of controlling the future by fixing it through standardization and rationalization, administrative hierarchies, and strict managerial command. The precise and rigid machinery of the Fordist factory constituted the arch-metaphor that permeated the entire era of high modernity. The image of the Fordist factory shaped a modernity which was obsessed with bulk and size, with a preference for matching forms of planning and social organization – giant farms, huge dams, and grid cities connected through highways and metro lines.

The large-scale factories and industrial projects exemplify a particular type of system that is characteristic of high modernity and its epistemology: *complicated* systems. Within system research, complicated systems are contrasted with *complex* systems (Andersson et al., 2014; Érdi, 2007). We will have more to say about complex systems later, but for now, the important point is that the systems at the heart of industrial modernity – from the steam engine to the automobile – represent a particular type of organization and structure. Complicated systems are organized in level hierarchies that



pack components into delineable compartments. From an engineering standpoint, designing complicated systems is highly beneficial for controllability, repeatability, and precision. Complicated systems are a prerequisite for mass-production, as they are composed of interchangeable parts to be assembled in a simple and systematic manner. Extremely complicated systems, such as spaceships, may be exceedingly difficult to design and construct, but they have the advantage that they are both precise and predictable: it is possible to construct spacecrafts with the capacity to land with high precision on a planet millions of kilometers away. Under high modernism, state officials, corporate leaders, and scientists viewed and constructed societies, cities, and organizations as machines, not just to increase efficiency but to break through the boundaries of what is possible and realize a vision of human progress. The spacecraft is, in this sense, not an arbitrary example; more than a tool for scientific discovery, it epitomized human ingenuity and defiance to limitations imposed by nature.

Complicated systems are associated to particular types of data. The Fordist factories and state were organized through exact accounting, measurement, and statistics, printed sheets of IBM machines that governed every movement on the factory floor. The data of the “average man,” monitored through rows and columns of data, steered through top-down command-and-control. Drawing on such data, the social organization of the Fordist factory was transposed to society at large, institutionalized in schools and hospitals, and inculcated in family life and subjectivity. High modernism was founded on a belief in linear progress and absolute truth to be achieved through a positivistic, technocentric, and rationalistic epistemology (Harvey, 1989: 35). The stability of Fordism relied on a powerful cultural dimension – an ethic of conformity, the primacy of the nuclear family, and the celebration of mass consumption.

High modernity itself is contradictory, even schizophrenic, as it attempts to both fix reality through infrastructure and administration while at the same time promoting incessant movement and continuous flow. And like any model, the imposition of this mechanical view was incomplete, uneven, and contested. The logic of high modernity permeated all facets society not as complete realization of its aspirations but as the arch-metaphor defining the battlelines of conflict. Some of the movements and ideas that came to define the 1950s and especially the 1960s – from Jane Jacobs in urbanism to the critical theory of the Frankfurt School – were defined by their resistance to the uniformity and standardization of the mass-society.

Although in some places high modernism is still alive and well – monotonous building blocks are erected on urban peripheries around the world at an unprecedented scale, scientists continue their attempts to engineer nature in ever more ambitious and detailed ways, and state bureaucracies collect more information on their subjects than ever before – Fordism as a

coherent ensemble unraveled in the 1970s. Its contradictions became apparent in the early 1970s as deficits grew and unemployment increased. As the West European and Japanese recoveries from the war were complete, and their internal market were growing saturated, the inherent contradictions of industrial capitalism became more apparent. The result was an intertwined global energy crisis, rampant inflation and economic stagnation, and growing environmental movements emerging in response to increased awareness of pollution and resource limits. The economic crisis was compounded by a crisis of legitimacy as demands for democracy and resistance against standardization – from union protests and student rebellions to mobilizations by civil rights activists and the anti-war movement – intensified. In 1973, OPEC issued an oil embargo in response to the West’s support of Israel, drastically increasing the price of oil, industrial modernity’s life blood, and sending an already faltering system into a full-blown crisis.

### **Neoliberalism, the infinite interregnum**

As firms responded by relocating production to countries with low wages and minimal worker rights, they effectively cut the closed loop of that had sustained economic growth and decreased inequality in the Global North; globalization severed the connection between growth of income, demand, and productivity, breaking the temporary truce between capitalism and democracy that was at the heart of Fordism. The result was the breakdown of the institutions that had held at bay capitalism’s inherent tendency toward rising inequality.

The ambitious and confident state was replaced by a minimal and hard-hearted neoliberal state, whose role was reduced to guaranteeing private property rights, upholding the rule of law, and supporting free trade. While the Fordist state had sought wealth redistribution and to hold at bay the destructive forces of capitalism, the neoliberal state sought merely competitive advantages vis-à-vis other states. Rather than engineering a cycle of investment and growth, the neoliberal state sold off state assets, cut taxes, and subsidized private investments to boost economic activity, and facilitate wealth accumulation.

If the high modernist era was defined by the arch-metaphor of the Fordist factory, the era that followed is defined by the all-pervasive metaphor of the *market*. Market dynamics and principles came to permeate every institution; what could not be outright privatized was re-modeled to follow a market logic through philosophies like “new public management.” Education, healthcare, housing, and even government itself began to be restructured and evaluated based on market principles. Schools, hospitals, and other public services were no longer modeled on the epistemic building-site of the Fordist

factory, but organized as market entities that should be run like businesses, focusing on efficiency, competition, and consumer choice.

In the corporate sector, Fordism's hierarchically integrated firms geared toward cost reduction by means of mass production were replaced by more flexible networks optimized for adaptability, with the financial, creative, and technological businesses taking over the once-dominant position of the manufacturing industry. The aim and focus of these production processes differed from those of their predecessors: they operated in an economy that was "increasingly characterized by diversity, differentiation and fragmentation, rather than homogeneity, standardization and the economics and organization of scale which characterized modern mass society" (Hall and Jacques, 1989: 11). The rise of flexible accumulation as a mode of production and labor was complemented by rapid financialization, shifting the emphasis from production to financial markets.

The shift from economy of scale to economy of scope in production was met by a corresponding shift in consumer culture. Authors such as Harvey (1989), Jameson (1991), and Baudrillard (1994) explored how flexible accumulation corresponded with a postmodern consumer culture: an eclectic, media-saturated environment where traditional boundaries and distinctions between styles, eras, and categories blur. In this culture, consumer identity and lifestyle choices become central, often influenced by a constant flux of images and narratives from advertising, television, and the internet. Postmodern consumer culture is marked by a fluidity of identity and reality, where image and style often take precedence over substance, and consumer goods are seen as integral to constructing and communicating personal identity. As Harvey (1989) observed, the decline of technical-scientific rationality's hegemony and the rise of pluralism provided space for a much broader range of experiences and identities while also generating new lines of division.

The decline of the modernist state brought with it a broader epistemic shift. Scott's work fits into a larger strand of literature that discredited not only the state's capacity to act, but the possibility of the modernist pursuit of universal truths and objective knowledge. Postmodern thought questions the validity and authority of objective knowledge, viewing modernist narratives not as universal truths but as constructs that serve to assert power and enforce conformity. In line with Scott's recommendations, postmodern culture steered toward a more local, fragmented, and pluralistic understanding of knowledge. Despite these wide-ranging economic, cultural, and social transformations, the 1970s crisis is in some sense still ongoing. After Fordism's demise, no coherent and robust regime of accumulation emerged in its place.

In this book, we join other scholars in exploring the transmutations of neoliberalism in the wake of Fordism's demise. We are interested in the

interrelationships between new modes of capitalist accumulation, technologies, cultures, and belief systems. In a word, we are interested in the contours of a new modernity. Authors writing on such emergent modernities, such as Baumann on “liquid modernity,” Harvey on “postmodernity,” and Sassen on “global modernity” emphasize that they are chronically unstable, as they are undermined by the very dynamics of capitalism and culture that animated them in the first place. The rise of new modernities – more or less coherent ensembles of epistemologies, ideologies, forms of social organization, and modes of capital accumulation – is always tendential and contradictory, marking new lines of conflict rather bringing about a coherent social order. And so it is with digital modernity: its rise is tendential, partial, and contradictory but nevertheless marks a fundamental change in how society is envisioned and organized.

### **A new way of seeing: complexity thinking as the epistemology of the digital**

The last few decades have seen the rise of a new way of seeing; birthed from early experiments with computer code, honed as the internet came to encompass ever more aspects of social life, and acquired dominance with the consolidation of giant technology corporations and their digital platforms. While high modernity was founded on the epistemic building site of the Fordist factory, the society emerging today is founded on the epistemology of the *digital*. As the logic of heavy machinery permeated high modernity, so does the logic of computer code permeate the society of today. The digital is, to paraphrase Bauman, emerging as the new epistemic building site for a whole worldview.

Computers were initially employed as part of the upkeep of high modernity, employed from the 1950s to help structure organizations, mobilize armies, and keep track of employees. The “if-then”-style logic of computers fits neatly into the paradigm of rational bureaucracies and rule-based governance, emphasizing efficiency, predictability, and standardization. The ethos of rational bureaucracies was to streamline operations, minimize human variability, and ensure consistent outcomes, thus requiring an architecture of standardized procedures and protocols. The rationality and neutrality of computers thus offered a perfect analog, and algorithmic procedures became an integral part of the postwar social and international orders. Digitalization then became part of the capitalist reorganization that followed the Fordist crisis of the 1970s, as replacing mass-production with flexible specialization meant the restructuring of production toward automation and digitalization. Digital technology provided the infrastructure for the global financial system, enabling the acceleration and deepening of securitization, financialization, and capital mobility.

While digitalization originated from high modernity's pursuit of control and attempts at countering crisis tendencies, it contained within it the seed of something different. As bored office workers, geeks, scientists, and hippies played with the new machines, they found new worlds within them. Early experiments with computer code in the early 1970s – artificial life, cellular automata, the Game of Life – seemed to reveal order emerging out of chaos, rather than of hierarchy and leaders. The digital invited a fundamentally new way of thinking of the world. It suggested forms of organization that seemed fundamentally at odds with the very epistemic foundation of the hierarchical and inegalitarian society. What early digital experiments showed was that order did not need to be imposed from the top-down, but could emerge from the bottom-up.

This early digital experimentation was entangled with California's counterculture movement; as Leary famously put it, "The PC is the LSD of the 1990s," hippies using computer code to explore alternative worlds. This revolutionary spirit was part of Silicon Valley since its inception, expressed through such cultural icons as the Whole Earth Catalogue and ritual events such as the Burning Man festival (Marwick, 2013). Writers of early hacker culture argued that the digital did not only enable decentralization and sharing, but *demanded* it: "information wants to be free."

Such ideas emerged praxeomorphically – through practice – by working with code and digital data. Some of the most evocative experiments in computer programming involved the construction of systems characterized by mass-interaction among large number of agents following simple rules. Instead of steering systems in a preconceived direction, the appeal of these simulations was that they generated unexpected and mesmerizing patterns. The internet, in particular, provided both the medium and the metaphor for conceiving of social and technical systems as distributed and decentralized, even anarchic (Fourcade and Healy 2024). From these disjunct experiments emerged the scattered fragments of a new form of order – and thus a new way of seeing and rendering legible.

At the Santa Fe Institute in the mid-1980s, a group of researchers began collecting these fragments, to examine the image that their assembly brought into light, and elaborate from it a coherent scientific perspective. The Santa Fe Institute came to act as a powerful uniting and aligning force in what can today be referred to as "complexity science": a science that focuses on *complex* rather than *complicated* systems. Drawing from diverse fields such as chaos theory, cybernetics, game theory, dissipative systems theory, and synergetics, the Santa Fe scholars developed a set of fundamental concepts for dealing with non-linear dynamical systems, such as bifurcation, self-organization, and path-dependency.

The central insight emerging from these studies was that the traditional approach of physics – with its emphasis on reductionism, linearity, equilibria,

and analytical solutions – could only capture a small part of the natural world. As the Santa Fe scholars argued, traditional physics had pretended as if the world consisted only of pendula and two-body gravity-systems – either simple enough to solve precisely, or machine-like enough to take apart into components pieces. But when a pendulum is subjected to too much initial force, or when a third body joins the gravitational system, the methods fail – and the systems effectively leave the domain of the predictable and enter the realm of chaos.

To capture these qualities, they argued, a new ontology is needed, one that views order not as a balance of forces in a closed system but as an emergent outcome of dynamic interactions. Such an ontology implied a new appreciation for the micro-foundations of natural and social life. Instead of viewing interacting elements as simply playing their preordained roles as defined by the overall logic of the system, they came to be viewed as generative, even creative and intelligent. Ants, for instance, may not be particularly intelligent on their own, but they exhibit remarkable brilliance as a collective. Each ant operates according to a set of simple rules – follow the smell of pheromones, pick up things you come across, and so on – but the emergent outcome of their mass-interaction is a highly functional and sophisticated order.

These so-called “complex systems” not only functioned, but had some significant benefits over the top-down forms of organization. They are adaptive and resilient. While a machine breaks down if a single cog is removed, an ant colony can continue functioning even if it loses a substantial fraction of its members. Moreover, studies of ant colonies showed that they were in fact engaging in form of decentralized computation: ants proved to be an unbeatable system for optimization, far more efficient than the top-down algorithms that had thus far been employed.

The Santa Fe Institute gathered a motley crew of physicists, economists, computer scientists, and ant scholars, seeking to articulate from the fragments of digital experimentation a new arch-metaphor – a new way of seeing. This digital way of seeing – complexity science – revealed a hidden order in what had thus far appeared chaotic. A growing number of systems were said to follow similar decentralized principles. Flocks of birds. Schools of fish. Brains. Darwinian evolution. Immune systems. These complex structures are emergent, they rise up out of distributed local interactions. These systems intrigue scientists because their highly sophisticated aggregate dynamics cannot be inferred from inspecting components or their base-level interactions. The survival strategies of ants, the enchanting dance of fireflies, and the consciousness of the brain emerge from countless seemingly mundane interactions. “Complex systems” came to the shorthand to refer to systems that have such emergent properties. A growing number of structures – ranging from brains to the economy – have been analyzed as complex

systems (e.g., Helbing, 2013; Johnson, 2002; Kauffman, 1993). With the rise of these ideas, the chief metaphors for understanding the social world gradually shifted away from machines and toward ecosystems.

At the same time as these ideas were flourishing in the sciences, they were also being put into practice. Digital technology allowed not only *studying* complex and self-organized systems but also *creating* such systems through code and data. Digital technology enables new forms of social organization based on distributed interactions rather than central coordination. With the internet itself as a paradigmatic example and foundational infrastructure, new applications and initiatives – from Wikipedia to Linux – demonstrated the potential of digitalization to facilitate distributed networks. The result was the emergence of concepts like the “sharing economy” (Puschmann and Alt, 2016) or “commons-based peer production” (Benkler, 2006), suggesting that digital technology could provide an alternative to both the market and the government. Social movements embraced digital technology as means of facilitating decentralized deliberation and decision-making, moving away from organizational models relying on strong leaders and inert institutions (Castells, 2012). The digital thus brought fresh optimism about the advent of a new, less hierarchical society, decentralized through digital intermediation. Digital technologies reflect and carry a “new spirit of capitalism” that draws inspiration from the critique of industrial modernity and is founded on values of creativity, self-realization, and autonomy (Boltanski and Chiapello, 2018).

But digital technology also enabled new forms of capitalist accumulation and extraction. The *platform* became central to these efforts. Early digital platforms like Facebook, Uber, and Airbnb presented themselves as a continuation of the preceding “sharing economy,” providing people with the opportunity to speak their mind, maintain social relations, and engage in business, unhindered by gatekeepers, brokers, or bureaucracy. But unlike their predecessors, these platforms had the backing of vast financial capital. Capital that had realized that the *disintermediation* enabled by digital platforms brought its own form of intermediation – and that this came with significant powers to control the social world. The owners of the platform control the social infrastructures that shape the world.

Whereas the Fordist factory relied on top-down control, digital platforms harnessed their power for ostensibly bottom-up self-organization and the celebration of individual expression. Instead of the commons displacing corporations, digital platforms enabled the expansion of the market into new facets of human life through code and data extraction. As Hassan (2022) observes in his dissection of digital modernity, platforms extend commodification in even the most intimate aspects of personal life and ensure dependence on corporations by means of technological infrastructure. Just as the high modernist state projects studied by Scott (1998) are founded on an

imperialist pursuit to fit people and nature into its grid, so digital platforms extend corporations' influence into the minutiae of everyday life and impose new conditions for culture, social life, and economic exchange.

Platforms epitomize the shift from a *mechanical* to a *digital* way of seeing, a way of seeing that renders the social world legible by viewing it as a complex – rather than complicated – system. The move from traditional to digital data constitutes not merely a question of new quantities of data or new tools – but rather, in the words of Boyd and Crawford (2012: 665), “a profound change at the levels of epistemology.” While the survey data that undergirded regulatory power require pre-defined categories and captures the social world through averages and variances, the so-called “Big Data” tend to be structured by and for algorithmic processing, implying indexed data structures and traversable networks (Mackenzie, 2012; Marres, 2017). While traditional data slot reality into fixed categories, variables, and variances, concealing its interactional elements (Conte et al., 2012; Lazer et al., 2020), Big Data are relational, interactive, heterogeneous, interactional, and emergent (Törnberg and Uitermark, 2021). The social ontology that digital technologies operationalize is not focused on the summing up of *populations* in fixed categories, but rather on clusters or patterns of individuals emerging from their dynamic connections and interactions (Castellani, 2014; Törnberg and Törnberg, 2018; Uprichard, 2013; Fourcade and Gordon, 2022).

Big Data thus gives space for the diversity, mobility, and individuality that traditional data erased – tracing individuals through models with thousands of ever-shifting attributes. While traditional data imposes grids and straight lines, and segregation along the lines of single categories, Big Data allows fractal structures and diversity, representing the world as networks of linked nodes. Like complexity, Big Data reveal hidden order in patterns that previously appeared chaotic and disordered – and when employed by the powerful, this order can be imposed on subjects. Platformization entails the birth of a new form of control, founded on the social powers of digital technology and embodying the epistemology of complexity. This new governing logic is coming to shift the fundamental market ideology, discipline, and rationality. In reference to its connections to complexity science, we refer to this form of power as *complex power*.

### Searching for digital modernity

As Scott showed, the high modernist state's combination of ambitious self-confidence and modernist epistemology often resulted in catastrophic failures. The monoculture “scientific” forests were susceptible to disease outbreak, pests, fires, and storm-felling. The square-grid cities of Le Corbusier and Robert Moses left out the human scale – the “sidewalk ballet” – that was necessary not only for a livable city but also for their economy and



safety. The list goes on. While bracketing aspects of the world is necessary to make it legible, the world left outside the brackets will tend to return to haunt the interventions. The aspects ignored are often precisely those that prove most important. The world proved more complex than what the models and plans could capture, and the simplifications often turned out to be inadequate for their lofty goals.

Seen in this light, the epistemology of complexity represents a step forward – bringing into view previously bracketed aspects of the human world. Instead of ignoring bottom-up self-organization, complexity-based approaches harness it. Viewing the world through organic rather than mechanical metaphors offers a way of embracing diversity, spontaneity, and contingency. But while the metaphors of complexity science feel more natural – they, in fact, are *organic* metaphors – they are still metaphors and abstractions. The epistemic shift associated toward complexity does not imply that the world is more correctly or fully represented, only that it is *differently* represented. Any model or metaphor will only partially capture the world, whether the metaphor is mechanical or organic. Just as high modernity imposed its mechanic metaphors of industrial machinery (with their hierarchies and strict divisions) on social life, so digital modernity imposes its own organic metaphors of self-organization (with their networks, clusters, and algorithms). This book examines the modernity shaped by this emerging epistemology, what it brings into view, and what it leaves out.

In this book, we are interested in the entanglement of epistemology, technology, and politics in digital modernity. A key argument that we develop in the following pages is that the natural metaphors of digital modernity both facilitate and conceal the workings of power. When societies, cities, and movements are presented as the outgrowth of bottom-up interactions, the role of the state, capital, or politics is minimized in discourse without being reduced in practice. Digital modernity's ideals of self-organization and emergent order tend to bracket quintessentially human qualities such as meaning and power; social orders do not emerge organically as in the natural world but are construed through cooperation and conflict between different interests and interpretations. While there is much that is wrong with high modernity, it had a clear vision of progress and how it might be achieved. Both nature and culture were presented as materials to be molded according to a vision, with the faith of humanity placed into its own hands. Modernist leaders were arrogant and ignorant but at least it was clear that they were responsible for engineering social and material realities.

Leadership in digital modernity is more difficult to pinpoint or hold accountable. Leaders in science, movements, corporations, and cities often present themselves as mere observers and facilitators of processes of self-organization that are beyond their control and must be respected. Sometimes this implies that some organizing principles of social life are implicitly

declared immutable. Whereas the modernist city of Brasilia, for all its flaws, represented a vision of a future that would break with the class inequalities that had characterized Brazil, no such vision exists in Jacobs-inspired contemporary urbanism which is predicated on a deep appreciation of cities' self-organization and a profound skepticism of, to invoke Scott's subtitle, "schemes to improve the human condition." At other times, power in digital modernity works through surveillance, tweaking, and nudging. Digital platforms do not command their users the way factories command their workers but rather create spaces where people are cast into the role of entrepreneurs who engage in exchanges on their own initiative in a market fully created and controlled by corporations. Similarly, social media platforms do not dictate with whom users connect or what they might say, but rather create a space of exchange that stipulates how they present themselves, what messages they may produce, and how they can interact with others. Instagram, for instance, offers a rather different kind of sociality from, say, Twitter or LinkedIn. Digital platforms' power is not that of command and control but of shaping the conditions according to which the social emerges. The analysis and critique of power in digital society must be thought anew – as the working of power changes, so must our epistemology.

As we explore digital modernity in different domains – science, cities, media, and social movements – we bring out contradictory and ambiguous dynamics of power. The nature of digital technology is fundamentally Janus-faced: at once enabling new forms of organization that empower scalable bottom-up organization, while also supporting more sophisticated and nimble forms of social control and the expansion of capital into new aspects of human life. The digital creates potential for alternative and more equal forms of social organization, while at the same time affording new forms of control and inequality through the monopolization of data power.

The rise of complexity – the epistemology of the digital – does not determine an outcome but defines the battlelines across which struggles over our social world are fought. While the growing social power of digital technology is inevitable, its social implications are defined by contingent and social processes of negotiation and struggle. Digital technology may be employed to undermine democratic power, weaken public services, promote labor precarity, violate privacy, and destabilize the world's democracies – but its political possibilities could also potentially enable new forms of democratic governance (Schneider, 2018; Scholz, 2016). As the digital is emerging as an unprecedented force with the power to shape institutions, code and data are emerging as a political battleground.

It is not predetermined which of the two faces of complexity will prevail. The implications of complexity do not unfold through a linear process in which platforms impose singular logics on the social world: it is more variegated, contentious, contingent, and ultimately more interesting. The digital

arrives not as a monolithic whole, but through a multitude of local and specific battles. In each arena, the incompleteness of the digital way of seeing will have fundamental implications. As the mechanic way of seeing before it, the digital erases and leaves out. As the high modernist state before it, governance through complexity will fail in fully implementing its scheme, while simultaneously stamping the world with the imprint of its designs. As we will see, each time power, inequalities, conflict, and meaning-making are bracketed and erased, they come back to haunt the interventions and designs.

At this point, we need to reflect on our own positionality. This is not only to acknowledge our inevitable blind spots as privileged White men but also to reflect on the power dynamics in the literatures in which this book is situated as well as the social worlds it examines. It is not a coincidence that people with our backgrounds are drawn to the study of complexity and digital technology. To start with, all authors in the series in which this book is published are men, which is indicative of power relations in the field of complexity science more broadly. We see a similar pattern in the fields of science, technology, engineering, and mathematics from which much of complexity science has sprung; although the share of women and people of color is increasing, White men remain heavily overrepresented. And, finally, we see the same in the technology industry that has been developing and applying computational methods and complexity, which has marginalized women and minorities both in its corporate culture and historiography (Hicks, 2017; Abbate and Dick, 2022). Although the workers and consumers involved in the production and consumption of digital data are diverse terms of class, gender, and ethnicity, the industry's iconic leaders – the likes of Elon Musk, Mark Zuckerberg, Bill Gates, Peter Thiel, and Jeff Bezos – tend to be White men of privileged backgrounds educated at elite US institutions.

Acknowledging the gender, class, and ethno-racial make-up of the different worlds that come together in this book is not perfunctory or tangential. The worldview implied in complexity science, discussed more fully in Chapter 2, in some ways reincarnates the view of the scientist as neutral and objective. It implies the re-introduction of a form of “view from nowhere” – a perspective that in the social sciences tends to instead imply an unacknowledged view from the center of power (Haraway, 1988; Hayles, 1999). By ignoring both meaning-making and power dynamics, an unrevised complexity perspective – sometimes referred to as “social physics” – resuscitates a separation between the subject and object of scientific inquiry, with the scientist distilling through observation – sometimes from afar, at other times up-close, but always from outside – the fundamental dynamics and principles of the system under study, be they ant hills, brains, or social relations. This worldview finds its analogue in the technology industry when engineers attempt to optimize digital platforms to maximize engagement, attention,

revenue, or user bases. Whether in scientific observation or the practice of constructing digital systems, the key characters appear as separate from the systems they comprehend and control, a position historically reserved for those who are deemed unbiased and disinterested, that is, elite White men.

Just as industrial modernism was built on notions of gender, class, and race – epitomized in individuals such as the afore-mentioned industrialist Henry Ford, the master planner Robert Moses or imagined popular figures like the blue-collar bread-winner – so is digital modernity. Throughout the chapters of this book, we explore these inequities. We examine how the decentralization implied in digital systems tends to paradoxically bring about new forms of inequities of power and resources. We examine how code and data embody and perpetuate racism and sexism. Through our cases, we examine the challenges involved in promoting equity and diversity in digitally mediated systems such as Wikipedia, and how digital media have come to channel the anxieties and desires of young White men into digitally mediated political movements. While not always visible and explicit, questions of race, class, and gender permeate ostensibly neutral artifacts such as data and code (Benjamin, 2019).

Central to this book is the idea that the bottom-up mechanisms engineered into digital systems, including algorithms and artificial intelligence, reflect and reshape historically evolved relations of power. This is not to suggest that complexity-thinking and digital technologies necessarily reinforce male dominance or white privilege. As we will see, complexity has often appeared as a revolutionary and progressive way of challenging old hierarchies, in particular when facing the oppressive structures of high modernity. For instance, as Chapter 3 details, Jane Jacobs' challenges against Robert Moses made her into an icon of resistance and a star of the emerging field of complexity research. We also do not mean to suggest that we exhaustively discuss the gender and ethno-racial dimensions of digital modernity. Following Bauman, Harvey, and Sassen, our main interest is in the emerging political economy, culture, and especially epistemology of digital capitalism.

In this book, we explore emergent digital modernity and its epistemology of complexity in six different arenas, examining how the rise of the digital inspires new ideas and ignites new conflicts. The chapters move between empirical cases and theoretical explorations to offer different vistas of the condition of digital modernity.

**Case 1: Science.** This chapter focuses on the digital paradigm in the social sciences. In recent years, complexity theory has emerged as part of a new research paradigm that studies the social world through digital data and advanced computational methods. Whereas the quantitative methods of old conceived of individuals as isolated units, complexity theory puts relationships at the center and examines the social world through interactional

patterns. The chapter shows how the digital paradigm relies on organic rather than machinic metaphors. Although this allows complexity researchers to identify bottom-up emergence, the perspective is much less suitable for scrutinizing top-down causation. In fact, we argue, the value of the perspective for corporations and governments lies precisely in how it ignores the very exercise of power it itself facilitates. Just as neoclassicism in economics, complexity theory presumes self-organization while at the same time offering tools to engineer the social world.

**Case 2: Cities.** Where the previous chapter examined the rise of complexity thinking in the social sciences, this chapter focuses on cities. We revisit the famed confrontation between city planner Robert Moses and activist writer Jane Jacobs, viewing the former as an icon of industrial modernity and the latter as an early proponent of complexity thinking. This chapter traces how our metaphors and ways of knowing are reflected in our cities – whereas Moses viewed the city as a machine, Jacobs viewed it as a complex ecosystem with emergent properties. These different metaphors imply different roles for the government and planners; they suggest some courses of action, while delegitimizing others. At least in the Global North, planners are moving away from seeing cities as integrally engineered machines toward a conception of cities as ecosystems with emergent properties. Drawing on examples from the city of Rotterdam, we examine how the commitment to self-organization plays out in practice. This chapter argues that self-organization is an inherently uneven and incomplete process, meaning it generates new inequalities and cannot be relied on to equitably deliver services.

**Case 3: Bureaucracies.** This chapter reflects on a promise that lies at the heart of digital modernity: that crowds are wiser than experts. Through the lenses of complexity, the hierarchical and closed structures of industrial modernity are both inefficient and undemocratic. Such structures are contrasted with the crowds that supposedly are empowered by digital technology. Wikipedia serves as a paradigmatic case to examine digital modernity's epistemology. We find that the encyclopedia by and large delivers on its promise of epistemological democratization – the crowds have indeed succeeded in composing the most comprehensive repository of human knowledge in history. However, this is in large part *because* of bureaucratization, not in spite of it. Moreover, while Wikipedia's content is crowd-sourced, its infrastructure is controlled by a hierarchically structured organization. The example of Wikipedia demonstrates both the promises and pitfalls of digital modernity's promise of democratization.

**Case 4: Media.** This chapter traces the shift from the mass-media of industrial modernity via the fragmentation of postmodern media to the datafied media of today. Our media are shaped by the political economy of their time, and in turn shape their societies way of knowing. Fordism shaped

a mass-media fitting its logic of mass-production and mass-consumption. As scholars like Neil Postman has argued, the media of the post-industrial era was shaped by a consumer society and characterized by postmodern fragmentation and individualization. This chapter asks: what characterizes the epistemology of the media of digital capitalism? The chapter argues that our contemporary media is shaped around the political economy of data extraction – creating an emphasis on engaging and identity-oriented content. As the world is cast through self-presentation on social media profiles, our very ways of knowing are defined by identity and belonging, what we know is reduced to another expression of who we are.

**Case 5: Movements.** This chapter examines Anonymous as a quintessential social movement of digital modernity. This notoriously elusive movement takes on radically different guises, constantly mutating, and traversing national borders and ideological divides. Drawing on ethnographic research as well as secondary sources, we identify mechanisms of power concentration and diffusion within this nominally horizontalist movements. While Anonymous activists often present the movement as a leaderless swarm and reject hierarchy, dominant groups emerged at various points in the movement's evolution. The example of Anonymous then shows both how ideals of self-organization and emergence stimulate activism, while also demonstrating the limitations and contradictions of complexity thinking – although movements are in important ways like swarms or crowds, in some fundamental ways they are also very different. We therefore use Anonymous to bring out some of the limitations and contradictions of pursuing complexity as an organizational ideal.

**Case 6: Platforms.** We finally turn to the changes in political economy that underpin the epistemological and cultural shifts examined in earlier chapters. Digital platforms have come to be associated with giant corporations such as Meta, Google, Amazon, or Airbnb. Initially, though, scholars viewed platforms as the digitally powered alternative to both states and markets. The promise of the platform was to bring coordination and collaboration in lieu of hierarchical commands and market incentives. This chapter traces the evolution of digital platforms and examines how they became the lynchpin of contemporary capitalism. It shows how processes of emergence and self-organization are designed to consolidate and expand corporate power. Instead of undermining them, platforms represent a reconfiguration of the state and the market. Platforms mark a shift in the nature of power, replacing the top-down and comprehensive engineering characteristic of industrial modernity with bottom-up, cluster-based, relational, and fluid forms of control powered by digital technology. Platforms therefore lie at the core of the shift to digital modernity.

**In the conclusion,** we draw together our findings from these cases to turn to AI as an emerging crystallization of digital modernity – that is in the process of transforming biopolitics. We seek to identify the shifts in governmentality that AI brings and propose five questions to guide future research seeking to understand the nature of our emerging digital modernity.

# 2

## THE SOCIAL SCIENCE OF COMPLEXITY

The social sciences are inextricably interlinked with the state. Demographics and statistics in the modern era arose in parallel with the evolution and consolidation of nation-states and were instrumental in the institutionalization of state power and governance structures. As Hacking (2015) put it, the modern state emerged in an “avalanche of printed numbers” in the 1820–1840 period, as the rise of statistics as a scientific discipline – and its associated demographics and probability theory – enabled a new view into the lives of citizens, using “statistical study of populations [...] to amass gigantic quantities of data” (2015: 280). The result was a reconfiguring of the relationships between states, subjects, and citizens so profound that it marked the birth of the modern regime of government.

Statistics – a term whose original meaning was “the science of the state” – is a crucial tool for states to collect, aggregate, and analyze data about their populations, economies, and territories, allowing for more nuanced and effective governance. This quantification was pivotal in shaping state policies and interventions as it enabled states to identify societal trends, allocate resources, and control its populations. The ability to quantify and analyze various aspects of society led to the development of the modernist notion of the state as a rational and objective entity, capable of managing and improving the welfare of its citizenry through scientific methods. The deployment of statistical methods became synonymous with modernity and progress, reinforcing the legitimacy and authority of the modern state.

In the 1930s, during the Great Depression, the US government had only vague notions about the rate of unemployment, the development of prices, or the commodities produced. In response, government officials elaborated



the “representative sample” (Didier, 2020). This was about more than just applying a statistical technique. It involved sending surveyors to the remote corners of the country, developing questionnaires, and harmonizing measures, all with the purpose to represent the country as a whole. Through such procedures, the state does not just simplify, but brings a reality into being, creating national economies and populations as objects of government. The representative sample can only approximate the national by abstracting away from interactions and relations (Barton, 1968). In the rows and columns through which survey results are processed, individuals exist as bundles of attributes and populations as aggregates of individuals. The modern state is inseparable from its associated social science, which is founded on grasping the previously unknown through measurement and quantification.

Recent years have seen this perspective challenged. A new avalanche of data is upon us, again reconfiguring of the relationships between states, subjects, and citizens. As digitalization has brought the mediation of nearly every aspect of human lives, it has ushered in an era characterized by incessant data extraction and the amassment of colossal datasets. From social media interactions to e-commerce transactions, and from traffic flows to diets, myriad aspects of human existence are now mediated by digital interfaces that systematically harvest, analyze, and store multitudinous data points reflecting our behaviors, preferences, relationships, and identities. This omnipresent data collection mechanism extends beyond explicit interactions, encapsulating passive data emissions such as location traces, browsing histories, and biometric data. As a consequence, the digital scaffolding of our lives yields an unprecedented and granular insight into individual and collective human experiences, preferences, and behaviors. The extraction of data is not merely a byproduct of digital evolution but often an intrinsic objective, fueling the advancement of data-driven technologies, analytics, and the economization of data, thereby reshaping the landscapes of knowledge, power, and societal structures.

For the social sciences, the data have offered a promise of unprecedented access to previously unimaginable views into the lives, dreams, and feelings of billions of people. Our online conversations can be tracked and studied, and our geolocational data examined, as our every action leaves digital traces that can be analyzed, promising deeper understanding of human behavior.

These are not merely *more* but also *different* data, describing a society that is also similarly different. In contrast to the survey data’s neat rows and columns, digital data are often structured as complex linked datapoints – such as text messages between individuals, or a complex network of relationships, rarely representative of anything than themselves, and rarely independent of one another. They describe a world that is interconnected,

capturing ever-changing flows, relations, and clusters. These data describe the social world as a “complex system,” to be examined with new methods. The data thus embody a new “episteme”: Foucault’s term for the knowledge, ideas, and assumptions that define and govern the way we conceptualize and inquire about the world, through which he highlighted that what societies accept as “knowledge” is subject to change over time and is intrinsically linked to prevailing power structures.

The result of the inflow of digital data in the social sciences has been a paradigm shift in the study and understanding of human behavior. As the traditional variable-based approaches to social science have struggled with the new forms of data, new approaches with their roots in physics and computer science have stepped forth to meet the tide, resulting in a renegotiation of the demarcations between the natural and social sciences. The proliferation of new social data has coincided with the intensification of relations between the university and the tech sector as methods, data, and researchers move freely across academia and private firms. These reconfigurations mean that there are not only new methods but also new ideas of what social science is and should aspire to. Complexity is at the heart of this new social science, representing a move toward a new computational paradigm, which sees in the epistemology of digital data not merely a *different* way of representing the social world but a *true* one.

In this chapter, we see how easily we confuse our maps with the territory; how our understanding of reality is modeled after the data and methods that we have at our disposal. We examine the social science approaches that have emerged around digital data, as a way of making visible the epistemology of digital modernity. We focus our inquiry on telling the story of a particular branch of complexity science, centered around Santa Fe Institute. This is not the *only* complexity theory, and it is not the first articulation of “complexity” – a concept that has a long history across the sciences (Jane Jacobs, for instance, offers an early chronology of the concept in medicine and biology and proposed to apply it to cities – which we explore in more detail in Chapter 3). But it is the history of what has become a mainstream articulation of complexity (see Andersson et al., 2014), and the embodiment of the epistemology of digital modernity. After examining complexity theory at the Santa Fe Institute, we trace its influences in the emerging field of computational social science, demonstrating how the use of new technologies brings with it new ways of seeing and appraising social life. Through our discussion of the Santa Fe Institute and computational social science, we outline digital modernity’s epistemology and examine how it is entangled with the governance of contemporary capitalism.

### Santa Fe Institute and the epistemology of the digital

The Santa Fe Institute (SFI), located in a small city with the same name in the mid-Western state of New Mexico, would develop into a crucial hub for complexity theory. The institute was founded in 1984 by high-energy physicists from the Los Alamos National Laboratory, where the Manhattan Project had some decades earlier represented one of the first large-scale scientific application of computers (Galison, 1997). The institute brought together a multidisciplinary community of researchers in pursuit of understanding the common patterns in physical, biological, and social systems, boasting a roster of prestigious scientific affiliates, headlined by Nobel-prize-winning physicist Murray Gell-Mann. SFI operates independently of any university and receives most of its funding through donations from corporations, foundation grants, and individual philanthropists.

The researchers gathered at the SFI in the mid-1980s came to focus on collecting and examining a range of early experiments with computer code that had emerged in the 1960s and 1970s with the increasingly widespread adoption of early computers. Some of these were part of the cybernetics movement that used computation and simulation to explore alternative social worlds (Hayles, 1999; Pickering, 2010). Many of these early experiments show how interaction based on simple rules could lead to sophisticated – even life-like – dynamics, pointing to something in the peripheral visions of the sciences. One such form of experiments was fractals: geometric figures generated by simplistic rules, characterized by self-similarity and intricate patterns that repeat at any scale of magnification, revealing infinite complexity. The Mandelbrot set (see left image in Figure 2.1) in particular triggered fascination among the public and researchers alike. A Mandelbrot set, named after the mathematician Benoît Mandelbrot, is generated through an exceedingly simple iterative algorithm, which, when visualized, reveals an infinitely intricate structure, teeming with swirling patterns, self-similar shapes, and boundless detail, uncovering unseen worlds at every level of magnification.

Another influential example was John Conway’s Game of Life (see right image in Figure 2.1). The game unfolds on a simple two-dimensional grid

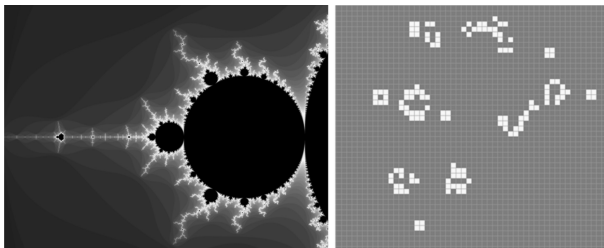


FIGURE 2.1 Part of the Mandelbrot set (left). Conway’s Game of Life (right).

where each cell is either black or white. The state of each cell subsequently changes according to the state of the neighboring cells. As the grid is updated step by step, the cells flicker on and off. Despite its rudimentary and deterministic rules, this simple cellular automaton produces emergent patterns that teem with unexpected oscillating vitality, a cosmos of evolving patterns, and self-replicating structures that exhibit behaviors reminiscent of biological organisms. In the 1970s, the zero-player game became an instant hit with bored office workers who were mesmerized by the remarkable patterns dancing on their early computer screens.

Early research on “artificial life” built on these ideas, seeking to understand life by emulating its properties and behaviors through simple computational models. A pivotal example is Thomas S. Ray’s *Tierra*, which created an artificial environment within which computer programs could replicate, mutate, and evolve, mimicking the evolutionary and ecological dynamics observed in biological life forms. These self-replicating digital organisms came to vie for computational resources, displaying evolutionary strategies, competition, parasitism, and symbiosis, capturing how simple mechanisms could produce complexity through evolution.

Taken together, such computational experiments seemed to offer fragments of a fundamentally new way of understanding the world, while simultaneously revealing the blind spots of the old way of seeing. These models showed how limited the analytical methods that had thus far dominated the natural sciences were, and the strong assumptions of linearity, homogeneity, and equilibrium that they necessitated. Through a multidisciplinary approach, that sought to identify patterns across the natural and social world, complexity science was thus elaborated through a set of fundamental concepts for dealing with non-linear dynamical systems, such as bifurcation, path-dependency, and far-from-equilibria dynamics, stemming from chaos theory, cybernetics, game theory, dissipative systems theory, and synergetics.

Computation came to be seen as not only the primary tool, but a model of the actual nature of the universe. Such ideas are perhaps most explicitly elaborated by Stephen Wolfram, who in his 2002 book “*A New Kind of Science*” suggests that the universe fundamentally operates like a cellular automaton, running on fundamental, simple, computational rules. The principles of computation can describe the fundamental processes of the natural world, proposing this as a foundation for a new scientific paradigm. Just as the early thinkers of classical antiquity harbored a profound belief that the universe was inherently mathematical in nature – epitomized by Pythagoras’ famous quip that “all things are number” and Plato’s ideal world of eternal mathematical forms – Wolfram argues that the universe is in fact fundamentally computational, at its core consisting of the on-and-off switching of a universal cellular automaton (Wolfram, 2002, 2020).

Complexity science thus offered an alternative to a mode of physics that had for centuries been driven by the pursuit of reductionism: the peeling away of the layers of the universe in search of a core – the fundamental “law of everything.” However, the limitations of such an approach became increasingly undeniable as advances in fundamental physics became increasingly challenging at the same rate as the resulting findings became increasingly detached from everyday reality. There was hence a growing realization that “the ability to reduce everything to simple fundamental laws does not imply the ability to start from those laws and reconstruct the universe” (Anderson, 1972: 393).

The computational experiments reflected the intuition that there was something *more* to the world than mechanical cause-and-effect relations. The experiments suggested that something crucial was taking place *between* the well-defined layers of the universe. Maybe physicists of the mid-20th century had fallen for the “drunkard’s search principle”: they had focused on the aspects of the universe that their method could grasp, while disregarding an entire world of phenomena that were less well-ordered and predictable, more fractal, chaotic, and alive.

In extracting an ontology from computational experiments and using it as a model of the world, complexity can thus be understood as the explicit elaboration of the epistemology of the digital. The Santa Fe Institute came to act as a powerful uniting and aligning force in defining a mainstream of what later became referred to as complexity science.

### Complicated versus complex systems

To get a better sense of the epistemology elaborated by the Santa Fe Institute – the nature of complex systems and their role within digital modernity – it is helpful to contrast them with *complicated* systems. Machines are the archetypical examples of complicated systems (Erdi 2007; Andersson et al., 2014): they are organized in level hierarchies that pack components into delineable compartments. They are well structured, and each component of the machine has a particular function in the larger whole. This means that these systems respond well to a reductionist approach. Facing the question of how a car works, for instance, we would do well to separate it into its components and observing, for instance, that its movements stem from the rotation of the wheels, which are in turn driven by the rotations from the motor. The motor can then in turn be reduced to its own components – pistons, cylinders, crankshafts, and so on – which all fulfill a particular designated function within the larger hierarchy. That such a strategy is possible stems from the simple and limited interaction between components, meaning that very little knowledge of the surrounding system is needed to understand a given component’s actions. We can therefore modify or interact with a

given component, without concern that the effects will cascade through the system. We might say that the system's "causal mechanisms" are isolated to specific components, and component interaction is minimal and simple. Complicated systems are in other words characterized by a strict division-of-labor between components: there are usually relatively few of each type of components, and each is adapted to be complementary to the whole.

Complex systems, in contrast, are described by Santa Fe Institute researchers as consisting of a large number of relatively simple interacting agents from a few component classes (Bedau, 1997; Corning, 2002; Holland and Wolf, 1998; Johnson, 2002; Morin, 2008). The components of these systems do not have a well-defined function, and the components interact with one another with few constraints. The result of this interaction is a dynamically emergent macro-level outcome. The go-to real-world examples for complex systems tend to be collective phenomena from the natural world: flocks of birds, schools of fish, or ant colonies. Such systems not only show rich behavior on the macro level, but their emergent dynamics are often highly functional and adaptive: while a single ant cannot survive on its own, the colony is highly intelligent and can solve difficult problems, such as finding food or building an anthill. The capacities of such complex systems can be seen in that ants are among the most successful species on earth.

Complex systems thus display another form of order – another way of being adaptive or fulfilling functions – without centralized leadership or top-down structures: each bee or ant simply follows its own genetically defined script, and the outcome is a functional whole capable of carrying out sophisticated feats of organization. Ants build bridges to cross chasms, construct anti-flooding systems in anticipation of storms, farm, make gardens, and organize wars. They even maintain advanced climate control. And they do all this without planning, leaders, or architects. The intelligent organization of the colony emerges from local mass-interactions of the individual ants (Ball, 2013; Mitchell, 2009).

Unlike for complicated systems, the strategy of reductionism – study through disassembly – does not work well on complex systems. While we can easily extract an ant from its colony, its behavior will not provide much information about the system as a whole. The outcome of its actions only become clear through the interaction with large numbers of other ants. The mechanisms of the anthill cannot be allocated in specific components: they are complex and distributed across components, and within the interactions *between* the components. The study of complex systems must thus emphasize how parts interact to form systems with global, novel, emergent qualities and patterns.

Since mechanisms are not located in specific components, complex systems are not characterized by precision, but rather by parallelism, adaptivity, resilience, and feedback: this permits resilience over components – if

one component breaks, others can dynamically step into its place (Scheffer, 2009). Compare, for instance, the removal of a cog from a sophisticated machinery to the removal of an ant from an anthill. The former is likely to have potentially catastrophic consequences for the functioning of the machinery, while the latter is unlikely to have any consequences for the colony whatsoever.

Instead of taking the system apart to find the universal laws, complexity science suggests finding patterns across seemingly disparate systems; a new form of universality that does not rely on decomposing the system into its constituent parts but on observing the mechanisms through which entities link together. At the core of complexity science is the idea that complexity represents an abstract similarity between ostensibly very different systems. For example, when viewing different systems as networks where things interact and connect, many studies have found common patterns in how connections are distributed across nodes. In these networks, most of the nodes (or points of connection) have only a few links, but there are a few nodes with a lot of links. This pattern, known as “scale-free,” shows up in many different and seemingly unrelated areas – the structure of the internet, how elements within a cell interact, in social circles, in the way airports are connected by flights, and even in how venereal diseases spread. This means that despite their differences, these systems share similar underlying patterns in how connections are formed and maintained. Another example is the phenomenon of self-organized criticality, a property of dynamic systems to naturally evolve to a critical state where a minor event can lead to a major systemic change. This phenomenon is observed in systems as diverse as sand piles, stock markets, earthquakes, and brain activity.

The abstract similarities identified by complexity science are not in the details or components of the systems but in the structural and dynamic properties that emerge from the interactions between components, suggesting the possibility of building an understanding of the universe not by decomposing it into ever smaller entities but by identifying the principles governing emergence and evolution of complex systems across different domains. Complexity thus suggests a new type of universal law, in which the constants of classical physics – such as Newton’s gravitational constant – were joined by the universal constants of complexity. For instance, the famous Feigenbaum constant, which represents the limiting ratio of each bifurcation interval to the next in a bifurcation diagram across chaotic systems – from dripping water faucets to the Mandelbrot set fractal to traffic congestions. The more radical complexity researchers, such as Stuart Kauffman, even argue that all complex adaptive systems are essentially isomorphic to one another. If we understand one complex system, we understand them all.

To examine complex systems, complexity science offers an alternative to the reductionist approach of “taking apart”: simulation. Simulations

build theory by “growing” systems from models of the underlying entities (Epstein, 1996). By making assumptions of the behavior of the underlying components, their interaction can be examined by replicating the system in code, and studying the resulting emergent dynamics. The systems can in other words be studied “from the bottom up.”

By building computational models of natural systems, researchers also found that they could reproduce the functional capacities of the systems. For instance, in seeking to understand how ant colonies find their food, researchers discovered that the simulation itself functioned as a highly effective form of optimization algorithm for solving, for instance, the so-called Traveling Salesman Problem – a classic NP-hard optimization problem in which the goal is to determine the shortest possible route that a traveling salesman can take to visit a set number of cities. A range of natural complex adaptive systems – brains, swarms, or evolution through natural selection – were simulated to enable similar naturally inspired optimization, allowing for systems that could seemingly learn by themselves.

These natural optimization systems quickly moved beyond the capacities of mechanistically organized systems – suggesting that “learning” and intelligence cannot be designed from the top-down but must emerge from the bottom up. The recent revolution in artificial intelligence and machine learning has been enabled by computational models originally inspired by natural systems, particularly artificial neural networks, which simulate abstract representations of brain function. While artificial neural networks had relatively limited applications for decades, the advances in highly parallelized GPU-based computing in the mid-2000s enabled an explosive growth in the systems’ capacities – laying the foundation for the last years’ revolution in machine learning and artificial intelligence that lies at the foundation of both contemporary tech firms and data-driven social science disciplines such as computational social science. These models have more recently enabled the rise of Large Language Models such as ChatGPT.

### **The political economy of the Santa Fe Institute**

The Santa Fe Institute offers a useful microcosm in which to examine how the interests of finance and capital shapes not only knowledge production, but how we understand the very nature of the world. From its inception, the SFI included staff members with different commitments, including critical scholars. Complexity research generally was and remains a very diverse and fragmented field that builds on and includes attempts to question, rethink, and transform society through critique and experimentation (e.g., Walby, 2007; Pickering, 2010).

However, the type of complexity thinking that came to dominate at the SFI was largely devoid of such critical undercurrents. While the SFI



was always a privately funded institution, it became increasingly dependent on donations from corporations and business leaders in the 1990s and 2000s, such as the John Templeton Foundation, an organization dedicated to promoting free-market politics and religious values, and the Institute for Humane Studies (IHS), a libertarian group funded by the Koch brothers. As Baker (2022) documents, the influence of the institute's financial backers has gradually shifted the research emphasis from its roots the physical sciences, to emphasizing social and economic applications of complexity.

Over time, the Santa Fe Institute perspective on complexity came to ideologically align more and more with ideas from the Austrian school of economics, focusing on the market as a canonical example of a complex system. Complexity scholars such as Stuart Kauffman and Brian Arthur suggested a similarity between the physics notion of “self-organization” and Friedrich Hayek's notion of “spontaneous order”: markets were fundamentally self-organized systems, producing complex patterns in the same way as the Game of Life. Complexity science thus offered a radical critique of neoclassical economics and its equilibrium assumptions while at the same time affirming the ontology that animates it.

Complexity science's critique of neoclassical economics emphasizes that economic systems are non-linear, out-of-equilibria, adaptive, and path-dependent, and consist of heterogeneous components (Fontana, 2010). In short, actual economies do not resemble at all neoclassic models. The critique of the assumptions of neoclassical economics thus paralleled its critique of conventional physics, stemming from the same shift from a mathematical to a computational ontology. Assumptions of linearity, homogeneity, perfect optimization, and equilibria are necessary to make problems mathematically tractable, but erase important aspects of the systems. By bringing in dynamical aspects, complexity science emphasizes the generative nature of self-organization, how it spawns qualitative change and stirs creativity, and thus placed more emphasis on the role of innovation – a long-standing weakness of neoclassical economics. These generalizations allowed the complexity lens to be plausibly applied to a broader range of social phenomena than traditional neoclassical perspective.

At the same time, complexity science leaves unchallenged much of the ontological perspective of economics. It affirms the fundamental idea of society as a system consisting of adaptive and optimizing individuals, while largely disregarding meaning-making, narrative, social institutions, and power. Complexity science and neoclassical economics (the latter through, e.g., Léon Walras) both draw from physics in their understanding of the social world – and are thus both founded on an underlying naturalistic belief in a continuity between the natural and social world, which makes

it unnecessary to appeal to qualities such as conscience, intentionality, or meaning to account for social behavior.

Just like Hayekian economics, SFI complexity also inscribes a normative dimension to self-organization: its fascination with the adaptive capacities of complex systems leads it to prefer solutions that are organized from the “bottom up.” Bottom-up self-organization is viewed as natural and legitimate, as contrasted with top-down “interventions” that are regarded unnatural and illegitimate (Malaby, 2011: 56). Such ideas represent an expansion of the laissez-faire ideology of neoliberalism, in which governments and institutions are seen as *constraining* and *controlling*, while the market is regarded as an outgrowth of the *free will* of its participants.

The ontological perspective on complexity developing at the SFI led it to become the hub for the spread of highly influential and politically charged ideas. Through its emphasis on dynamism, innovation, and non-linearity, the SFI perspective on markets was more compatible with the digital capitalism of the 21st century. Instead of representing the economy as a closed system composed of demand-supply curves converging on stable equilibria, it proposed to view the economy a dynamic system that is always spontaneously evolving and adapting, generating qualitative changes through constant innovation. Scholars such as Brian Arthur developed a “complexity economics” that emphasized a dynamic understanding of economic phenomena, emphasizing the role of positive feedback, network effects, and increasing returns to scale. As we will see in Chapter 7, such narratives became key components of large platforms such as Uber, Airbnb, and Facebook, driving an explosive rise in their valuations based on the expectation that “network effects” would lead to unprecedented profits. The understanding of the market as a generator of innovative solutions also motivated the SFI, in particular under the leadership of Geoffrey West, to promote “social innovation” and “social entrepreneurship” centered around the notion that socially oriented free-market actors can solve problems without state intervention – a position that helped attract substantial donations from business. The donations and investments in the SFI thus shaped a scientific perspective that exchange provided the ideological foundations for the financial valuations that enabled the rise of digital capitalism.

In 2006, Jesse Walker (cited in Baker, 2022), an editor at the libertarian magazine Reason, identified a new political identity in his social milieu: “Santa Fe Institute libertarians,” summarized as believers in “spontaneous order, entrepreneurship (many of them are entrepreneurs themselves), decentralization, free expression, and peace.” The institute had transformed into – in Oprah Winfrey’s terms (Baker, 2022) – the “ultimate think-tank,” contributing to developing the relationships and the philosophical foundations for the new neoclassicism for the 21st century’s digital capitalism.

Under the influence of Santa Fe Institute, complexity theory was thus shaped both epistemically and ideologically to align with the emergent digital economy. Although an emphasis on complexity could be understood as setting limits to the capacities of formal methods, at the Santa Fe Institute complexity guided efforts to expand formal methods into new realms (Waldrop, 1993). Similarly, while complexity could be read as a rejection of the neoclassical paradigm, it came to reaffirm its central tenets. While early observers saw in complexity theory an invitation to experiment with *alternatives* to market-based forms of social organization, it instead became an *argument* for market-based solutions – and associated with a long-standing ideological perspective characterized by a normative preference for the “bottom-up” of the market, as opposed to the “top-down” of democratically mobilized political interventions.

### **“Big Data” and a paradigm shift in the social sciences**

While the relationship between complexity science and computational social science is far from straightforward, the two disciplines align in important and powerful ways. While both fields are internally heterogeneous, they ultimately build on computational methods and the epistemic perspectives that follow from their use. Whereas complexity science emphasizes the elaboration of new ontologies and epistemologies of the social world, computational social science (and adjacent fields, such as social data science) focuses on the application of new computational tools and methods that implicitly embody these perspectives. Textbooks and manifestos of computational social science tend to describe society as a “complex system,” but many practitioners within the field may have given little reflection regarding to which social ontology they ascribe, or do not feel the need to highlight their opposition to historical equilibrium-based perspectives. In their approach to studying the social world, we however note a clear synergy or even a symbiosis between the complexity approach and computational social science in that they both thrive on digital data and social simulations, and promise to go beyond traditional statistical analysis to analyzing the social world as emergent, dynamic, and relational.

When digital trace data first became influential in the social sciences, it was labeled “Big Data”: a concept that pointed not so much to its scope, as to the challenge of fitting it into existing paradigms. The name stemmed from the influence of the data in the technology industry – first to feel the effects of this development – where quantity was indeed among the primary issues, challenging traditional tools such as relational databases, which proved incapable to deal with new demands emerging from large-scale systems (Manovich, 2011).

In the social sciences, the emerging problems associated with the new forms of data had less to do with their size than with their quality. As Boyd and Crawford (2012) observe, some of the data sets presented as examples of “Big Data” are significantly smaller than sets described as “traditional” data (e.g., census data), suggesting that the data quantities in themselves are not the issue – even huge quantities of structured census data are relatively easy to process using traditional methods. Instead, the use of the term pointed toward *qualities* of the data. Whereas survey data is constructed for statistical analysis – requiring careful pre-compartmentalization to make it palatable for a scientific perspective that sees the social world through a lens of averages and variances – the data that is extracted from platforms tends to be structured by and for computational processing. The data models the platforms themselves, implying indexed data structures and traversable networks (Mackenzie, 2012; Marres and Weltevrede, 2013). This data therefore tends to be poorly suited for traditional, variable-based statistical analysis; it often comes in small chunks, spreading and diffusing in complex and constantly transforming networks, without clearly defined bounds. The social ontology that digital technologies operationalize is not focused on the summing up of a population in fixed categories, but rather on the individuals and their dynamic connections and interactions (Castellani, 2014; Uprichard, 2013). This implies no longer producing data by departing from the aim of a whole, implicitly assumed to be the sum of its parts, but rather departing from the parts and their location within a data structure. In other words, the impact of Big Data is not seen as merely methodological – they are associated with new ways of seeing and understand social life (Boyd and Crawford, 2012).

For Computational Social Scientists and the scholars that gathered around the new forms of data, the misfit between newly available digital data and traditional statistical analysis suggested a fundamental failure of the latter. They felt that the difference in structure was explained by census data being “artificially” produced for scientific analysis, whereas digital data is a “naturally occurring by-product” (Edwards et al., 2013; Kitchin, 2014). Digital data consists of traces of ongoing social processes rather than something produced for scientific consumption. This ostensible rawness is taken to mean that the data is not merely a *different* representation of social reality, but a more accurate one. Traditional survey data are structured, meticulously collected, and generated through deliberate solicitation of responses, often characterized by predetermined questions, thus inherently imposing ontologies and erasing the possibility for temporal and contextual dynamism. Individuals are represented in separate rows and their attributes are listed in columns. Interactions between variables are allowed for in regression analysis up to a point but interactions between the individuals in the dataset are not considered at all. Digital data originated from platforms are

structured very differently and reveal aspects of the world that surveys have long concealed: social reality is relational, dynamic, and interactive.

The suggested misrepresentation of survey data resonated with an idea among Computational Social Scientists that the social sciences had long been a disappointment – the black sheep of the sciences. In a 2015 TED talk, Brian Epstein pointed to the 2008 Financial Crisis as an example: despite there being 15,000 economists in the United States, not a single economist had predicted the crisis. They had, he argued, yet even to fully explain its cause:

The social sciences are not working. Sociology, economics, political science, history; we need good answers from these disciplines. ... The reason is the social sciences are largely in the Dark Ages, they're relying on old assumptions and dogmas that we need to overturn.

*(Epstein, 2015)*

Duncan Watts – an influential Computational Social Scientist that has moved back and forth between academia and corporations such as Microsoft and Yahoo – expressed similar frustration, criticizing the social science for not being useful in his work in the private sector. If Microsoft's CEO would ask him how to optimally reorganize the corporation, the scholarly literature would not be able to give a definitive answer, but merely a multitude of incommensurable theories (van den Berg, 2017).

For scholars like Epstein and Watts, these failures are indicative of the dismal state of the social sciences, and the advent of digital data and methods represents a new hope. To them, the promise digital methods and data goes beyond merely offering new methods to traditional social science research, but rather to create “an entirely new scientific approach for social analysis” aiming to “uncover the laws of the society” (Conte et al., 2012: 327). The new paradigm could allow social science to catch up with its disciplinary peers, becoming a “hard” science in the sense of “replicable, cumulative, and coherent” (Lazer et al., 2020: 1062). It could also offer a corresponding form of social engineering: Watts (2017) proposes a “solution-oriented” social science (see also Lazer et al., 2020: 1062) that would enable him to give a straightforward response to Microsoft's CEO if asked how to reorganize the corporation.

The ambition here is to bring social science onto the same plane as physics. The physicists Caldarelli et al. (2018: 870) argue that the proliferation of digital data “provide the opportunity to build a ‘physics of society’: describing a society – composed of many interacting heterogeneous entities (people, businesses, institutions) – as a physical system.” Lev Manovich (2016) argues that “Digital is what gave culture the scale of physics, chemistry or neuroscience. Now we have enough data and fast enough computers to actually study

the ‘physics’ of culture.” Nicholas Christakis similarly describes CSS as “a new kind of social science” (Christakis, 2012; in reference to Wolfram’s, 2002 complexity-opus “A New Kind of Science” discussed above), which answers to the crisis of the old approach of empirical sociology (Savage and Burrows, 2007) by supplanting surveys and interviews with data mining and simulation (Conte et al., 2012; Lazer et al., 2009). As Watts (2011: 266) puts it,

just as the invention of the telescope revolutionized the study of the heavens, so too by rendering the unmeasurable measurable, the technological revolution in mobile, Web, and Internet communications has the potential to revolutionize our understanding of ourselves ... we have finally found our telescope. Let the revolution begin.

As critics have been quick to point out, such dreams of a “social physics” are far from new. They can be traced back to the social physics of the 19th century, with for instance Auguste Comte describing social physics as a science that treats “social phenomena [...] as being subject to natural and invariable laws” (Conte et al., 2012; Iggers, 1959). The idea that the social world could and should be brought into the hard sciences thus goes back a long way and lives on in a field like economics, the self-proclaimed “queen” of the social sciences, which attempts to make the social world mathematically tractable and thereby intelligible.

While the ambition to quantify and model is not new, there is still something new about this “new science” (e.g., Pentland, 2015) of complexity, stemming from its social ontology’s roots in the structure of digital data and the logic of computation. While both the new and old social physics suggest that the social world can be understood through metaphors of the natural world, the emerging computational paradigm represents the application of new understanding of the natural world. That is, while both represent the application of physics within the social world, the physics of today is very different from the physics of Comte.

This novel ontological stance subscribes to naturalism but brings a fundamental criticism against the linearity and equilibria of traditional quantitative approaches (Cilliers, 2002). As Ball (2012: ix) puts it, in the complexity science perspective, the traditional conceptualization of social physics:

... remains valid but it often drew on the wrong analogies. Society does not run along the same predictable, ‘clockwork’ lines as the Newtonian universe. It is closer to the kind of complex systems that typically preoccupy statistical physicists today: avalanches and granular flows, flocks of birds and fish, networks of interaction in neurology, cell biology and technology.

While Comte viewed nature as a predictable machinery – a clockwork that could be disassembled and studied using analytical mathematics – contemporary natural science instead views the natural world as interactional and non-linear: as a “complex system.” It is this relational, interactive, non-linear, and dynamic understanding of the natural world that has so strongly resonated with the structure and nature of digital data, that it has resuscitated the hope of a social physics, with computational social science representing its novel embodiment.

### The political economy of data

As we have seen, the proliferation of digital data and the advancement of computational methods and data have stimulated the development of a computational paradigm for the social sciences, founded on the core notion that the social world is complex, which is taken to mean that it is possible to compute. The new paradigm promises to use computational methods to understand and model social life as a complex system, complete with emergent qualities and collective intelligence. Much of this promise hinges on the notion that the computational ontology of digital data matches the reality of the social world.

However, while computational social science poses a dichotomy between “artificial” survey data, and the “naturally occurring” digital trace data, there is, as critical scholars have argued, *no such a thing as raw data*. Digital trace data is computational not because it is an unvarnished representation of the true computational nature of the social world, but because it is shaped by the requirements of the computational systems that produce and process them. Digital data, by definition, need to be amenable to efficient large-scale computational processing. When we study the structure of data, we are thus studying a structure imposed on social reality with the aim to produce data amenable to the same type of data analytics that computational social science employs. Just as survey data are produced for scientific inquiry, so are digital data shaped by certain models in such a way as to facilitate analysis, prediction, and control.

The digital data that computational social scientists study are not only shaped by the demands of efficient computation, but are also more specifically shaped by the pressures of the political economy of a digital era in which data have emerged as a valuable form of commodity. Central to understanding the relationship between data and capitalism is that digital data is not “naturally occurring,” but actively extracted and inscribed in such a way as to become susceptible to evaluation, calculation, and intervention (Cukier and Mayer-Schoenberger, 2013). Couldry and Mejias (2020) compare the talk of data being “just there” to historical colonialism and the legal doctrine of *terra nullius*: the idea that land such as the territory now known as Australia supposedly belonged to “no one” and was “for the

taking.” Rather than viewing data as “traces” of a social process, a truer description is that the data are extracted – by designing digital mediation in such a way as to produce the most valuable data.

The data produced by these platforms are thus shaped by a range of social forces, as explored by a substantial recent literature examining the political economy of digital data. This literature describes a period of capitalism in which data have become the defining commodity (Dean, 2005; Foster and McChesney, 2014; Fuchs, 2010; Sadowski, 2020a; Srnicek, 2017; Zuboff, 2019). Data collection has become an important motivation for businesses and governments (Zuboff, 2019); data are valuable and value-creating (Arvidsson, 2016; Srnicek, 2017); and data systems shot through with inequities and designed for extraction and exploitation (Andrejevic, 2014; Dalton et al., 2016).

Data have, in short, emerged as a pursuit for its own sake. The extraction of data has, as financialization before it, become “a new frontier of accumulation and next step in capitalism” (Sadowski, 2019: 9). Just as finance capitalism is characterized by the subordination of processes of production to financialization, so brings contemporary capitalism the subordination of production to data accumulation. Digital capitalism is taking shape as a political economic regime driven by the logic of accumulation, circulation, and manipulation of digital data.

Seen in this light, the structure of digital data is the expression of a particular way of probing and representing the world’s features and dynamics for the sake of manipulating and monetizing of human behavior (Sadowski, 2019). Digital data must be extracted, in a process that reduces and abstracts, stripping context and including only certain aspects of the world. The process of generating data, thus, constitutes a way of exercising power over the world, by defining what counts as knowledge, who has access to it, and how it can be processed. Thatcher et al. (2016: 994) argue that these extractive practices “mirror processes of primitive accumulation or accumulation by dispossession that occur as capitalism colonizes previously noncommodified, private times and places.” The value of data lies in their power to capture, predict, and control the social world, enabling every layer of the human experience to become the target of profitable extraction (Couldry and Mejias, 2020).

Data derived from digital platforms can, thus, not be considered traces of pre-existing social interaction, but should rather be seen as expressions of the quantified social fields created by platform infrastructures, and simultaneously shape certain types of behavior and interaction (Dalton et al., 2016). It is not so much that our new forms of data are more similar to the nature of the social world, but rather that our social world has been remolded to fit the structure of our new data. These platforms must be sufficiently open-ended to allow social interaction and individual expression



(Marres, 2017), but sufficiently controlled to structure and format social life in ways that render it amenable for large-scale monitoring, data analysis, and intervention (Couldry and Hepp, 2018). Although users are, to an extent, free to choose how they interact with these interfaces, they are not free to choose the context and conditions of this interaction; they cannot choose the menu of options from which they make their choice (Törnberg and Uitermark, 2020). This context is provided by the platforms, acting to pursue their own goals, such as extracting valuable user data by for instance maximizing platform engagement through algorithms designed “to nudge, coax, tune, and herd behavior toward profitable outcomes” (Zuboff, 2019: 8).

This logic has come to also shape the relationship between citizens and governments, as governments employ sophisticated methods for “nudging” and directing users through nimble forms of control (Törnberg and Uitermark, 2020), for instance driving the emergence of forms of “predictive policing” that use methods developed for analyzing consumer behavior to predict criminal behavior (Perry, 2013). More broadly, the extraction, distribution, and use of data are situated within an emerging political economy that has wide-ranging implications across society (Dalton et al., 2016; Sadowski, 2020a, 2020b): from cities (Ash et al., 2018; Leszczynski, 2015) and electric infrastructure (Levenda et al., 2015) to labor (van Doorn, 2017) and media (van Dijck et al., 2018).

The data and methods on which CSS is constructing its understanding of the social world are hence far from “digital traces” of natural human behavior. Platforms like Twitter in part make their profits from extracting user data to sell targeted advertising, and because of this, they are designed to produce profitable and marketable data. Big Data are not accidental byproducts of digital social life – they are often the very product that these platforms are built to produce. Rather than “naturally occurring” or “traces” of social processes, we should think of Big Data as valuable commodities or a form of capital that are extracted and constructed in ways that reflect and perpetuate power inequities, while reshaping social processes into forms that best allow their analysis and manipulation through data analysis.

In political terms, if digital data are not traces of social reality, but the product of an abstraction created by power interests, constituting valuable commodities and means of production within contemporary capitalism, then building a science on its epistemic features appears not so much as bringing a deeper understanding into the nature and structure of social reality, but rather as perpetuating, and lending credence and methods to a current regime of capitalist accumulation (Couldry and Mejjias, 2020; Dijck, 2014). This is not merely a question of “ethics” that can be addressed through guidelines and internal review boards, but an issue of CSS being fundamentally implicated in digital capitalism, providing it tools and ideological

backing – as seen in Watts’ dream of transforming the social sciences into a discipline that can instruct Microsoft’s CEO to restructure his organization “most efficiently.”

In expanding the SFI complexity to the realities of platform capitalism, scholars like Alex Pentland have become key conduits for transforming the ideas of complexity into the ideological bulwark of surveillance capitalism. Building on the complexity notion that “social phenomena are really just aggregations of billions of small transactions between individuals” (Pentland 2015), Pentland argues that digital platforms can function as key actors in “improving” social systems, arguing for supplanting political life with computation as the foundation of governance (Pentland, 2015; Zuboff, 2019). By viewing society as a complex sociotechnical system, it can be treated as an engineering problem – modifying the micro-level rules of interaction to produce given emergent outcomes. By drawing on detailed data on human behavior, and the capacity of platforms to shape human behavior by using the control of social infrastructures to *design self-organization*, we can “increase the efficiency and responsiveness of industries and governments.” Drawing normative visions from the complexity metaphor of society as a “hive,” he suggests that the behavior of individuals must be adapted for the interest of the emergent outcomes of the system as a whole; “a computer-mediated society where our mutual visibility becomes the habitat in which we attune to one another, producing social patterns based on imitation that can be manipulated for confluence” (Zuboff, 2019).

If we follow complexity science’s interest in finding isomorphism across systems, we may thus conclude that computational social science’s relation to digital capitalism is homologous to the relation between neoclassical economics and neoliberalism: it represents a scientific paradigm that provides tools and legitimacy to a mode of capitalist accumulation. Just as neoliberal elites adopted and instrumentalized certain ideas from neoclassical economics, the elites of digital capitalism selectively adopt and instrumentalized the ideology of self-organization and complexity in computational social science. And just as the “marginal revolution” became the foundation not only of a scientific paradigm, but also of an ideology, so has the “complexity revolution” provided the epistemology for an emerging form of capital accumulation: an epistemology where the social is fundamentally computational, suggesting that data have the potential to fully capture – and thereby financialize – the social world (Finn, 2017; Hayles, 2010).

## Conclusion

This chapter has traced the entangled epistemic, ideological, and financial histories of the sciences of the digital era: complexity science and

computational social science. The way these disciplines understand the world first emerged from the structure and logic of digital data, representing an epistemic critique against the atomistic and reductionist approach of neoclassical economics, but was over time shaped by the financial interests that are inextricably intertwined with these data.

Computational social science has in recent years emerged as one of the fastest-growing academic disciplines. Located in the intersection of academia and industry, it has become the dominant field for the study of social behavior through digital data. Viewing digital data from platforms as natural occurring by-product of digital social life, this field brings powerful new methods and approaches to bear by approaching social science as a form of data analytics. We have suggested that digital data are more than simply a source of empirical information; they have provided the impetus for a new ontology that draws upon the networked and interactional nature of digital data to characterize social life as a complex system – that is, a pattern which emerges bottom-up from individual interactions. Through this complexity lens, social phenomena appear fundamentally computational in nature, making the quest for knowledge a quest for computation, and pulling the social world into the domain of the hard sciences. The boundary between the natural and the social dissolves as both realms become seen as – ultimately – computational.

However, the literature on digital capitalism suggests that data are less by-products of digital social life than the primary product which these platforms are geared to extract. Data are valuable commodities, and their complex and interactive structure has been imposed on the social world to make it amenable to analysis, prediction, and control through precisely the data analytical tools that computational social science applies and develops. It is, in short, not that our new forms of data are more similar to the true nature of the social world, but rather that our social world has been remolded to fit the structure of our new data. As the modern state imposed its statistical way of seeing on the world, so the ontologies of digital platforms represent the contemporary state's imposing a digital way of seeing. Our lives have become more digital and computational in structure.

Rather than survey and digital data as opposites on a spectrum from artificial to natural, they each represent the dominant forms of data extraction of their time. Just as statistics and demographics represented the modern state's pursuit of social control, so platforms like Facebook, Twitter, and TikTok represent the privatized forms of data extraction and surveillance characteristic of the era of digital modernity.

While data is cast as a universal and as offering “raw” view into the universalities of social life, it is a lens that is ultimately white and Western-centric. As Milan and Treré (2019) have highlighted, data and digital technologies are not universal and placeless – and the one-size-fits-all approach

fails to account for the data of marginalized communities and developing countries. The world that we see through data tends to implicitly apply the epistemic views of the Global North.

Computational social science and its underlying complexity perspective thus appear akin to a new form of neoclassical economics. If neoclassical economics aligns with neoliberalism in the sense that both share a foundational ontology and epistemology that allows for the exchange of people, ideas, and methods between academic and industry, so complexity science aligns with the emergent digital economy. Just as neoclassicism before it, the complexity perspective casts the social world as – actually or ideally – the outgrowth of bottom-up self-organization, while minimizing the role of power. The structural ignoring of power dynamics and meaning are arguably what make both neoclassical economics and complexity science so very appealing and helpful for corporate and government leaders. The gaze is always on the components of the system, not on its proprietors or their interests.

The shift from neoclassicism to complexity can perhaps be best understood as a response to the changes of the demands of capitalism. The assumptions of stasis and equilibria meant that neoclassical economics was increasingly ill-suited for a dynamic and fast-moving form of capitalism. The shift from neoclassicism to complexity and computation meant that our social lives – slotted into digital platforms – could be integrated into the economy. As we will see in Chapter 8, the complexity perspective thus provided the foundation for an economic shift away from classical neoliberalism.

Implicit in computational social science is thus an ideology – what scholars have termed “dataism” (van Dijck, 2014). Scholars have emphasized dataism as the valuing of data as a primary source of truth and insight, often accompanied by the assumption that nearly all aspects of human life can be quantified and optimized through data analytics. But as we have seen, there is implicit in it also a notion of the intrinsic value of self-organization, and the ideology is intimately entangled with what can be best understood as a computational form of neoliberalism.

The scientific work in constructing this ideology was key to enabling the rise of digital capitalism. It was the theoretical shifts brought by complexity that enabled the growing valuation of the platform firms of the digital era. The academic use of digital data and computational methods has contributed scientific legitimacy to dataism. Neoclassicism was useful not for its veracity or accuracy but for its legitimization of the ideological content embodied within it, allowing it to function as the bulwark of neoliberal ideology. Power interests and ideological claims were turned into mathematical formulae that could then be offered as indisputable evidence for the objectivity and apolitical nature of the original claims. In the same way, it is less important whether digital data and platforms *can* actually predict and

control our behavior than that it could plausibly claim that it was true, to thereby enable the coordination of financial investment to create sufficient political power to transform capitalist accumulation.

Key to the construction of the ideology of “dataism” is the revival of the idea of a category of systems described as “natural,” and of the dichotomy between “top-down” and “bottom-up.” Foucault’s (2008) lectures on biopolitics include an analysis of the notion of “laissez-faire,” tracing the conceived opposition between the “bottom-up” of the market and the “top-down” of the state to a transition in the late 18th century when scholars of the state and social order contemplated the idea of a creating a self-regulating market. With this shift, the market started to appear as something that “obeyed and had to obey ‘natural,’ that is to say, spontaneous mechanisms” (Foucault, 2008: 31). As Polanyi (1957[1944]) had argued before, the market did not emerge spontaneously; it was laboriously constructed. Competition and market “freedom” do not emerge naturally, but, Foucault argues, must be continuously monitored and subjected to governmental “control, constraint, and coercion” (2008: 6), and “economic freedom ... and disciplinary techniques are completely bound up with each other” (2008: 67).

The idea of self-organization represents a return of the notion of *laissez-faire* in new clothing, and Foucault’s powerful deconstruction and critique of the concept apply equally well to its new incarnation: self-organization is never natural but the product of permanent vigilance, activity, and intervention. Digital platforms are far from disintermediated: they are constituted by a tangle of rules and procedures for sorting information, nudging and surveilling, and they define the rules that produce ostensibly spontaneous outcomes. This chapter has thus sought to rewrite the history of complexity science and computational social science by attending to power dynamics, examining how they were gradually shaped by the interests and forces of contemporary capitalism. The following chapters continue in this vein by examining how aspirations toward self-organization and emergence are employed in different domains and what kinds of dynamics result.

# 3

## COMPLEX CITIES

### Longing for Wikitopia

Ant hills have captured the hearts and occupied the minds of complexity scientists like few other structures.<sup>1</sup> What looks like a heap of soil to the untrained eye is in fact a highly sophisticated feat of engineering. The intricate network of tunnels and chambers is designed to fulfill different functions, such as nurturing pupae and storing food, and is adapted according to the colony's changing size and needs. The hills are waterproof and preserve heat, enabling the ants and larvae to stay warm even when it's snowing. The brilliance of the ants as a species compared to humans lies in the fact that they are capable of producing these magnificent structures without ever knowing they are doing so. Just by responding to local clues – the ants have a small vocabulary of signals communicated mostly through pheromones – the ants erect structures that have allowed them to survive over millions of years in almost all environments. Their complex collective behavior is emergent; it arises from distributed local interactions resulting in *self-organization* (e.g., Kauffman, 1993; Johnson, 2002; Ball, 2013; West, 2017)

As complexity scholars have conceived of ever-more phenomena as complex, it is unsurprising that they have also turned their attention to the human equivalent of anthills: cities. Although the conceptualization of cities as self-organizing systems is not new – the founder of the Chicago School of Sociology, Robert Park, already argued that the “the city is not merely an artefact but an organism” that grows “uncontrolled and undesigned” (1928: x) – it has been reinigorated by recent generations of complexity scholars. This chapter thus examines how complexity theory has revised our understanding of cities.

We should perhaps make explicit that this chapter does not specifically deal with smart cities or digital urbanism. Although we touch on these themes in what follows, our interest lies elsewhere, namely in the broader reconceptualization of what cities are and how they need to be governed. In one sense, this chapter provides a specific illustration of our argument in the previous chapter: while there we looked at social science as a whole, here we focus specifically on cities. We examine how ideas of the city as a complex system moved from the margins to very center of urban studies, in effect substituting the machinic metaphors of industrial modernity for the natural metaphors of digital modernity. In another sense, this chapter extends the previous chapter's argument by showing how these epistemological shifts have repercussions for governance and politics. Complexity theory does not only offer a different way of viewing cities but also suggests different rationales and modes of intervention.

Self-organization has gained ground not only as an explanatory concept but also as a political ideal. Seeing cities like a platform means that the government itself does not dictate what happens but instead facilitates urbanites to participate and take initiative. This vision gains traction as digital technologies suggest new ways of organizing and collaborating. The development of technologies for distributed communication has spurred hopes that people can coordinate and cooperate without delegating power to central authorities (Castells, 2012). Open-source software inspires Sassen's ideal of a city that "made through a myriad of interventions and little changes from the ground up" (Sassen, 2011: n.p.) as well as Sennett's elucidation of "open urban forms" that are designed to facilitate coordination and deliberation instead of optimizing for control and efficiency (Sennett, 2018: 164–167). Thus emerges the ideal of the self-organized city, a city where people are not directed by central authorities but cooperate voluntarily in communities and for the public good. We might call that city Wikitopia, an ideal city where bottom-up cooperation coalesces into an ingenious and complex social organization.

Strikingly, self-organization has not just been embraced by social movements or critical commentators but also by governments: they, too, long for Wikitopia. The idea that state interventions should primarily be aimed at strengthening civil society rather than the state has become a mainstay of international development (Watkins et al., 2012). Governments of Western Europe and the United States, too, have accorded increasingly important roles for local communities, recasting their role from parties for consultation to prime drivers of social change. Networked communities rather than hierarchical states have come to be seen as the source of welfare, prosperity, and happiness – it has become axiomatic that urban development is a collaborative process in which the local government is one among many stakeholders that together shape the city. In what follows, we first explore the rise

of self-organization as a political ideal in urban planning before examining its uneven and contradictory development in practice.

### The irresistible rise of self-organization

As signaled by its simultaneous rise in different sectors, self-organization has developed into a paradigmatic concept that both explains and prescribes how societies, and also cities, function. The physicists Bettencourt and West have promoted a complexity approach in urban studies, arguing for a “new science of cities” that seeks to uncover universal mechanisms of urban development. At the root of their approach lies the idea that cities, just like cells or biological organisms, are composed of massive numbers of units connected through resource distribution networks. Although the forms and histories of individual cities are vastly different, just as mice are different from dogs, their networks of resource distribution follow the same scaling laws. Bettencourt and West find that crime, innovation, and even walking speed are predicted by city size (Bettencourt et al., 2007; West, 2017; Bettencourt, 2021).

While Bettencourt and West are mainly concerned with the identification of patterns and regularities, the conceptualization of cities as complex systems has implications for how cities are governed. It has become common to represent the city as akin to a biological system with a natural order that defies ambitious intervention. In the words of the urban planner Michael Batty, as cited by the physicist Philip Ball:

Planning, design, control, management – whatever constellation of interventionist perspectives are adopted – are difficult and potentially dangerous. If we assume that social systems and cities [are] like biological systems... then interventions are potentially destructive unless we have a deep understanding of their causal effects. As we have learned more, we become wary of the effects of such concerted action.

*(Michael Batty, cited in Ball, 2013: 46)*

Ball goes on to argue that

the only effective way to manage cities will be to discover their intrinsic bottom-up principles of self-organization, and then to work with those so as to guide the process along desirable routes, rather than trying to impose some unreachable and unsustainable order and structure.

*(2013: 43)*

In urban planning, the “unreachable and unsustainable order and structure” and the “bottom-up principles of self-organization” have become associated with two icons, respectively: Jane Jacobs and Robert Moses. Robert



Moses was New York City's master planner for almost four decades, from the 1930s until the 1960s, overseeing the modernization of the city. When Moses looked at New York from above, and this was his preferred vantage point, he saw inefficiencies, even chaos. The photograph in Figure 3.1 encapsulates modernistic planning: a White man, dressed in a suit and carrying expert credentials, gazes down upon a model of the city as he would like to create it. For Moses and modernist planning, the city was an artifact, to be conceived in the mind and then build into reality.

In one of the neighborhoods Robert Moses wanted to raze to make way for his plans lived Jane Jacobs, a journalist whose resistance to Moses' modernization plans has made her into an icon – perhaps *the* icon – for contemporary urban planning. Jacobs looked at the city not from above but at the street-level. And what she observed was quite different from what Moses saw. She did not see chaos but an intricate web of social relations. Whereas the modernist planners like Moses wanted to create efficient environments by creating separate spaces for different functions, Jacobs suggested that mixture and diversity – of people, buildings, and functions – nourished the vitality of urban life. She felt at home in the messy everyday realities of New York City (Figure 3.2). For Jacobs and most contemporary urbanists, the city is an assemblage whose vitality and intelligence are a function of the extent to which its bottom-up principles of self-organization have been allowed to play out.

By conceiving of the city as a system of organized complexity, Jacobs pioneered complexity theory and became an inspiration for generations of planners (Johnson, 2002). How to assess Jacobs now that her erstwhile critique has become part of the mainstream planning doctrines in many cities? Or, in other words, how do we appreciate self-organization as an ideal now that it has been adopted by city governments?



**FIGURE 3.1** Robert Moses inspects a model of the Battery Bridge. Photographer: C.M. Stieglitz. Free of rights, obtained from Wikipedia.



**FIGURE 3.2** Jane Jacobs and Richard Sennett have a drink in a neighborhood bar, seemingly undisturbed by the intoxicated patron in between them. Sennett discusses the picture and its backstory in *Living and Dwelling* (2018). The photo is from Richard Sennett’s personal archive on Flickr (Sennett 2024)

A number of authors have observed that Jacobs’ scathing critique of planning and her appreciation of self-organization align well with neoliberal planning precepts (Page and Mennel, 2011; Van den Berg, 2018). There is a homology between the ways neoclassical economists and Jacobsian urbanists present their object of study: as a system with inherent beauty and intelligence that defies ambitious intervention by governments.

It is important at this point to distinguish the general concept of self-organization and the political ideal. As an explanatory concept self-organization accounts for the ways in which social and natural life evolves. Self-organization thus understood can refer to natural selection or bureaucracy running out of control; it can refer to processes that are benign or malign. However, self-organization often takes on a specific ideological guise in scholarly literature and policy statements. In this conception, an arbitrary distinction is made between, on one hand, “the system” with its endogenous and ingenious principles of self-organization (i.e., the market and civil society) and, on the other hand, “interventions” as carried out by some agent alien and exogenous to the system (i.e., the state). Rather than conceiving of the state as foundational or integral to urban and social systems (Schinkel, 2012), its role then becomes to foster and respect the self-organizing of communities and especially the market. Adopting a view of cities as akin to biological systems removes from view the wider political and economic forces that determine the ground rules for urban development and makes it possible to portray even contested processes like gentrification as “natural” (Ball, 2014; for a critique, Slater, 2014).

Although the rejection of state-directed social development is cloaked in an antipolitical vocabulary (Rose, 2000: 1400), it mobilizes enthusiasm

and skepticism in particular ways: while the logic through which uncoordinated and individual decisions produce social outcomes is readily accepted as a consequence of intrinsic principles of self-organization that have to be respected, the logic through which collective and coordinated decisions produce social outcomes is suspect. This is not to say no government intervention is possible – in fact, Jacobs describes in some detail how governments might preserve or cultivate vibrant city life – but this must not amount to more than tinkering.

### Self-organization in Rotterdam

If governments scale back their ambitions to organize city life and instead aim to empower citizens, what kind of cities would emerge? We give part of the answer by taking a closer look at citizen initiatives in Rotterdam. The city of Rotterdam in the Netherlands is one interesting case for examining citizens' self-organization, in part because cooperation toward a common cause is far from trivial here. Even though Rotterdam's has in recent years developed a reputation as an exciting and attractive city (Custers and Engbersen, 2021), it is also known as a place where revanchist sentiments against immigrants and Muslims have been forcefully expressed (Van Eijk, 2010; Van den Berg, 2012). Anxieties about the discontents of multicultural society have been compounded by concerns that the local government does not have the means to upkeep its services. Municipal governments are reconsidering their own role and proclaim that they want to give communities the space they need to organize their own services. This longing for a more Wikitopian city is informed by austerity politics but also expresses widely felt discontent with state-delivered services which are believed – not just by governments or parties on the right – to have alienated people by considering them as customers or target groups rather than constituents (Van der Zwaard et al., 2018). In the Netherlands, the aspiration toward a new, more facilitative role for the government has been articulated with the notion of “the Participation Society,” the Dutch equivalent of the British “Big Society.” While both these terms were short-lived, the underlying ideas – to cut costs and reduce bureaucracy while unleashing the creativity and zeal of citizens – have continued to inform government policy in the Netherlands and elsewhere. One important question, however, is if, where, and how communities can and do self-organize.

Although Jacobs herself was an active participant in citizen initiatives, they were of marginal concern to her in *The Death and Life of Great American Cities* – she was interested in individual urbanites and their networks rather than collective organization. Still, citizen initiatives arguably exemplify the potential for self-organization. Around the time we carried out most of the research informing this chapter – 2012–2014 – the Dutch and Rotterdam

governments as well as the media were especially enthusiastic about citizen initiatives. Journalists, scholars, and government officials produced magazines, blogs, and books with inspiring examples of people organizing their own care provisions, generating their own energy, creating their own child-care facilities, or farming their own food. Neighborhood centers run by residents rather than welfare organizations had become places of pilgrimage for government officials who had converted to the faith in community power.

Such success stories are a breath of fresh air for a society desperate for new ways of organizing solidarity and social relations. It would be mistaken to view the longing for Wikitopia as merely a fig leaf for budget cuts. At the same time, the government's idealization of citizens and their initiatives obscures self-organization's fraught and uneven nature. Michael Batty is certainly right when he says, as quoted above, that government intervention is "difficult and potentially dangerous," but this is just as well true of self-organization and policies aiming to harness self-organization. Just as the state can fail, so can the market, and so can civil society. Assessing self-organization demands, on one hand, a distanced, macroscopic view that allows us to map and explain broad patterns. On the other hand, it requires a microscopic view to examine what goes on within self-organizing networks.

### **A macroscopic view**

With a macroscopic view we can examine where self-organization takes off and where it does not. In recent years, researchers have shown that self-organization develops stronger in some than in other areas. Robert Putnam has shown in his studies on Italy (Putnam, 1993) and the United States (2007) that some areas have greater capacity for self-organization than others. Robert Sampson's research on Chicago also shows the uneven distribution of self-organization. Initiatives like charity benefits or protest actions are much more present in some than in other neighborhoods (Sampson, 2012). What explains this uneven development? Although research shows that economically deprived and ethnically diverse areas score relatively low, residential composition does not fully account for the geographical differences. More important than the background characteristics of the population is the institutional tissue of associations and foundations that enable people to connect (Putnam, 1993; Sampson, 2012). Walter Nicholls (2009) calls places where this tissue is strongly developed "relational incubators."

A first insight into the Rotterdam's variegated geography of self-organizing capacity can be gleaned from Rotterdam's Social Index survey (Custers and Engbersen, 2022). Respondents were asked if they take care of less able people, improve their neighborhood in some way, and work as volunteers. When the answers are scaled and expressed as grades, the poor and

ethnically diverse neighborhoods of Bloemhof, Tussendijken, and Bospolder would not pass the test while the more affluent and homogeneous neighborhoods of Hillegersberg-Schiebroek and Hoek van Holland score high grades. The first impression these figures give is in line with Robert Putnam's finding that deprived and diverse neighborhoods are poor also in terms of self-organization.

But when we look at neighborhood data rather than aggregated individual data, a very different pattern comes up. A survey of Rotterdam's civil initiatives from 2010 shows a surprisingly even distribution: all city districts have between 200 and 300 citizen initiatives (Schinkel et al., 2010). A plausible explanation for this pattern is that Rotterdam has a highly developed city-wide infrastructure for community development. From the 1980s onwards, the municipality has invested in umbrella organizations and professional support for residents, immigrants, women, and other groups (Uitermark, 2012). Through that infrastructure the Rotterdam government has rolled out city-wide community development programs, with the so-called Opzoomeren as iconic example. Opzoomeren was invented when residents in the run-down Opzoomerstraat decided to work collectively to make the street clean and friendly by sweeping the street and planting flowers. The municipality scaled this initiative up to the entire city and since the 1990s hundreds of street groups throughout Rotterdam participate in Opzoomeren. More recently the activities of Opzoomeren have been expanded to Dutch language lessons and reading sessions which are now organized throughout Rotterdam with financial and professional support from the municipality.

These kinds of community development programs are strongly associated with the social state; they are centrally coordinated, standardized, and rely on public funds and professional support. Such initiatives, rooted in a tradition of social planning, came under pressure as the ideal of self-organization gained ground. Planned development and concerted action are considered ineffective or inauthentic while self-organization is regarded as both cost-effective and genuine. Citizens are expected to play key roles in providing their own provisions. One important example is public libraries. In the United Kingdom, hundreds of public libraries have closed but also many new community-run libraries have been established. In Rotterdam, the government decided to close down 14 out of the 21 libraries in 2011. In response to the closure of the public library in their neighborhood, two sociologists and active residents, Joke van der Zwaard and Maurice Specht founded the Reading Salon West, a vibrant place where people read, work, take Dutch lessons, organize meetings, and perform poetry or music (Van der Zwaard and Specht, 2015). The Reading Salon became one of those places of pilgrimage for government officials as it supposedly demonstrates

that unsubsidized volunteers are better capable of creating vibrant neighborhood spaces than publicly funded officials.

However, there is more to the success-story than the ingenuity and commitment of the Reading Salon's founders. The Reading Salon could emerge in this neighborhood because of the strong institutional tissue that had historically developed around the Aktiegroep Oude Westen (Van der Zwaard and Specht, 2013). The networks that had been cultivated through the Aktiegroep enabled the Reading Salon's founders to reach out to potential volunteers and mobilize people to design, maintain, and operate the space. This helps us understand why in all the other 14 neighborhoods where public libraries had to close, residents have *not* successfully taken initiatives to create community-run libraries. Organizing an initiative like the Reading Salon requires immense effort from dozens or even hundreds people volunteering their time and coordinating their activities. In the absence of strong and dense pre-existing networks, undertaking an enterprise of this magnitude is too much even for very committed and skillful initiators.

Not only social but also economic capital is unevenly distributed, and such inequality is likely to increasingly translate into uneven service provision as the state delegates its responsibilities. Celebrated forms of self-organization like cooperatives in the field of care, housing construction, or renewable energy emerge where people are well organized *and* can afford the necessary investments. Elanor Ostrom's research that is often used to underscore the value and feasibility of self-organization suggests that robust forms of common resource management benefit from homogeneity among participants and the possibility excluding of outsiders (Dietz et al., 2003: 1908). The so-called Klushuizen, or Do It Yourself houses, are an example of common resource management in the field of housing. As part of an operation to upgrade the neighborhood of Spangen, the Rotterdam municipality bought an entire housing complex and gave it for free to a cooperation of aspiring homeowners on the condition that they would renovate the buildings. The project has been widely cited as an inspiring example of collaborative and bottom-up initiative. It did indeed provides tangible benefits for the group of home-owners – a spacious and affordable home overlooking a gated inner-garden that is a focal point for vibrant community life – but these are not available for people unable to finance a major renovation.

These examples illustrate that community life may surge where the government devolves responsibilities and assets to communities but also illustrate that this is a highly uneven process. It is important to acknowledge that residents in one neighborhood created a very successful initiative in response to the closure of their neighborhood library, but it is equally important to recognize that this is exceptional as no community initiatives emerged in 13 other neighborhoods where public libraries closed. If we take a broad

look, we find that self-organization is unevenly distributed across cities and neighborhoods.

### A microscopic view

Research into the determinants of self-organization can give insight into the structural conditions that encourage or constrain citizens' initiatives. But self-organization is not a pure expression of these conditions. People who organize and take initiatives try to beat the odds and outmaneuver the conditions that hinder them. This is a fascinating process exactly because it is difficult. People are not fireflies, bees, or ants. While those insects instinctively know their role, self-organization among people is even in the best cases the result of struggle and trial-and-error (see Harvey, 2000). When we take a microscopic view of self-organization, we do not observe the seamless confluence of preprogrammed elements but different characters and interests which sometimes creatively merge but at other times tragically crash.

While exclusion, power concentration, and bureaucratization are often considered as counter or alien to self-organization, these tendencies can emerge from self-organization. This is also the case for perhaps the most iconic example of the power of self-organization, Wikipedia. As discussed in Chapter 4, Wikipedia is an impressive and inspiring example of self-organization but a closer look at the online encyclopedia reveals that cooperation and coordination among the hundreds of thousands of volunteers requires considerable work. Self-organization is facilitated by a formal organization, the Wikimedia Foundation, that maintains servers, fights legal battles, raises funds, and develops software. Wikimedia also struggles with tendencies toward bureaucratization and exclusion. In their efforts to work efficiently and conscientiously, Wikipedia editors have developed jargon, acronyms, and rules that come across to outsiders as obscure and secretive language (Rijshouwer, 2019).

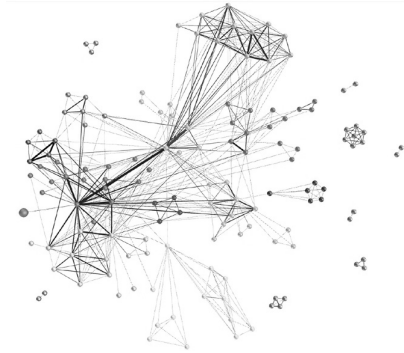
While many commentators give the impression that contemporary self-organizing networks elide tendencies to centralization or exclusion, it turns out that self-organizing networks are often less open, flexible, and egalitarian than we perhaps would like (Freeman, 1973). Exactly because self-organizing networks lack central oversight and people do not know their place instinctively, it is a matter of struggle and improvisation to bring divergent ideals and interests in line (Bouttelier, 2011).

This process of struggle and negotiation is especially challenging in urban areas characterized by deprivation and competing demands from diverse groups on limited space. Schipper's ethnography of a resident-run community center in Rotterdam provides one interesting example (Schipper, 2014). The center used to be managed by a welfare foundation until budget cuts forced it to close in 2012. The building remained vacant for almost two

years until a group of neighborhood residents occupied it, reappropriating the space for a resident-run community center. While before the center had been run by professionals, after its relaunch it developed a culture of cooperation underpinned by active participation and provides space to Turkish and Moroccan women learning to mend clothing, Polish and Dutch residents exchanging language lessons, former prisoners reintegrating into mainstream society by assisting activities, pensioned artisans doing repairs, and clients of labor market reintegration programs. The residents ritually reiterated how their occupation of the building ushered in a period of civic resurgence. Their new community center received subsidies and assistance from subsidized professional organizations, but a crucial difference is that residents were in charge and that they have a diverse yet connected constituency of user groups. However, after two years, the government announced that it would start to demand market-level rents as it felt its task was only to help kickstart civic initiatives, not to sustain them. The residents had to surrender their ambitions. They were replaced by a professional welfare organization that is fully subsidized by the government and therefore able to pay the rent (to that same government). Schipper's ethnography demonstrates the conditionality of the government's support to self-organization: except for commercially viable citizen initiatives (an oxymoron, especially in this deprived area of the city), it only supports self-organization as a liminal and exceptional condition, otherwise prioritizing fully subsidized and incorporated welfare organizations.

Van Summeren's case study of a community garden provides another interesting glance into the micro-dynamics of self-managed spaces (Van Summeren, 2012). The community garden she researched has been created on a vacant lot of land that had not been developed because of the financial crisis, providing one example of how aborted projects created new spaces for civic engagement. Creatief Beheer, the organization managing the space for the government, receives funds from the municipal budget for physical management but it opts for a more community-based approach as it employs gardeners who are expected to cultivate the land and to cultivate community in the process – a practice Gilchrist (2000: 269) refers to as “human horticulture.” Creatief Beheer radically embraces the principle of openness and refuses to erect fences, use surveillance cameras, or regulate access through identification cards. This philosophy goes against the intuition of many neighborhood residents using the garden. They pressure the professionals to regulate access and enforce rules, but Creatief Beheer categorically rejects these demands. Although this strategy is not without its costs, Van Summeren's research suggests that it may be successful (Van Summeren, 2012). Her network analysis shows that the users of the garden segregate into different clusters, but these clusters are connected through brokers who mediate potentially conflictive relations (Figure 3.3). The biggest node in





**FIGURE 3.3** Network structure of social relations in a community garden managed by Creatief Beheer. Nodes represent persons; edges indicate persons engage in activities together; colors indicate clusters; node size indicates betweenness centrality, a measure for brokerage.

*Source:* Van Summeren 2012.

Figure 3.3 is a professional working for Creatief Beheer, which indicates that she is an important broker between individuals. However, she is strongly connected to adults with mostly Dutch backgrounds while having no direct connections to a group of neighborhood youngsters with mostly foreign backgrounds, represented by the tightly connected yet somewhat isolated cluster at the top of Figure 3.3. A youngster of Turkish descent, represented by the second biggest node in the middle of the figure, forms a bridge between the adults and youngsters. Since this youngster was trusted by both groups, he could help to bring about results the professionals could not achieve alone; he enlisted volunteers and carved out a space for the youngsters to participate. The network is nevertheless fragile; relations are disproportionately formed around a professional and there are only few linkages among segregated groups.

These examples suggest that some important emancipatory effects can be realized when professionals do not monopolize social development, but they also hint at the fragility of self-organization. Rotterdam seems to be in a limbo. On one hand, self-organizing residents have stepped in as the social state retreated. As welfare organizations have dwindled and market-based development projects were aborted, community engagement has been “crowded in” (cf. Ostrom, 2000). As the government becomes dependent on communities to perform key tasks, community members are in a better position to push for the changes they like to see and get meaningfully involved. On the other hand, self-organization is an important part predicated on the financial and professional support that helps residents to finance activities and cope with the more vicious problems associated with self-organizing in

an urban context where community cohesion is not self-evident. In opposition to the “crowding out” hypothesis, we might expect that engagement suffers when communities are left to vent for themselves: if the state retreats further, so may residents.

## Conclusion

Complexity thinking has a long history in urban studies, starting with the Chicago School. About half a century after the Chicago School, Jane Jacobs resurrected complexity thinking, conceiving of the city as a system of organized complexity. Most recently, the proliferation of digital data has breathed new life into a view of the city as a complex system composed of feedback loops of informational, material, and economic flows. Echoing the sociologists of the Chicago School, present-day complexity researchers such as Bettencourt and West draw upon the natural sciences in their efforts to identify common patterns and mechanisms in urban development.

In these different iterations and types of complexity thinking, the main goal is to better understand cities and urban development but there is a clear and occasionally strong link to practice. Complexity thinking not only provides a prism to *study* cities as emergent structures but also hints at ways to *construe* them that way. Such efforts have been reinvigorated by digital technologies, which enable unprecedented opportunities to track and steer urban development. In this context, Richard Sennett (2018) schematically distinguishes between two different types of digital urbanism. On one hand, there is the type is that oriented toward surveillance. In this archetype, smart city applications are deployed by governments and corporations to optimize control and extraction, reducing citizens to objects of government and management. On the other hand, Sennett celebrates the capacity of new digital technologies to allow for distributed coordination. Using their phones and apps, citizens can reduce their dependence on governments and corporations and acquire their own information, form their own networks, and undertake their own activities, including protest.

While this seems to suggest a fairly straightforward opposition between autocratic top-down planning and democratic bottom-up self-organization, Sennett complicates this vertical reading of urban politics in his discussion of Jacobs and Mumford, another giant of urban planning, though with nowhere near the same staying power. Different from Jacobs, Mumford was deeply committed to comprehensive planning as a means to creating cities in the pursuit of progress and equality. The two came head-to-head after Jacobs published her classic work. Mumford was furious that Jacobs had criticized his beloved Ebenezer Howard, the inventor of the Garden City model, and wrote a brutally negative review of *Life and Death of Great American Cities* that radiated hostility and sexism (it was titled “Mother

Jacobs”). Mumford did not shy away from hyperbole and took Jacobs’ organic metaphors all the way, claiming that her home recipes would provide no cure for urban cancers (Campanella, 2011). Although Sennett is partial to Jacobs, he reconsiders his loyalty as he ponders the challenges of a rapidly urbanizing world – Jacobs’ prioritizing of the small and the local seems to offer no way forward in addressing the fundamental challenges of inequality, climate change, and authoritarianism (Uitermark, 2023). Sennett recuperates Mumford’s vision, seeing it not so much as a negation of democracy but as a “more embracing” vision of what an open city requires and entails.

In this view, cities are created through concerted collective action that foster equality and coordination as well as bottom-up initiatives that enable citizens to adapt their environments to their needs. Urban planning then becomes a means in pursuit different collective values that are invariably in tension. Viewed in this way, digital technologies might better be modeled on cities and urban planning rather than the other way around. Perhaps the major challenge is not so much to make the city more like the internet but to make the internet more like a city (Bettencourt, 2022).

Self-organization does not come into being on its own accord. Just as scholars like Polanyi and Foucault showed that the market did not naturally emerge but had to be created by an active and interventionist state, so does community self-organization require a supporting scaffolding. The simplistic dichotomies between top-down vs bottom-up or “intervention” vs *laissez-faire* must thus be abandoned for an understanding that sees the two as inextricably intertwined – and sees any type of emergence as contingent on structuring, rules, and context. When self-organization takes place among humans, it moreover inherently tends toward generating more top-down structuring, to address the limitations of the bottom-up way of organizing.

The battle between Jacobs and Moses became stuff of legend because it embodied the battle between high modernity and its critics, encapsulated in a familiar David against Goliath narrative in which the everyday neighborhood resident stood up against the powerful ruthless oppressor. While her victory was delayed by decades, Jacobs has over time won over planning, at least among scholars and practitioners in the Global North. As top-down solutions and blueprint planning are discarded in favor of a more incremental and collaborative approach, Jacobs has become the best-known and most revered planning theorist.

In the years since, a range of legislation has sought to prevent the return of a new Moses. Large-scale urban projects have become much more difficult and expensive, in part through community processes that were enacted as a reaction against Moses’ excesses. These institutions have meant that inner-city communities have been empowered to stand up against the destruction

of their neighborhoods, and that a prospective future powerbroker might find himself powerless in the face of community resistance.

But the shift away from the Moses model has not been without costs. It has also meant that construction has become more expensive, slow, and difficult. It has become nearly impossible to build in cities. And we thus see the costs of *not acting*. In cities, the lack of large-scale projects and investments have meant housing crises, growing costs of living, gentrification, and homelessness.

Within the two visions, we also see competing notions of what democracy should be. In Jacobs' vision, democracy appears as local participation, and the right to shape your own neighborhood. The result tends to be that the communities and individuals most capable of wielding these neighborhood powers tend to be those most like Jane Jacobs herself; well-educated and able to take time from work to participate in never-ending planning meetings. Bottom-up organization, in short, tends to privilege those with resources and connections.

The democracy of Moses, in contrast, was the democracy of high modernity: mass-democracy and machine politics. For all the negative view that we have of Moses today, it is easy to forget just how popular he was, in particular during the first decades of his reign. Moses' popularity stemmed from his ability to channel the democratic powers of the state to break a decades-long stalemate during which the state had been unable to build (Caro, 1975). Moses stood up against wealthy landowners and magnates, and pushed the interests of the many over the powerful few. The result was many of New York's immense and beloved public parks.

Jacobs' vision saw what Moses' maps and models could not show him – the delicate street ballet and urban life – but her bottom-up view was equally blind to other essential aspects of the city, including the perspectives and experiences of those who were not represented in the neighborhood because they could not find a home. Jacobs' vision offers very little ways to answer – or even ask – questions such as: Do we need a library? Who should own the land? How might the urban environment attenuate or accentuate inequality?

The lesson we should learn from the battle between Moses and Jacobs is thus not a black-and-white story about the dangers of top-down planning, but a more nuanced and complex story of the failures and inadequacies inherent in each perspective. The dualities of both Moses and Jacobs as individuals hold within them the dualities of their respective modernisms. Moses – the democratic public park-builder, and racist powerbroker and bulldozer of community life. Jacobs – the defender of neighborhood culture and urban life, and trailblazer for neoliberal urbanism.

In the next chapter, we turn to a more in-detail look at the relationship between top-down and bottom-up, by examining the emergence of bureaucracy in the quintessential example of social self-organization: Wikipedia.

**Note**

- 1 This chapter is a revision of Uitermark J (2015) Longing for Wikitopia. The study and politics of self-organization, *Urban Studies* 52(13): 2301–2312. It also draws on: Uitermark, Justus (2023) What kind of problem is a megacity? Planning, rapid urbanization, and self-organization, *Sociologia Italiana* 21: 137–150.

# 4

## COMPLEX BUREAUCRACIES

### Self-organization in Wikipedia

*With Emiel Rijshouwer and Willem de Koster*

The history of Wikipedia reads as an epic tale of the demise of the old and the rise of the new.<sup>1</sup> Before, encyclopedias were the provenance of experts. Professional editors, on the payrolls of large publishers, decided which entries were needed and commissioned specialists to write them. Once completed, the encyclopedias were published as sets of volumes that populated the bookshelves of the educated classes, ready to be consulted in case of a query and always on display as a monument to knowledge and a marker of status. Although encyclopedias predated industrialism, they resembled factories in that they achieved their comprehensive and detailed coverage through hierarchical steering, an elaborate and formalized division of labor, and expert knowledge. The towering example of this kind of encyclopedic knowledge has been the *Encyclopedia Britannica*. For the almost 250 years before the last edition rolled off the presses in 2012, a team of professional editors and acclaimed experts, including Nobel laureates, had made the *Britannica* into the most comprehensive and authoritative overview of human knowledge.

And then came Wikipedia. Wikipedia thrives upon openness instead of credentials, referring to itself as “the encyclopedia anyone can edit.” Contributors are not directed by editors but decide on their own whether entries should be revised, expanded, or added. In fact, there is no distinction between editors and contributors; all Wikipedians are self-directed volunteers, none receive compensation or take orders. Instead of relying on their credentials, Wikipedians are expected to refer to publicly available sources so that anyone is able to verify their claims. The fact that anyone can edit means that mistakes will be made but the philosophy is that users and contributors will swiftly correct them. Rather than organizing knowledge

top-down and through a blueprint, the encyclopedia emerges from the distributed efforts of self-directed volunteers.

Robert McHenry, a former editor-in-chief of the *Encyclopedia Britannica* and author of *How to Know*, summarized the Wikipedia method in the following terms:

Anyone, irrespective of expertise in or even familiarity with the topic, can submit an article and it will be published.

Anyone, irrespective of expertise in or even familiarity with the topic, can edit that article, and the modifications will stand until further modified.

Then comes the crucial and entirely faith-based step:

Some unspecified quasi-Darwinian process will assure that those writings and editings by contributors of greatest expertise will survive; articles will eventually reach a steady state that corresponds to the highest degree of accuracy.<sup>2</sup>

“Does someone actually believe this?” McHenry asked. Evidently, he himself did not.

But Wikipedia exceeded McHenry’s expectations. Perhaps the defining battle in encyclopedic epistemology occurred around 2005 when Wikipedia and the *Encyclopedia Britannica* went head-to-head. That year, the journal *Nature* sent two sets of 42 science entries to a pool of expert reviewers: one set from Wikipedia, the other from *Encyclopedia Britannica*.<sup>3</sup> The old and established encyclopedia outperformed the digital newcomer, though by a small margin – both encyclopedias contained an equally small number serious flaws but Britannica committed fewer minor errors than Wikipedia. Instead of rejoicing, the *Encyclopedia Britannica* called *Nature*’s research “fatally flawed” and demanded a retraction, claiming that *Britannica*’s reliance on expertise and editorial procedures put it at on entirely different level from Wikipedia.

Crowds instead of experts, emergence instead of blueprints, openness instead of selection: Wikipedia’s success has made it into an icon of the digital age. If Anonymous presents itself as the harbinger of digital modernity’s democratic potential, Wikipedia is a champion of digital modernity’s epistemology. It’s a fine test case to examine if and how digital modernity delivers on the promise to generate and organize knowledge more effectively and democratically than before. In this chapter, we specifically examine power concentration and bureaucratization. Does Wikipedia evade, replicate, or revamp the power inequalities and bureaucratic rigidities characteristic of industrial modernity?

To do so, we first update Robert Michels’ and Max Weber’s classical sociological theories to account for power concentration and bureaucratization

in the digital age. We then outline three stages in Wikipedia's evolution, drawing from Emiel Rijshouwer's extensive research which comprises 118 conversations and interviews with various stakeholders as well as extensive archival research on the online encyclopedia (Rijshouwer, 2019; Rijshouwer et al., 2023). For each of these stages we show trends toward or away from power concentration and bureaucratization. Finally, our conclusion reflects on our findings' relevance for assessing digital modernity's promise of epistemological democracy.

### **Michels and Weber in the digital age**

According to Michels and Weber, self-organized groups inevitably develop hierarchies and bureaucratic structures as they grow in size and complexity. They argue that such structures violate the ideals of direct democracy by reducing the capacity of constituents to govern themselves. Through Michels and Weber's seminal contributions, we identify potential mechanisms of power concentration and bureaucratization, but we also amend these classic insights to account for the role of digital technology.

Robert Michels ([1915] 2001) concluded more than a century ago that even organizations with a deep commitment to equality eventually become dominated by conservative elites. While it is feasible for small communities to keep their constituents informed about every issue, make decisions based on a consensus, and develop strategies collaboratively, this becomes impossible when communities grow. The result is a hierarchical division of labor between representatives and constituents. While the former have discretion and intimate knowledge of the organization, constituents lack the time, capacity, and resources to participate decision-making processes. Although Michels' ideal of democracy demands that representatives only serve their constituents' interests, he argues that, in practice, they use their discretion to maintain their own privileges and serve their own interests.

As the internet developed, scholars grew optimistic that digital technologies would enable communities and organizations to elude the power-concentration tendencies that Michels thought inevitable (cf., Bauwens, 2005; Benkler, 2006, 2011; Castells, 2012; Raymond, 1999; Shirky, 2008; Tapscott and Williams, 2008). In this understanding, digital technologies erode hierarchies and divisions and facilitate "peer production," a flexible form of production that relies on self-organization and collective intelligence. At the same time, many scholars have argued that digital networks are subject to similar forms of power concentration as Michels' socialist parties. Studies of online networks found that they develop hubs – i.e., concentrations of power among prominent participants (cf. Barabási, 2003; Bright et al., 2019; Schneider, 2022). A number of authors have suggested that such mechanisms are at play in the case of Wikipedia (Carr, 2011; Kittur et al.,



2007; Konieczny, 2009; O’Neil, 2014; Panciera et al., 2009; Shaw and Hill, 2014). And even when content is collaboratively produced, the underlying infrastructures are often proprietary, creating outsized influence for the corporations or organizations controlling it (Schneider, 2018). In this perspective, digital technologies may offer new opportunities for collaboration but do not allow communities to escape Michels’ iron law of oligarchy.

Just as with power concentration, classic sociological contributions would lead us to expect that the process of bureaucratization is inevitable. According to Weber, movements in their first stage of development rely on “charismatic authority” (Weber, 2013). These communities are inherently unstable and transient: over time, both charismatic leaders and their followers display a tendency toward “routinization,” i.e., the development of formal-rational or traditional forms of authority to guarantee stability, continuity, and legitimacy. While being sensitive to the downsides of rationalization, Weber stressed that bureaucratic forms of organization limit the arbitrary exercise of power. Importantly, bureaucracy is not only a means to improve productivity or control but a means to legitimize authority; bureaucratic forms of organization involve well-documented rules and procedures as well as clearly established formal, impersonal hierarchies.

As with Michels’ theory on power concentration, contemporary observers present reasons why digital technology may help escape the bureaucratization tendency that Weber considered inevitable. These authors argue that the formal rules, procedures, hierarchies, and entry-barriers that bureaucratic organizations use to motivate and control employees have become obsolete (cf., Benkler, 2011; Raymond, 1999). Many contemporary management philosophies are explicitly anti-bureaucratic as they stress agile development, brainstorming, and experimenting. Wikipedia, too, is occasionally conceived as an anti-bureaucracy. In fact, according to the encyclopedia itself, “Wikipedia is not a bureaucracy” (Wikipedia, 2021). Nevertheless, studies observe tendencies of bureaucratization. Butler et al. (2008), Joyce et al. (2012), De Laat (2012), O’Neil (2014), Viégas et al. (2007), and Jemielniak (2014) all describe an increase in the number and complexity of formal rules, policies, and guidelines that coincided with the expansion of Wikipedia.

In short, scholars provide both reasons why we should or should not expect bureaucratization and power concentration. Instead of testing whether the optimists or the pessimists are correct, it is more productive to break out of the deterministic mold. This means, first, that we should not assume that bureaucratization and power concentration are synonyms. Power concentration may occur in the absence of bureaucratization, as examined in Chapter 5 (see also Freeman, 1973). Similarly, bureaucratization may occur in the absence of power concentration. In other words: instead of being phenomena that inevitably grow in parallel and that reinforce each other, power concentration and bureaucratization could be considered as being intertwined in a

sort of balancing act, with increasing power concentration invoking bureaucratization to minimize domination. The task then becomes to understand the changing constellations of power concentration and bureaucratization over time.

Second, breaking out of the deterministic mold of prevailing accounts means that we should think conjuncturally. Both Michels and Weber predict a linear development: while Michels foresees the inevitable growth of power concentration, Weber depicts the inevitable expansion of formal organization. Their contemporary followers similarly foresee either a clean break from the shackles of industrial modernity or the continuation of domination by different means. Instead, we think of bureaucratization and power concentration as contingent processes, with digital technologies taking on changing roles. Crucially, processes of self-organization – into or out of inequality and bureaucracy – do not emerge organically from micro-interactions but are subject to reflection and contestation (e.g., Konieczny, 2009). People reflect on the processes they participate in, trying to steer them one way or the other. By tapping into their accounts through interviews we learn how digital technologies were employed to counter, promote, and shape bureaucratization and power concentration.

### **Power concentration and bureaucratization in Wikipedia**

To examine the interplay of bureaucratization and power concentration over time, we identify two stages in Wikipedia's development. Each of these stages tells us a story of how a digitally powered encyclopedia organizes knowledge and develops an organizational infrastructure. Together, the two stages demonstrate how both bureaucratization and power concentration are not so much avoided as revamped.

#### ***A charismatic community***

Wikipedia began as a response to a failed bureaucratic and centrally led commercial enterprise. In 1999, the for-profit company Bomis started Nupedia, an open-source, online encyclopedia written and peer-reviewed by experts, intending to make it profitable via advertising. However, only 15 articles were published in its first year. Consequently, by the end of 2000, Bomis's CEO, Jimmy Wales, and Nupedia's editor-in-chief, Larry Sanger, effectuated a sharp break with the encyclopedic epistemology: they jettisoned the experts and called in volunteers. They allowed users to edit at their own discretion, without elaborate coordination. Wikipedia was born on January 10, 2001, when Wales installed UseModWiki software on Nupedia's server. A "wiki" allows pages to be edited by users. No other software is needed on the user-side except for a web browser.

Within a month, self-selected enthusiasts had created 600 entries. In its initial form, Wikipedia could be described as a charismatic community (cf. Weber, 2013: 243): self-chosen volunteers – operating stigmergically based on shared beliefs and mutual trust rather than formal procedures and central commands – coordinated editing and reviewing processes as well as the development of the project’s editing infrastructure and collaborative culture.

Despite increasing productivity, the enterprise remained unprofitable. To add to the financial challenges, community members expressed their aversion to advertisements on Wikipedia. Sanger recalled:

we knew that this [idea of advertisements on Wikipedia] would be extremely controversial, because so many of the people who are involved in open source and open content projects absolutely *hate* the idea of advertising on the web pages of free projects, even to support project organizers.

(2005: n.p.)

He tried to convince the community that generating revenues was essential to pay for the servers and the salary of a professional coordinator.

It is my well-considered opinion, as well as the opinion of Jimmy Wales and of many of the older (and a few newer) contributors to Wikipedia, that a full-time, paid employee (namely, me) has been absolutely essential in creating the success that Wikipedia is today. Wikipedia would not exist if I had not been paid to start and manage it. ...It is, frankly, *silly* to think that this sort of large-scale project could be properly managed without paid employees.

(Sanger, 2002a: n.p., cited in Rijshouwer, 2019: 59–60)

Many Wikipedians disagreed, though. The editors of the Spanish Wikipedia went as far as to use their right to “fork”: they started their own branch on the encyclopedia. This community-driven and ideologically inspired act of countervailing power is one of the reasons that Wikipedia has remained ad-free (Tkacz, 2015).

Members of the charismatic community made many incremental improvements and additions to the open-source wiki engine to accommodate the exponentially growing numbers of visitors and editors. Some prominent developers of the first hour recalled that they were trusted with root access to the server and software repository, which enabled them to implement and test adjustments and new features. People self-selectively *doing* things were regarded as authorities and experienced a sense of autonomy, ownership, and trust even though only Wales had the formal authority to make final decisions regarding access to the code repository and accepting modifications.

Wales and Sanger were convinced that mistakes, discrepancies, and disputes could be resolved through what were now considered wiki values: community members should feel free to improve each other's work and are asked to be respectful and polite, use rational arguments, and write articles from a neutral point of view. Sanger and Wales were the final arbiters of any disagreements. Sanger recalled that, over time, these basic principles were not being respected and applied unequivocally anymore, as editors promoted their views rather than striving to reach consensus and trolls intentionally frustrated debates. He got convinced that a self-organizing community needed a central authority to maintain the project's core principles and pursue its objectives. In the early days of Wikipedia, Wales and Sanger had enjoyed such authority by default; as CEO and lead programmer and editor they had the final say. However, as the community they had brought into being grew more vocal and confident, their position, and especially Sanger's, was questioned. Sanger therefore demanded the authority that he originally had by default:

I need to be granted fairly broad authority *by the community* – by you, dear reader – if I am going to do my job effectively. Until fairly recently, I was granted such authority by Wikipedians. I was indeed not infrequently called to justify decisions I made, but not constantly and nearly always respectfully and helpfully. This place in the community did not make me an all-powerful editor who must be obeyed on pain of ousting; but it did make me a leader. That's what I want, again. This is my job. Now if, as I have been recently, I am constantly forced to justify my every action, I can act far less, and my effectiveness as a leader of the project becomes much less effective.

*(cited in Rijshouwer, 2019: 178)*

Although he emphasized that such a leader would have limited power, his request was denied by Wikipedians, who expressed aversion to an elite monopolizing decision-making.

In this phase of Wikipedia's development, we did not find any signs of self-organizing bureaucratization yet. As the community's members shared an ethos, close ties, and common goals, there was no need for bureaucratic structures to regulate editing or decision-making processes. There was power concentration though. Power was concentrated in the hands of charismatic leaders and veteran staff and editors, who were trusted to make decisions for the sake of the project's functioning. However, community members pushed back against centralized decision-making when they felt it violated their ideals of democratic self-organization.

### Power concentration and bureaucratization

In 2006, Wikimedia's board of trustees concluded that it needed a professional leader to meet the organizational, technical, and financial challenges arising from its massive growth. Wikipedia not only faced the challenge of scaling up, but also of diversifying. Wikimedia's leaders felt that it was a problem that Wikipedia was mainly edited by a very homogeneous group of young, Western, and well-educated males and had only a limited reach in the Global South. During this phase, Wikimedia's leadership pushed for *both* power concentration and bureaucratization.

Under the lead of executive director Sue Gardner, the organization transitioned from a pragmatic, egalitarian, volunteer-driven community to a professional and centralized bureaucracy, with a growing staff of experts, clearly established strategies and goals, and an increasingly extensive body of formal documents, policies, and procedures. Gardner deliberately grew and professionalized the Wikimedia Foundation so that it would be, in her words, "worthy of supporting Wikipedia" (cited in Rijshouwer, 2019: 78). She describes what she found as she joined the organization and where she wanted to take it:

People were really stressed out; there were a lot of tears in the office, stuff like that. It was very very hard. ... [I]t was mismatch between what they were capable of and what they were responsible for. ... So ... it was extremely obvious to me that we had to do a lot of hiring. We had to bring in a lot of skills we didn't have. We had to bring in a lot of staff hours that we just didn't have. And in order to do that, we were going to have to make a lot more money. ... The simple fact that the organization had to grow was screamingly obvious. Everybody would have melted down, and quit, and died. It was unsustainable in every way.

(2017, cited in Rijshouwer, 2019: 78–79)

By explicitly framing the WMF's mission as *grant-making*, Gardner indicated that it would focus its activities on raising and disseminating funds for projects that demonstrably contributed to its mission, rather than being actively involved in local organizations' schemes. During Gardner's tenure, the WMF invested in fundraising staff and campaigns. With success: she revenues increased from 5 to 52 million USD. The collection and distribution of Wikipedia's funds in this period were largely brought under the control of the WMF and taken away from national chapters. An argument in favor of centralized fundraising was that it would provide the WMF with sufficient funds to sustain the growing organization and its technical infrastructure. The board further stated that it needed to intervene in the uneven

distribution of funds, which it claimed did not accord with the mission of providing free access to the sum of all human knowledge on a global scale. A final argument was that a central organization raising funds with dedicated experts would be far more efficient than different bodies run partly by volunteers.

Gardner's mission to grow and professionalize the Wikimedia Foundation was fundamentally at odds with the non-hierarchical spirit among early participants. While many agreed that scaling up Wikipedia's operations indeed required a large and professional organization, others suggested that the Wikimedia Foundation usurped power at the expense of national chapters and contributors. Instead of generating their own resources, chapters were now required to apply to the Wikimedia Foundation. The WMF responded to complaints by setting up bureaucratic procedures: it founded the Funds Dissemination Committee (FDC) through which the community could participate in fund allocations and it promised to provide more transparency by submitting its own financial plans for review. These concessions did not go far enough for the critics but the WMF said it could not go further for legal and strategic reasons. Here we see Michels' mechanism of power concentration at work: elites used their discretionary power and privileged access to information to consolidate their hold over the organization and implement their ideas.

However, where Michels views elites as conservative and constituents as radical, Gardner argues that it was the Wikipedia community that had become too homogeneous, closed, and conservative. She felt that it was her prerogative and duty to push through: "If I had abdicated responsibility and said, 'You decide,' how would that have been useful to anybody? [They] wouldn't have hired an executive director if they wanted to just vote" (cited in Rijshouwer, 2019: 79). More than before, the Wikimedia Foundation identified the community itself as an obstacle to improvement. The WMF had research conducted that showed a decrease in the size, activity, and retention of the active editor-base. In addition to the supposedly protectionist attitudes of established editors and bots to newcomers, the WMF's board and staff identified the limited user-friendliness of Wikipedia's user-interface as a reason for its alleged lack of appeal to new editors. In 2011, the WMF formally announced the development of VisualEditor, the largest and most complex software-development project in its history. The project's goal was to improve Wikipedia's editing experience to persuade readers to contribute more. The WMF's leadership argued that it did not expect volunteer developers to be equipped or motivated to manage this crucial endeavor. Accordingly, it proceeded to bypass the volunteer-driven developer community in order to expand and diversify Wikipedia.

Overall, power-concentration and bureaucratization processes operated in tandem in this third phase of Wikipedia's self-organizing bureaucratization.

WMF's officials and staff increasingly allowed themselves the discretion to employ bureaucratic means to achieve the organization's objectives and ensure community compliance. This bureaucratic structure empowers community members to the degree that they further the WMF's mission: through grants, the WMF directs the energies of its affiliates toward extending the readership and the number of contributors in the Global South, and improving the community's gender balance. While there are obviously still tensions and conflicts, the general trend is that the proliferation of bureaucratization has served to accommodate the convergence of WMF's and the community's objectives. Whereas previously community members pushed back against power concentration, in this phase they more readily complied. The development of bureaucratic procedures and formal positions is crucial to this pacification: community members both accept and demand formal avenues for participation and consultation.

## Conclusion

By researching Wikipedia's processes of bureaucratization and power concentration, we get a sense of how a champion of digital modernity delivers on the promise of epistemological emancipation: Does Wikipedia elude tendencies toward power concentration and bureaucratization typical of industrial modernity? The paradigmatic example of Wikipedia shows that the inequalities and rigidities of the industrial corporation are neither avoided nor simply replicated in digital modernity. Rather, they are revamped and transformed.

We show that Wikipedia is a thoroughly bureaucratic entity, though not because elites imposed such a structure. Its bureaucratization was emergent and community-driven: Wikipedians wanted bureaucracy, both to effectively organize their work and to hold those in power accountable. While we only considered Wikipedia, we hypothesize that bureaucratization can also be found in other instances of digital peer production. Many peer production efforts start off as charismatic communities; a couple of leaders succeed in articulating a vision that attracts followers (Coleman, 2013; Ferraro and O'Mahony, 2012; O'Neil, 2014). Over time, however, such initiatives develop into full-blown organizations that spawn norms, routines, and institutions in response to the growth in size and complexity (cf. Fiesler et al., 2018; Lampe et al., 2014). Bureaucratization further is crucial for countering tendencies toward power concentration. Feuding groups use bureaucratic means to keep each other in check and constituents demand procedures and routines to strengthen accountability (see also O'Mahony and Ferraro, 2007).

With respect to power concentration, Wikipedia demonstrates that crowds of self-directed volunteers can be incredibly effective in carrying out

and coordinating tasks: without receiving orders from managers or leaders, Wikipedians have collaboratively crafted the most comprehensive repository of knowledge in the history of humankind. However, two important caveats are in order.

First, Wikipedia's self-organization has resulted in a rather skewed constituency: White males from the United States and Western Europe account for a large proportion of encyclopedia articles (Hill and Shaw, 2013). This impacts Wikipedia's content. American history and science receive more attention than literature while North America and Western Europe are more elaborately covered than the rest of the world (Callahan and Herring, 2011). The writing often reveals male bias (Wagner et al., 2021; Tripodi, 2023) while women and people of color are less likely to be recognized as experts (Adams and Bruckner, 2019). Although some of these biases may also be found in expert-based systems such as the *Encyclopaedia Britannica* (e.g. Reagle and Rhue, 2011), the case of Wikipedia underlines that equity and diversity do not emerge organically from digitally powered self-organization. Wikimedia has for many years tried to correct these emergent yet persistent biases by selectively investing in the coverage of underrepresented topics and areas, with uneven success (Young et al., 2020; Schmahl et al., 2020). Here we see that top-down interventions and bureaucratic rules are mobilized to counteract the selectivity and biases inherent to digitally powered self-organization.

A second caveat is that the infrastructures on which peer production relies are often proprietary (Schneider, 2018). While peer production represents participatory modes of knowledge production, participation and control do not extend to the infrastructures on which self-organization unfolds. In the case of Wikipedia, the digital infrastructure is owned and managed by the Wikimedia Foundation, which is formally beyond the control of Wikipedia's constituents. Reddit presents another example. In 2023, the media company behind Reddit announced that it would charge third parties for use of the site's Application Programming Interface (API). While the Reddit community mobilized and took down large parts of the site in protest, they were ultimately powerless against those who owned the underlying infrastructure. Here we see a central contradiction of digital modernity that is visible in a mission-driven organization such as Wikipedia but, as we see in Chapter 6, much more consequential and potentially detrimental in digital platforms run by corporations: self-organization is permitted and facilitated only in so far as it serves interests of the proprietors of the infrastructure.

## Notes

- 1 This chapter is a revision of Rijshouwer E, Uitermark J and de Koster W (2023) Wikipedia: A self-organizing bureaucracy, *Information, Communication & Society* 26(7): 1285–1302, DOI: 10.1080/1369118X.2021.1994633.



- 2 McHenry, Robert (2004) The Faith-Based Encyclopedia. Available at: [https://web.archive.org/web/20101204040824/https://www.ideasinactiontv.com/tcs\\_daily/2004/11/the-faith-based-encyclopedia.html](https://web.archive.org/web/20101204040824/https://www.ideasinactiontv.com/tcs_daily/2004/11/the-faith-based-encyclopedia.html).
- 3 Giles, Jim “Internet encyclopaedias go head to head,” *Nature*, December 15, 2005: 900–901. *Encyclopedia Britannica*’s response is linked in the online article: <https://www.nature.com/articles/438900a>.

# 5

## COMPLEX MEDIA

### The epistemology of digital capitalism

In 1985, Neil Postman published a now classic exposition on the impact of television on Western society, entitled “Amusing Ourselves to Death.” Postman argues that the superficial, fragmented, and short attention-spanned society he saw around him was the indirect product of the television. The argument leaned on the broader suggestion that the nature and structure of the public discourse of any society is a function of its predominant medium. Media forms encourage and dissuade certain thoughts, certain definitions of truth, and certain content. The dominant media logic does not affect only the content that it relays, but tends to seep into society at large, permeating culture and public discourse. The arrival of a major new media technology will thus change the very culture of society. Postman observed a transition from the fixed, immutable, and structured form of the written word to the television’s “sequencing of information so random, so disparate in scale and value, as to be incoherent, even psychotic” (Postman, 1985: xi). With television, form became more important than content, and authenticity more than authority, producing a decontextualized information environment.

Postman was not the first to argue that the culture of a society is shaped by the affordances of its media technology; he followed in the path of early media scholars like Harold Innis (1950, 1951) and Marshall McLuhan (1962). Political economists, starting with Karl Marx, have developed a historical materialist argument to the same effect. In *The German Ideology*, Marx rhetorically asks:

Is the Iliad possible when the printing press and even printing machines exist? Is it not inevitable that with the emergence of the press, the singing

and the telling and the muse cease; that is, the conditions necessary for epic poetry disappear?

(p. 43)

In Marx' account, however, this is more than just a question of "the medium is the message" (McLuhan, 1962): for Marx, media technology is intertwined with the larger capitalist regime of accumulation.

David Harvey (1989) argued along similar lines that cultural shifts in the 1970s and 1980s can be traced back to changes in the regime of accumulation. While the media of industrial Fordist mass-production had high modernity as its expression, flexible accumulation had postmodernity as its corresponding cultural logic (see also Jameson 1991). Harvey's account suggests that the conditions of capital accumulation are central to determining the structure of technology, which in turn come to shape the medium – and, ultimately, the message. Media technologies can thus be conceived as important mediators between the regime of accumulation and the logic of culture; media act to channel the dominant form of production to a dominant structure of culture.

This chapter situates social media within the larger shifts of accumulation, with the aim of throwing light on the epistemology resulting from social media becoming the defining media technology of the current epoch. As the mass-media of modernity was shaped by mass-production and mass-consumption, so is social media shaped by the accumulation of data and the logic of data extraction (Dean, 2005; Fuchs, 2010; Sadowski, 2019; Srnicek, 2017; Zuboff, 2019). These changes in media technology shape how we come to know and understanding the world, in other words: our epistemology: "As a culture moves from orality to writing to printing to televising, its ideas of truth move with it. ... every epistemology is the epistemology of a stage of media development" (Postman, 1985: 24). Echoing Postman, we here ask: what is the epistemology of digital capitalism?

### **The changing business of public discourse**

It is often said that contemporary digital media are structured as an attention-economy: since media corporations' business model is based on advertisement revenue, they try to find ways to maximize attention from viewers, readers, and users (Goldhaber, 1997; Marwick, 2015). However, this was arguably the case also for the newspaper and television media of the 20th century: they, too, competed for viewers and readers by maximizing interest and attention. The difference between the two media regimes rather concerns the conditions for the advertisement revenue pursued. The media of industrial modernity were organized around the central factor of *scale*: purchasing a television broadcasting station, or printing a newspaper

was expensive, and these tended to cover relatively local markets. Because of this, newspapers and television channels were focused on attempting to maximize their audience within their specific regions of coverage: the larger their audience, the more advertising revenue. Competition was often rather limited: markets were quasi-monopolies or oligarchic, and it was challenging and expensive for a new competitor to move in. Media were, in short, driven by the logic of an industrial economy of scale.

The media logic of scale was the result not only of the material conditions of the media production, but also of the broader regime of accumulation: it was the media logic that corresponded to industrial mass-production. The era of broadcast mass-media has been referred to as the era of mass-individuality, as consumer goods were produced at scale and aimed at mass-markets (Harvey, 1991). Consumers were subjected to powerful pressures toward homogeneity, with individuality reduced to a choice from products superficially differentiated by aesthetics and accessories. Since the products were not aimed at niche groups, neither was advertising spending (Gartman, 1998, 2004). This implied an advertisement system that was similarly aimed at scale: advertisers wanted to reach as many consumers as possible, regardless of their specific preferences. This was, in other words, the era of the *mass*: mass-media, mass-consumption, mass-production – all catering to a culture of mass-individuality.

The media culture was shaped by the advertising revenue that was the foundation of their business model. The goal of dominating markets implied the need to appeal to as large an audience as possible, creating pressures for a homogenized, nonpartisan, and highly integrated media market. This had implications for what media decided to print or broadcast: newspapers and television channels had to encapsulate and appeal to different opinions, preferences, identities, and political persuasions. Media developed various strategies to achieve this. One such strategy was the creation of a culture of “nonpartisan” news, based on the central separation between *fact* and *opinion* pieces (Altheide and Snow, 1979). The former were presented as “neutral” shared common ground, which was not subject to debate or different views; they were the realm of ostensible objectivity. The latter were demarked as potential territory for disagreement; that is, the realm of subjectivity. This separation allowed for constructive disagreement on some opinion matters, based on a common ground in what the issues were, and shared stories about what is happening in the world. The demarcation came to structure not only media, but also a broader epistemic belief in society in the possibility of separating “facts” and “opinions”.

The idea of media’s objectivity of fact was constructed and legitimated through various standardized procedures, aimed at creating an air of independence and neutrality. News anchors were neutrally dressed and trained to present a neutrality of voice and expression. They leaned on the authority

of experts and officials representing public institutions such as the police or universities, or the ostensible objectivity of polls and surveys. These practices came together to creating a rhetoric and aesthetics of “facts” (Altheide and Snow, 1979; Van Dijck and Poell, 2013). Mass media presented themselves as neutral platforms, modeled on the idealized notion of a public sphere, drawing their legitimacy from a sense of objectivity and neutrality founded in the notion of a rational exchange of ideas – while rendering invisible their filtering and choice of who and what gets exposure.

It was not that the media were actually neutral in some absolute sense; they rather had the power to *define what was to be considered neutral*. The media had control over what was part of the sphere of public consensus, what was part of the sphere of legitimate debate – and what was to be considered deviant and outside the realm of the respectable. These distinctions were, importantly, associated with the exclusion of minority groups or dissenting views from mainstream discourse, with the constructed objectivity, universality, and rationality being founded on racist, sexist, and classist exclusions (Fraser, 1990).

The construction of a realm of respectable disagreement enabled a form of polite, rational, and gentlemanly disagreement. The civil and compromise-driven political culture which is often seen as characterizing this era was enabled precisely by the exclusion of important cleavages and conflicts, the systematic repression of minority claims to recognition and representation. The political discourse could be consensual in part because many existential conflicts were simply not allowed into the realm of legitimate debate. While there was certainly some pressure to highlight conflict and news known to draw audience attention, the limited competition, combined with the need to maintain and uphold an air of seriousness and credibility – which could be damaged by excessive catering to audience attention – meant that there were distinct limits to what was fit to print.

In the 1970s, however, the Fordist system of mass-production and mass-consumption came under growing pressure and so did the associated media model (Harvey, 1989). The crisis of Fordism was simultaneously cultural and economic, as a new regime of production drove and was driven by a rise in cultural diversity and fragmentation, in a revolt against the assembly-line individuality, associated with an escalation in demand for product diversity (Amin, 1994; Hebdige, 1994). This demand stimulated the development of a new production regime, aimed at economies of *scope* rather than of *scale*, and at *creating* rather than *meeting* demand.

The response to this crisis saw the development of a new production and consumption regime. While Fordist mass-production was narrowly focused on efficient production at scale, the aim now moved toward economies of *scope*. For industrial production, this meant replacing mass-production with flexible specialization, allowing quick adaptation of output (Mort, 1989;

Murray, 1989). The aim and focus of these production processes differed from those of their predecessors as they operated in an economy that was “increasingly characterized by diversity, differentiation and fragmentation, rather than homogeneity, standardization and the economics and organization of scale which characterized modern mass society” (Hall and Jacques, 1989: 11). This fragmentation meant that the countercultural alternatives to the mainstream could now be brought in and transformed into market segments, employed to generate demand (Fraser, 1990). Production moved from aiming to appeal to as many people as possible to being as appealing as possible to specific groups of people.

As production became focused on economies of scope and market segmentation, advertising spending followed, aiming to capture specific market segments. This means a decline of the spending directed toward “one-size-fits-all” media, and a shift toward targeting niche audiences. This shift was supported by falling fixed costs in media, with printing and broadcasting equipment becoming more affordable due to much the same technological innovations that enabled the flexibilization of industrial production. The business model for advertising changed from reaching mass-markets to micromarketing and the identification of precise market segments (Gartman, 2004), bringing about a logic of specialization in which production, advertising, and media all segmented, specialized, and segregated. Shifting revenue pressures and falling costs of radio and television broadcast equipment allowed smaller players to enter the market, resulting in media fragmentation, with channels catering to more niche audiences and views.

It was this context into which digital media entered the scene in the late 1990s, characterized by an unprecedented flexibility, and near-zero fixed costs. While falling costs of television broadcast equipment allowed smaller players to enter the market, resulting in an incremental increase of fragmentation, digital technology constituted nothing less than a seismic shift. Virtually anyone could set up a website and start producing content for whichever audience niche, however specific, and wherever located in the world. In the place of local advertising monopolies emerged an all-out competition for every slice of a national or even global audience. Media business models went from seeking to dominate a diverse local audience to targeting a specific slice of the global audience based on some particular attribute. They went from seeking to capture a city to capturing a certain type of person.

This fragmentation in terms of audience initially drove a corresponding corporate fragmentation, with large media corporations finding themselves struggling to compete with a myriad of smaller scale online blogs and news sites often operating on shoestring budgets (Castells, 2013). Much of the initial optimism surrounding digital communication technologies stemmed from this early growth of fragmentation, which was taken as hopeful premonition of a coming fall in the oligopolistic power of media conglomerates.

However, the initial market fragmentation proved transient. The rise of digital platforms enabled combining fragmented and individualized targeting of audiences with an oligopolistic ownership structure (Arsenault and Castells, 2008; Helmond, 2015). The sprawling network of blogs, initiated by people who originally had no intention to monetize their content, was first largely brought under the control of large media corporations and infused with advertisements (Lorenz, 2023) and later transferred to digital platforms.

Social media can be understood as a generalized solution on the part of oligopolists, to win the competition for the attention of diverse audiences by creating internally competitive environments in which small-scale content production is brought in under the influence of a single media platform. While digital platforms design their interfaces and tune their algorithms to encourage users to create and share content, the flexibility of media technology further allows creating different experiences for different users, the so-called “filter bubbles” (Pariser, 2011) that constitute the logical progression of the media for the postindustrial regime of production: fully automatized and tailor-made information products. This allows media companies to become monopolistic while serving audience segments that are more fragmented than ever before: the public splinters while corporations consolidate.

The digitalization of the economy has meant that capitalism is now on the precipice of a new regime of accumulation, as production and advertising have become increasingly data-driven. Yuval Noah Harari (2016) argues that this sets us on a course where humans become “hackable” as proprietors of digital data are able to know users so well that they are easy to dupe and manipulate. Sophisticated computational methods aimed at predicting and manipulating user behavior contribute to instill great value in the user data that ultimately fuel these processes of production and marketing. Explored under concepts such as “informational capitalism” (Fuchs, 2010), “communicative capitalism” (Dean, 2005), “platform capitalism” (Srnicsek, 2017), “surveillance capitalism” (Foster and McChesney, 2014; Zuboff, 2019), and “digital capitalism” (Sadowski, 2020b), the literature on the relationship between data and capitalism now describes the contemporary era as a period of capitalism in which data have become the defining commodity, and the extraction of user data has become a central aim. While scholars have questioned the actual capacity of digital data and algorithms to predict and manipulate human behavior (Törnberg, 2024), such issues are, to some degree, beside the point. The *belief* in the capacity – supported by the scientific legitimacy of complexity science and computational social science examined in Chapter 1 – was enough to drive a fundamental societal transformation, in which our media system has been constructed around the central imperative of data extraction.

As a result, advertising revenue has moved from targeting a mass-audience, to then targeting specific niche market segments, to now pursuing the extraction of audience data. This has come to again transform the business models of media, aiming no longer to merely capture the attention of a certain audience segment, but to extract ever more user data. Social media platforms have therefore become designed around the aim of gathering information about their audience; they “datafy” social relations, turning social action into quantified data, to enable tracking and predictive analysis (Van Dijck, 2014). Just as house owners with mortgages keep afloat the financialized real estate industry, so social media users are at the very base, and at the very bottom, of the financialized information industry, with the value of stocks reflecting opportunities for data extraction (Sadowski, 2019).

While the extraction of personal data has remained central, we can discern a shift in how they are used. The years since the pandemic have seen a new shift in media models: the BuzzFeed News and Vice – epitomizing the “click-bait” media model (Munger, 2020) that optimized for attention-grabbing headlines seeking to attract ephemeral traffic from social media sites – have fallen into decline. The social media platforms that fueled this media model, such as Facebook and Twitter, have both seen rapid decline compared to algorithm-first media such as TikTok and Instagram Reels, and furthermore moved away from highlighting politics and news, after being accused of driving polarization, and for being implicated in the 2016 election and the 2020 storming of the US Capitol. Meanwhile, the *New York Times* – previously accused of being slow-moving and traditionalist – is now thriving in the digital age, due partly to initiatives that have nothing to do with news: addictive puzzles, a cooking app, and a product-review site. The *New York Times* combines a model that used to be understood as incompatible with the digital era – brand-focused, impenetrable paywall and subscriptions – while seeking to grow horizontally into new areas (Srnicek, 2017b: 256). The *New York Times*, in other words, is developing from a newspaper catering to a specific niche into a comprehensive platform that internalizes competition and relies on subscriptions of captive audiences. We will explore this platform logic more fully in chapter 7.

Whatever their precise business model, media are no longer just competing for audience attention; they are competing for their personal information. The aim of data extraction means that media aim not merely to compete for audience attention, but to entice users to *engage*, that is, to give attention and interact with the media in such a way as to produce marketable data on their preferences, behaviors, and lifestyles. The data that platforms extract is valued on the basis of how useful it is to predict and shape user behavior and consumption, which implies particular value on data about *who their users are*. This has implications for how these platforms are organized and designed, in turn affecting the type of public culture that the platforms



shape. Just as mass-media shaped the mass-individualist public culture of its time, and the fragmentation of the post-Fordist media landscape shaped its time, so is the media of data extraction coming to shape ours.

### Media of the self

One of the clearest effects of social media being shaped by the political economy of data is that the platforms are characterized by a persistent focus on selfhood and identity-oriented content. On virtually all social media and digital platforms, we are welcomed by a familiar textbox next to a picture of ourselves – beckoning us to share, to express ourselves, to engage in performances of self-presentation (Hearn, 2008; Marwick, 2013). While the emphasis on identity can be seen as a continuation of trends of both post-industrial accumulation and postmodern identity (Boltanski and Chiapello, 2005; Harvey, 1989), social media platforms such as Facebook and LinkedIn have pushed the art and science of “mass self-communication” to a new level, as their interfaces nudge users to consciously and unconsciously release information about themselves (Castells, 2010; Van Dijck, 2014). Social media platforms have become tools for storytelling and narrative self-presentation (van Dijck, 2013), with Facebook’s encoded activity resembling the analogue real-life shoebox experience: people reassembling pieces from their old photo albums, diaries, scrapbook, and weblog into one smooth presentation of their past. This emphasis on self-presentation is central to shaping the public culture that these media afford, with broad social implications.

Long before the emergence of online communication, Erving Goffman (1959) developed a theory on the relationship between self-presentation and identity centered on playacting. In every human interaction, we put on performances to create an impression for our audience. In Goffman’s view, it is not that we perform our identity, it is rather that our identity is constituted by the totality of our performances: “A correctly staged and performed scene leads the audience to impute a self to a performed character, but this imputation – this self – is a product of a scene that comes off, and is not a cause of it” (Goffman, 1959: 244). The notion that the narrative self emerges from the performances of self-presentation suggests that social media, by providing us with a particular form of technologically inscribed stage on which to tell ourselves and others who we are, affect our very selfhood (Papacharissi, 2011). The designs and algorithms of this digital stage set conditions on our self-presentation, which in turn come to shape our sense of self.

These performances of self-presentation are evaluated and valued on the basis of the ubiquitous “liking” and “sharing” mechanisms, which aim to both fuel the social media platforms and extract valuable user information. Which messages are selected to be shown and highlighted, and which are hidden and left out of sight, is decided through the fundamental mechanism

of whether they are *shared*, *starred*, or *liked* by users, functioning as a way of determining which messages are most engaging. This mechanism is presented as enabling a social experience, while figuring into an automated “like economy” (Gerlitz and Helmond, 2013; Van Dijck and Poell, 2013; Veszelszki, 2018), employed to gather quantified data about the lifestyles, preferences, and interests of individual users.

The feedback mechanisms built into the “like economy” mean that certain users are elevated to the status of social media celebrities based on their ability to play the media and accumulate attention. These celebrities are sources of value for the social media platforms, and the platforms are thus engaged in promoting their popularity and ranking (Abidin, 2018; Marwick, 2013). As social media are embedded within larger media ecosystems, social media celebrities are drawn into mass-media and recognized as stars. Platform-defined metrics similarly grow in importance outside the platforms, becoming seen as legitimate standards to rank ideas and individuals in mainstream media and public life (Van Dijck, 2014). As influencers are commissioned by companies to promote products, boundaries between advertising and sociality dissolve, bringing what Goffman (1979: 23) calls the “pseudo-reality” of advertising into daily life: promoting and branding the self has also become a normalized, accepted phenomenon in ordinary people’s lives. As individuals attain recognition and value through successful self-presentation, popularity, and worth are increasingly measured by their online manifestation. The self has turned into an object of marketing and promotion now that connectivity could transform online social value to real rewards in the offline world. Performances of self are thus valued in likes and shares – “influence” – that is in turn translatable to economic value.

Consumption is central to our performances of self; our digital performances are construed through an assemblage of goods, clothes, practices, experiences, appearance, activities, visits to iconic places, and other objects consumption (Featherstone, 1987; Currid-Halkett, 2017; Boy and Uitermark, 2017). On social media platforms – essentially stages for enacting the self for appraisal by others (Boy and Uitermark, 2024) – these symbols are brought together to tell a story that simultaneously defines a unique self and positions someone within a larger field (Bennett et al., 2009; Bourdieu, 1979; Featherstone, 1987). This expansion of the symbolic means that we engage with places, experiences, ideas, information, material goods, and activities as communicators – for their symbolic value. Much of contemporary consumption should thus be understood not primarily as the consumption of use values but of signs. This role of consumer goods became dominant with postmodern capitalism in which consumption gains more weight as a marker of identity, and its meaning becomes disassociated from its material properties (Jameson, 1991). In the ideological code of consumerism, identities are fashioned primarily through the exchange of symbolic differences:

“The social logic of consumption, is not at all that of the individual appropriation of the value of goods and services ... It is a logic of the production and manipulation of social signifiers” (Baudrillard, 2016: 60).

Social media has expanded and become tightly interlinked with these postmodern expressions of distinction, as they enable and encourage certain types of symbolic expressions (Bourdieu, 1979). As these performances move online, the dynamics of the larger symbolic economy and the social system of distinction with which they interact are reshaped by social media logic. As social media platforms become stages for self-presentation, they evolve into key sites for turning consumption into symbolic capital. This positions social media as part of a flexible regime of accumulation centered on differentiation and lifestyle. The emergence of these possibilities of distinction is coinciding with scholars observing a gradual shift in our class distinctions. The emphasis of class distinction has moved from expensive material goods aimed at displaying economic capital, to more mundane forms of consumption that serves to display not primarily economic capital, but rather values and competence associated with status within certain groups (Currid-Halkett, 2017). This expansion of the symbolic dimension of consumption into new segments of life is part of longer trends of flexible accumulation. Social media continues this trend by providing means to publicize our everyday consumption and lifestyle through posts and stories, elevating otherwise inconspicuous acts of consumption into markers of status, and thus further expanding the realm of the symbolic.

As actions and expressions are brought into performances of self-presentation, they become valued and staged in anticipation of their appraisal – an evening out at a restaurant is valued not only as a pleasing activity in the moment but also as an occasion to stage a display through mementos that are shared online. As representations grow in importance, this suggests a continuation and culmination of cultural trends that were identified by scholars following the early stages of consumer society: Baudrillard (1994) referred this growing importance of the symbolic relative to the real as the *precession of simulacra*, arguing that reality is gradually replaced by symbols and signs. Social media can be put in the context of a capitalism based on the production and marketing of symbolic goods and the expansion of cultural commodification (Baudrillard, 2016). This is also linked to the type of superficiality that Postman (1985) lamented in relation to the television, now seeping into the interactions of everyday social life. Just as television, social media do not reward decency, reason, or virtue but their appearances and expressions – whether the performance is genuine or not, the challenge remains to convincingly act it out so that others believe it is (Uski and Lampinen, 2016; Van Dijck, 2013).

Datafication thus brings a commodification of selfhood that constitutes both an expansion of commodification into new cultural domains and an

*inward* expansion as commodification creeps deeper into our very sense of self. Datafication is not only an “expansion of quantification into parts of our lives and the world that have never been quantified before” (Cukier and Mayer-Schoenberger, 2013), it is simultaneously a *commodification* of parts of our lives that had been outside the realm of the market.

Social media are part of a regime of hyperflexible production, centered on differentiation and lifestyles. The role of identity on social media can be positioned both in relation to larger economic trajectories of capitalist accumulation and in cultural trajectories of shifts in postmodern identity. In the former, the focus on self-presentation serves the role of nudging and coercing users to share valuable personal information in stories written in the language of datafied assemblages of consumer products. In the latter, it can be seen as the response to demands for self-expression linked to longer trends in postmodern identity, in which identity has become a project, making self-absorption a virtue (Giddens, 1991). Digital capitalism is in this sense continuing and expanding trends that post-Fordism began; as post-Fordism was linked to the emergence of postmodern consumer culture, so is data capitalism linked to the expanding and shifting role of selfhood in contemporary culture and capitalism (Harvey, 1989).

Social media have thus signified the emergence of a public culture that is centered around selfhood and identity-oriented content, construed through assemblages of symbolic goods. These are given value in “like economies,” serving to track user behavior and to identify the most engaging content, and simultaneously providing a measure of “influence,” translatable to fame and economic gains. Since everything – actions, beliefs, everyday consumption – is quantified and datafied, everything becomes reified, symbolic, and part of constructing our narratives of self. Social media are, in short, spaces that enable us to express who we are, through what we consume, implying that datafication brings the expansion of commodification, both inward – deeper into our sense of self – and outward – in that a broader range of activities can be subsumed into the symbolic marketplace.

### **Political discourse as self-presentation**

As Castells (2010: 241) puts it, “a political message is necessarily a media message. And whatever politically related message is conveyed through the media it must be couched in the specific language of the media.” As the language of social media is identity, political discourse is couched in the language of self-presentation, meaning that we engage with politics through the expression of personal identity. We thus see the public world as projected on our selfhood: information, thoughts, and stories are all seen and valued as ways of expressing *who we are*. Events, ideas, anything around us are seen through their symbolic role, as markers of identity, used in a symbolic language to tell stories

about ourselves. The political discourse that is afforded by social media is one based on the underlying mechanisms of identity and group belonging.

This means a form of politics that is obsessed by appearance. This is expanding and continuing a trend observed both by Sennett (1977) and Postman (1985) in relation to the television's impact on political discourse, in which the public sphere is disintegrating, as politicians came to be assessed less for their substantive views on policy issues and more for their personal character and style. Televised political debates brought an obsessive interest in moral character and appearance, in surface and symbols over content. As Postman (1985:133) puts it, "If politics is like show business, then the idea is not to pursue excellence, clarity or honesty but to appear as if you are, which is another matter altogether". Social media has intensified and expanded the importance of surface and appearance, centering the role of staging and signaling in everyday social interaction.

As political expressions are treated as a form of symbolic consumer goods, the segmentation and fragmentation of consumer groups that are central to the flexible regime of accumulation and thus to social media enter also into political life. As political messages are conveyed in the commodified and symbolic language of these platforms, political opinions become part of lifestyle assemblages, functioning as expressions of distinction and group belonging. One's political affiliation joins other lifestyle choices – *Do you drink your coffee plain or latte?* – to become part of self-presentation, signifying values and competence associated with status within certain groups (Currid-Halkett, 2017; DellaPosta et al., 2015). Political discourse thus comes to be driven by a logic of lifestyle fragmentation and segmentation, as ways of expressing group belonging.

The notion of a politics that is based on the logic of group identity, in which political positions serve as symbols expressing social status and group belonging, resonates with an emerging literature within political science. This literature argues that identity is gaining an outsized role in contemporary politics, describing an emerging political logic driven by the logic of partisan identity (Iyengar et al., 2019; Klein, 2020). As Achen and Bartels (2016) argue, in this form of politics, voting behavior is primarily the result of partisan loyalties, social identities, and symbolic attachments. Over time, engaged citizens may construct policy preferences and ideologies that rationalize their choices, but those issues are seldom fundamental. Politics as self-presentation in other words means that opinions serve to signal values and group belonging, casting reasoning not as the foundation for political belonging, but an expression of it (Kahan, 2017). In social media politics, as Schmitt (2004) succinctly puts it, "it's not what you say about the issues; it's what the issues say about you."

The exposure to identity-oriented content constitutes a type of activation that tends to strengthen and deepen our identities, making new aspects

of our selves salient. Once political identities and positions have become integral to our sense of self, being exposed to the messages of an opposing group will not serve to reduce conviction but rather fuel outrage and strengthen dislike of the out-group. Indeed, messages from the opposing side are among the most common way to affirm and activate common identities on social media: that a public person that your group commonly dislikes says something bad serves to confirm prejudice and creates a spiral of collective outrage that focuses attention, generates emotional energy, and strengthens the group's identity (Collins, 2012). This has been confirmed by experimental research showing that Democrats and Republicans who agreed to be exposed to views from the other side did not revise or moderate their positions; the Republicans even hardened their views (Bail et al., 2018). While social scientists have shown that social media users are not as neatly separated into insulated groups as concepts such as “echo chambers” or “filter bubbles” would suggest (Boy and Uitermark, 2020; Arguedas et al., 2022), social media support the clustering of lifestyles, identities, and political preferences.

Social media not only tend to draw new traits and activities into the realm of identity, but the constant exposure to identity-oriented content also tends to strengthen and deepen salient social identities (Tajfel, 1974). In relation to political identities, this strengthening of political identity has been linked to political polarization (Iyengar et al., 2012): as identities become stronger and more salient, elections and other forms of politics collapse into a form of inter-group conflict (Mason, 2018). The growth of political polarization in recent years has been linked precisely to politics having become increasingly driven by identity, and the logic of group difference (Iyengar et al., 2012; Tajfel, 1974), with partisanship emerging as a strong social identity (Huddy et al., 2015; Iyengar et al., 2012, 2019).

Social media furthermore affords the tendency interlinking and connecting different identities. As political expressions are put in the same language as postmodern consumption, political identity grows in importance also outside the political arena, as partisan affiliation not only shapes political behavior (Bafumi and Shapiro, 2009), but also corresponds to what car we drive (Hetherington and Weiler, 2018), whom we marry (Alford et al., 2011; Klostad et al., 2013), where we live (Cramer, 2016), whether we believe in God (Inglehart, 2020), and more (Pew Research Center, 2014; Iyengar and Westwood, 2015). While social media's interfaces and algorithms allow people to participate in a wide range of communities and adopt a diversity of lifestyles, the homophilic networking typical of social media results in the self-organization of users into larger groups. Through such networking practices, seemingly nonideological lifestyle choices (such as preferences for certain brands, types of sports, or food items) become associated with politics and ideology. Users thus self-organize into larger groups in which users

have consistent preferences on a range of seemingly disparate items: liberals like latte, conservatives prefer their coffee plain (DellaPosta et al., 2015). While such patterns are far from new, social media provide the affordances for this type of politics, by flattening political affiliation with other forms of identity expressions. The result is that partisanship or ideology is drawn into broader conflicts and become part of a larger culture war (Jacoby, 2014). The reduction of cross-cutting identities which this brings further strengthens the sense of difference and distrust (Mason, 2016, 2018). As even the most mundane everyday consumption expresses values and invites recognition, it inevitably becomes political, so much so that the most basic acts of consumption – whether to get a latte macchiato or a regular coffee – come to be identified with political stances.

This tendency toward conflictual and polarizing politics is further emphasized by the mechanisms of how media attention is allocated to different messages (Bail, 2021). That the number of “likes,” “shares,” or comments shape what messages get through and become dominant creates important inherent biases in media attention. Quiet and reasoning voices do not engage people to click “share” – people share ideas that *move* them, that help them express who they are, and how they feel. Sharing is biased toward messages and ideas that produce emotional reactions, that activate us, and resonate with us. Importantly, negative feelings have been shown to engage more than positive, and therefore tend to spread more, meaning that things that make us angry, upset, or outraged are more likely to spread in our public discourse (Berry and Sobieraj, 2013; Crockett, 2017). While algorithms and culture vary considerably between platforms, the sharing mechanism tends to promote political discourse that is more evocative, colorful, and confrontational.

This tendency for social media to highlight content that maximizes engagement constitutes an important shift in logic for not only what content is given attention, but also what discourses are seen as within the realm of legitimate political debate. In the mass-media of industrial capitalism, editorial decision by professional journalists provided control over what was to be seen as part of the sphere of public consensus, what was part of the sphere of legitimate debate, and what was to be considered deviant and outside the realm of the respectable. These institutional gatekeepers thus served a powerful role of agenda-setting, and in defining neutrality and common ground (Shaw et al., 1997). With social media, this role has been taken by algorithms identifying what content maximizes engagement, which leads to a radical restructuring of the boundaries of legitimate debate. Rather than to impose pressure to mainstream conformism, with the aim of maximizing acceptability and thus the potential audience, a growing literature shows that social media benefits content that drives outrage and strong emotional response (Berry and Sobieraj, 2013; Crockett, 2017). One way of describing

this shift is through the notion of “discursive power,” that is, who has the power to control the conversation (Castells, 2013). In Koopmans’ (2004) terminology, social media has brought a shift of emphasis from “consonance” to “resonance”: it is not the messages that trigger broad agreement that float to the surface, but rather those that trigger broad *reactions* – any reaction, whether positive or negative. The pursuit of engagement implies a dissolution of the boundary between critique and promotion, and between thought-leader and troll. This produces a political discourse that highlights outrage and content that most effectively activates – and particularly *threatens* – our social identities, thus further driving the strengthening of perceived difference.

### Conclusion

This paper has drawn from scholarship in media studies and political economy to explore the epistemology of digital capitalism. The economic valuing of digital data comes from its capacity to represent, and thereby colonize and commodify new aspects of human life. Digital data are able to describe and capture almost any activity or expression, thereby allowing their prediction and manipulation, which in turn gives them a value and brings them into exchange. This means that digital capitalism should be understood as an expansion of commodification: going *deeper* into our sense of self and *broader* into new parts of social life. But this capturing as data also transforms that which is captured, as it must be made fit to encode as data. The logic of accumulation thus shifts the cultural logic of the quantified activity. While scholars have critiqued digital capitalism for infringements of privacy, for surveillance, and for the undue power it grants to control all aspects of human life (Couldry and Mejias, 2020; Zuboff, 2019), this chapter has focused on the way that it reshapes epistemology: digital capitalism shapes how we come to know the world.

What, then, is the epistemology of digital capitalism? This chapter has argued that as data on personal identity have become the defining commodity of contemporary capitalism, our media have been designed to extract data about *who we are*. Platforms seek to extract such profitable data by encouraging us to share information about ourselves. This means that our public sphere is designed as a space for identity performance in which messages and practices become inextricably linked to the expression of personal identity. Public culture thus becomes centered around the self as a performative project. The epistemology of digital capitalism is, in short, the epistemology of selfhood: we come to understand the world through identity and difference.

Social media in many ways represents a continuation and intensification of the tendencies that Postman observed. He wrote that the television



caters to a context-free, disjoint, and superficial understanding of events, leading to short attention spans and limited cognitive effort from its viewers. Social media has clearly taken these aspects much further, as epitomized by TikTok's and Reels' constant flow of context-less seconds-long videos. But the chief logic of the television was entertainment. As Postman argued, it transforms serious subjects such as news, politics, education, and religion into forms of amusement, and thereby brings about the trivialization of important issues, and a superficial, uninformed, and unengaged public. The chief logic of social media, in contrast, to capture our data, by maximizing our engagement and transform everything into a story about ourselves. The latest war, terrorist attack, or growing inequality – you name it – all become a story about us and our virtues.

For the cultural realm, this means the expansion of a symbolic marketplace in which individuals perform using symbols to draw distinctions and show (sub)cultural belonging. The ability of data to capture and commodify more aspects of human life means that social media make visible the inconspicuous, enabling virtually any activity, opinion, value, item, or geographical place to be brought into its symbolic logic. This allows using these inconspicuous activities to express our cultural belonging and draw distinctions, bringing them into the symbolic marketplace, used to tell a story of who we are.

For the political realm, it means that both that the loudest and most attention-grabbing messages dominate, and that political discourse becomes drawn into a commodified symbolic marketplace. This politicizes and ties together diverse cultural differences, meaning that lifestyles and everyday consumption choices are mobilized politically and become part of class distinctions. As different lifestyles and tastes become associated with political positions, we observe a group distinction that is simultaneously a distinction of class, cultural belonging, taste, and political identity. Public discourse is thus drawn into a logic of identity and difference, fawning the flames of cultural conflict. Social media did not create this form of politics, but they are its media *par excellence*. Whereas the epistemology of industrial modernity was characterized by an ostensible rationality and civility – enabled by exclusion, imposed homogeneity, and the systematic repression of claims to recognition and representation – the epistemology of digital capitalism works in the opposite direction, turning political discourse into a form of self-expression, highlighting difference, and fueling identity conflict.

As the boundary between opinion and fact dissolves, and both become drawn into the logic of difference, the question of truth becomes submerged into the larger process of cultural fragmentation and difference. This means that the emerging epistemology of digital capitalism treats truth as a question

of identity: information is evaluated based not on common standards of evidence applied to commonly accepted facts, but on its alignment with our social identity. As our very ways of knowing are defined by identity and belonging, what we know is reduced to just another expression of who we are.

# 6

## COMPLEX CONTENTION

### Anonymous' power dynamics

On July 12, 2006, Bill Cosby's birthday, thousands of Black men dressed in disco outfits and with Afro haircuts, self-describing as "nigras," flooded Habbo Hotel, an online meeting space for teenagers. The nigras blocked the swimming pools and formed swastikas. When Habbo's moderators removed the nigras, the crowds, noting that only black characters were removed, protested against the moderators' racism. The nigras dispersed, hid in libraries and private rooms, and then regrouped to again raid the pool. A year after the first Habbo raid, the nigras came back with more inciting and bizarre rhetoric. In an absurdist parody of Louis Farrakhan's "million men march," the nigras announced they were to block Habbo's swimming pools "to stop the AIDS!" and protest the racism of the Habbo moderators. In a clip circulating on the internet – with images of "Afro ducks" (a duck with afro hair cut) and other absurdity displayed with Europe's rousing hit song Final Countdown playing in the background – viewers were called to action with a slogan that would resound in many variations in the years to come:

We are many  
We are one  
We do not forgive  
We do not forget  
We are fragile  
We are invincible  
We are powerless  
We are Gods  
We are Anonymous

The Habbo raid marked the beginning of Anonymous as a whimsical and often ruthless, racist, and misogynist online social movement. It demonstrated in playful and absurd ways the power of collective and synchronized action within online environments. Anonymous emerged on image boards like 4chan, 711chan, 7chan, and 8kun, populated predominantly by young White men in the United States and Western Europe. Collective online actions were first developed on 4chan/i, a subboard of 4chan designated for enthusiasts of Japanese *oekaki* drawing. Posters labeling themselves i/nsurgents called to participate in online raids. They were what is often called “trolling” by disrupting online games like Gaia or posting provoking or satirical comments on YouTube videos.

These collective quests for “lulz” showed that the synchronization of large numbers of anonymous users allowed them to hijack sites, channels, or comment sections. The Habbo Raid was the first raid under the Anonymous label and introduced the massive number of visitors of /b and many other boards to the possibilities of synchronized mass subversion. Countless other actions in the name of Anonymous were undertaken after the Habbo raids. Anons – i.e., the people mobilizing under the Anonymous label – perfected the “ruin life tactics” and crafted an online non-identity through bombastic and heroic rhetoric and a repertoire characterized by youthful cruelty and imagination. They defaced Hip Hop On-line’s frontpage with racist slogans and images, disabled the website of the racist radio presenter Hal Turner with a DDoS attack,<sup>1</sup> discovered the child abuser Chris Forcand through an online hunt, defaced the frontpage of an association for epileptics with turning images that supposedly could trigger epileptic fits, and so on. If their personal details were revealed online (the so-called “doxing”), victims received nightly phone calls, black faxes, and orders of pizza. The collective action emanating from the image boards was ephemeral, cruel, ironic, and impulsive. It was gratuitous and uselessly heroic, not pretentious or aspirational.

Nobody could have expected that years later, when Tunisians rose up against the dictator Ben Ali in 2010, Anonymous would come to their support. Anons functioned as a voluntary counter-espionage unit, scrutinizing and subverting the government’s notoriously effective monitoring and censoring apparatus. An Anon with the screen name of Kcore<sup>2</sup> wrote the so-called “safe packages,” software enabling internet users to circumvent government censorship and surveillance. Another Anon, with the screen name Bazi, remotely operated the computer of a Tunisian and defaced the website of Tunisia’s prime minister, replacing its frontpage with messages penned by collectives of Anons. As the Tunisian government was closing off internet communication and cracking down on protesters, its defaced websites displayed verbose communiqués in French and English, with one typical open letter warning Ben Ali’s government that Anonymous “will not stop until you realize that your continued censorship of the Internet

is unacceptable and you lift the burden of ongoing oppression you have placed upon your citizens.”<sup>3</sup> Meanwhile scores of Anons engaged in crowd-sourced journalism as they relayed information obtained from Tunisians, hooked their computers up to botnets to participate in DDoS-attacks against Tunisia’s government, and contacted media and governments to urge them into action. In Anonymous’ chat channels, one could still find plenty of nihilism, racism, cynicism, and trolling; the Anonymous that had emerged in the Habbo Raids had not disappeared, but it had taken on an additional identity guise as a self-styled vigilante force of freedom fighters dead serious about ending oppression and delivering justice. Marx famously said that history repeats itself first as tragedy, the second time as farce. In the case of Anonymous, it was the other way around.

Fast forward to 2017. This time Anonymous appeared as “Qanon.” Like its predecessors, Qanon first arose on image boards, in this instance 4chan. The person or team writing under the Qanon moniker presented themselves as an official in the Trump administration with the highest possible security clearance (known as “Q”). Their access to highly privileged information, so Qanon claimed, allowed them to uncover a vast conspiracy, a “deep state,” that would eventually be revealed and thwarted by then president Trump. Interpreting the dispersed and vaguely worded missives released by Qanon, followers attempted to grasp the intricacies of the alleged conspiracy and figure out their supposed role in foiling the deep state. At its peak, Qanon inspired large sections of the American public as well as a sizeable number of prominent politicians.

As social movement researchers have extensively argued, digital technologies reshape contention. More than simply tools to be used, digital technologies change the dynamics of mobilization. Tufekci argues that digital technologies allow mobilizations to grow at unprecedented speed, enabling social movements to amass people online and in the streets (Tufekci, 2018; see also Gerbaudo, 2012). The flipside, though, is that such digitally powered mobilizations are typically fickle. Protagonists involved in fast-moving mobilizations don’t have the time or patience to cultivate trust and commitment, set up organizations, or have profound conversations on strategy and purpose. The result is that mobilizations often recede almost as fast as they had grown. Digital technologies do not just change the dynamics and structure but also the content of mobilizations. Bennett and Seegerberg (2013) suggest that social media users engage in mobilizations through personal action frames, linking the collective symbols of movements – visuals, slogans, hashtags – to their personal circumstances. While this allows them to make activism personal, it also carries the risk that movements will lack continuity or coherence compared to more traditional forms of collective action grounded in the local grassroots (Van Haperen et al., 2020, 2023).

Anonymous is a digitally powered movement on steroids; it is fast-changing and dazzlingly incoherent. We are principally interested in how Anonymous uses digital technologies to imagine and construe itself as an alternative to the hierarchical, closed, and rigid systems associated with industrial modernity. The desire for “ad hoc, leaderless, participatory, and horizontalist” styles of organization is not new, but “technology has brought a new dimension to protester desires for horizontalism by allowing ad hoc organizing to address collaborative needs in an unprecedented fashion” (Tufekci, 2015: 13; see also Bennett, 2013; Van Haperen and Uitermark, 2023). Anonymous thrives on and stimulates such desires. Grown outside of the mainstream media and the purview of the state, Anonymous is a true grassroots movement of digital modernity. The movement presents a compelling test case to assess digital modernity’s democratic promise as the movement explicitly identifies itself as an emergent amalgam that grows out of the distributed efforts of its members. Lacking formal organization and rejecting leadership, Anons see their movement as the combined and culminated result of their individual efforts or even as the pure expression of the popular will.

Anonymous exemplifies the deep connection between digital technology and complexity thinking that is at the center of this book. It is an extreme (and, in some ways, absurd) case but one that provides insight into what complexity discourse enables as well as what it frustrates, what it highlights as well as what it hides from view. As we examine the evolution of Anonymous over a period of roughly 15 years, we focus on the movement’s power dynamics. As in other chapters, we see that complexity thinking provides critique of specific kinds of power – movement participants insist on openness and equality, challenging prospective leaders within their ranks and incessantly critiquing and attacking state and corporate elites. At the same time, though, dynamics of power are not so much transcended as transformed. We argue in this chapter that the idealization of emergence and leaderlessness obscures and thereby enables the concentration of power. As Anonymous exemplifies the democratic promise of digital modernity, it also points to its limitations and dangers – at various points in time Anonymous self-organized not into a wise and democratic crowd but a powerhouse of reactionary mobilizations and conspirational ideas.

### **Complexity thinking for – and in – social movements**

While social movements may exhibit regularities, they are essentially generative, creative, and transgressive. Acknowledging that the “search for universally valid propositions and models, at least for anything so complex as social movements, is bound to fail” (Goodwin and Jasper: 51) some scholars have turned to complexity theory for a conceptual vocabulary capable of

capturing dynamism and contingency (Fuchs, 2006; Escobar, 2017; Beraldo, 2022). However, here we are less interested in complexity thinking as a mode of scholarly understanding than as a movement discourse, as a theory that the movement has about itself. Digitally powered movements cannot only be objectively considered as complex and emergent but are also often actively conceived and modeled that way by participants. For instance, the Spanish *indignados* and worldwide Occupy movement categorically rejected the delegation of power and instead aimed to develop a set of basic principles for deliberation and decision-making that would enable the movement to evolve iteratively. Anonymous' constituents and origins are different, but participants equally emphasize the movement's radical openness and egalitarianism.

Anons often say that Anonymous is an "idea" to emphasize that it is not a club or organization. The signifier Anonymous and the movement's symbols are like brand marks that anyone can appropriate at will and for radically different purposes (Beraldo, 2017). Anons routinely emphasize this radical difference, citing the phrase "Anonymous is not unanimous" as a matter of fact but also a reminder that the movement is not supposed to converge on a position. While it is practically impossible for any authority, leader, or organization to control the appropriation of Anonymous symbolism, participants in the movement have also cultivated a culture of vigilance against the concentration and imposition of power (Coleman, 2014). When participants feel that one among their ranks is taking on too big of a role, they may be accused of "leaderfagging" while participants using their own names – and may thereby may develop personal reputations and stand out among the masses – risk accusations of hunting glory and derision for "namefagging."

The commitment to transcendence also finds its expression in embracing anonymity not only as a practical means of evading persecution but also a condition that allows a higher state of organization and consciousness by skirting and superseding individuality. Digital technology here becomes much more than a tool but is seen as the cradle of new ways of organizing and thinking. As one pamphlet puts it, the

singular individual and his actions become subordinate to the "larger" yet anonymous result of the collective process that is the production of knowledge. It is the nameless collective and the procedures by which it is governed which in the end prevail over the necessarily biased and single-minded individual. ... It is not surprising, that all these features and characteristics can also be found within ANONYMOUS – an idea and movement which was truly born out of these new technologies, these new principles of organizing things, these radical new ways of thinking. For it is exactly this being nameless, this lack of positive qualities, which

enables anyone to project their own ideas, values and ideals into this open space of possibility that is referred to as ANONYMOUS.

*(Anonymous pamphlet, 2 February 2011)<sup>4</sup>*

Anonymity is expressed and dramatized by Anonymous symbols like a suit with a question mark instead of a head and the Guy Fawkes mask worn by the lead character in the “V for Vendetta” movie (Figures 6.1 and 6.2). These symbols enable movement participants to symbolically cede their individuality and integrate into an emergent supercreature, a process that is graphically depicted in an image that resembles a virtual Levithian (Figures 6.3a and 6.3b). The conception of Anonymous as an emergent super creature also finds its expression in words as Anons describe the movement as a “swarm,” a “giant globs of digital mucus,” a “hydra,” a “global consciousness,” or a “hive.” Followers of Qanon feel that they function as a distributed intelligence unit and have “where we go one, we go all” (WWG1WGA) as a slogan.

These metaphors of assembling inspire the synchronization of collective action through digital technology. The block quote above identifies “these

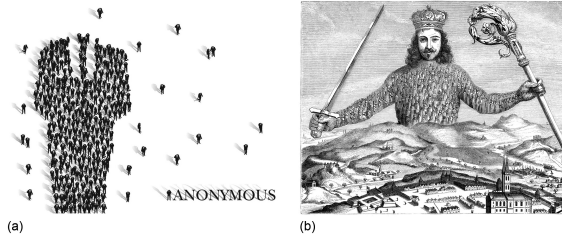


FIGURE 6.1 An Anonymous emblem.



FIGURE 6.2 Anons wearing Guy Fawkes masks at a protest against Scientology in Los Angeles, 2008. Photo by Vincent Diamante.





**FIGURE 6.3** Illustrations of complexity thinking within Anonymity. An image suggesting that Anonymity is a headless man in a suit made up of headless men in suits (a) resembles the original picture of the Leviathan as printed on the cover of Hobbes' book (b).

new technologies” as the driving force of new ways of thinking and organizing that enable Anons to transcend their individuality. One technology that exemplifies this confluence of individuals in a larger collective is the Low Orbit Ion Canon (LOIC), an (ironically named) computer program that anons may use to participate in DDoS attacks. While most DDoS-attacks are executed by a single user who remotely operates numerous (infected) computers or “zombies,” the LOIC enables users to contribute their own bandwidth volitionally. The program gives users the choice to hand over control to channel operators who then direct the amassed bandwidth capacity in attacks, an option that is referred to as the “hive mode.” Transcending individuality and achieving democratic potential are two sides of the coin in Anonymity's discourse. If the movement is a sublime and unmediated expression of the will of its constituents, there is no need for delegating power or imposing rules. This digitally powered and unforced amalgamation stands in contrast to nation-states, large corporations, or international organizations that rely on enclosure and hierarchy.

These self-representations suggest that Anons view their movement through the lens of complexity – they epistemologically and ideologically subscribe to a model of social organization premised on emergence and self-organization. Anons articulate emically what academic complexity theorists argue etically: that self-organization and emergence are more efficient and just than design and imposition. A following question is how such a social movement – one embracing emergence and complex evolution by means of digital technology – deals with power dynamics. In movements that reject top-down leadership or formal organization, how do decisions get made? Assuming it is naïve to think that movement networks are fully egalitarian, how do some people and groups gain outsized influence? The goal is to reconstruct Anonymity's evolution and tease out processes of power concentration and diffusion at various stages of its development.

### **Anonymous' changing dynamics of power**

Anonymous has always been multiple, operating across different settings, using a variety of tactics, and propounding a range of opinions and sentiments. Here we are not interested in a detailed reconstruction of the movement's many branches and multifold manifestations (see, e.g., Coleman, 2014; Beraldo, 2022). Instead, we intend to provide a general overview of how Anonymous developed a particularly powerful activist core in three episodes of its turbulent history. This stylized historical account illustrates mechanisms of power concentration and shows how movements that are nominally horizontal and heterogeneous nevertheless develop elites that define the movement's agenda. Moreover, it helps understand how a digitally powered populist movement transforms over time to alternately support very different and even conflicting political agendas.

### **The battle against Scientology**

When it first arose on image boards, Anonymous was characterized by ephemeral collective action and unstable hierarchies. Campaigns were impulsive, whimsical, and brief, with participants typically taking interchangeable positions as faceless anons. This is not to say that degrees and types of participation are the same. Exactly because the campaigns direct masses in one way or another, participants who put effort and wit into directing the crowd wield disproportionate power. Already early in Anonymous' history, users opted for chat channels to plot, in effect taking on leading and coordinating roles. However, the mass dynamics on the image boards decided which campaigns took off and which did not. Such cascades are intrinsically difficult to predict or steer, especially on image boards where users are by default anonymized.

The image boards are a "hetacomb of failed attempts with few survivors" (Koopmans, 2004: 371) because the vast majority calls to action remain unanswered. Selection does not occur by pre-empting mistakes or delegating the initiative to especially competent participants but by distributed selection. The result is an extremely volatile dynamic where campaigns that generate a positive feedback cycle early on (i.e., they draw in many participants fast) succeed in generating the critical mass necessary to flood games, manipulate online polls, or cause other kinds of mayhem. At this point of Anonymous' development, it "was strength in numbers. The more people were there, the bigger the deluge" (Olson, 2012: 52). Anonymous had emerged from the relatively autonomous space as a self-organized and self-referential entity. Participants mobilized under the same banner and used a distinct set of symbols and slogans, but did not develop a stable division of labor, fixed roles, clearly defined ideologies, or durable networks.

The moment that Anonymous engaged in a sustained battle against the Church of Scientology in 2008 is widely regarded as qualitative change of the movement (e.g., Coleman, 2014). From the 1990s on, critics had made public revelations and released classified documents to draw attention to what they considered coercive, exploitative, and manipulative strategies on the part of Scientology. These battles intensified in 2008 when YouTube removed a leaked video of scientologist Tom Cruise testifying about the extraordinary acumen and prowess of the Church's followers. Responses to the first call for action against Scientology posted on 4chan's subboard /b were mixed, with some openly hostile to the idea ("I think scientology is cool and the guy who had this awesome idea to create a fake religion just so he can collect money from idiots is brilliant!"), others skeptical, and yet others falling for the idea. A new call to action on the next day solicited more positive responses as users noticed that the Scientology website was experiencing off-time. Anons wrote short instructions how recruits could send bogus packages to clog Scientology's servers and published addresses of Scientology so that prospective participants could call for deliveries of pizzas and taxis.

The image boards were crucial sites for mobilizations, but the campaign sprawled to other settings. Opposition against Scientology had already proliferated in many corners of the internet and the move to "a better place to plan" was already hinted in the first call to action. Veteran critics of Scientology, new Anonymous recruits, and many other internet users responding to the battle cries increasingly gravitated to Internet Relay Chat (IRC) channels. IRC affords a very different set of roles than image boards. IRC networks have network administrators that have ultimate command over the channels and chat rooms on IRC can be closed to non-invited users. Chat rooms further feature a range of different positions with different privileges. Last but not least, all these features and roles are associated with unique usernames, making it possible for participants to build up a reputation and accrue privileges.

Gregg Housh, an avid 4chan user based in Boston, came to play a key role in this period. When Housh and four other activists congregated in one chat room to discuss press strategies, they discovered that they collectively had the skills to make a clip and put together an Anonymous video press release with a computerized voice uttering declarations of injustice against a background of dramatic visuals. The video press release became a hit in obscure places like 4chan but also in more mainstream internet venues like Gawker and Reddit. The then little-known publishing platform Wikileaks released classified Scientology documents that Anonymous volunteers helped to interpret and circulate (Domscheits-Berg, 2011). Anonymous also adopted street protests in this period. Housh had applied for a permit and was subsequently targeted by scientologists but instead of backing down

Housh came to serve as the movement's kingpin. To deal with the massive inflow of recruits, Housh and his fellow activists made separate chat rooms for activists based in different cities and set up an exclusive and secret chat room called #marblecake for people who were deemed competent and committed enough to serve as coordinators.<sup>5</sup> Prompted by a video from a veteran opponent of Scientology (colloquially referred to as “wise beard man”), they also developed elaborate protest manuals, instructing activists how to challenge Scientology while keeping within the law. Gregg Housh turned from a 4chan enthusiast with an appetite for mayhem into a strict coordinator, saying he ran meetings in a designated chat room for high-level activists “with an iron fist” (cited in Olson, 2012: 88).

While whimsical mass trolling continued unabated on the image boards, Anonymous transitioned into a different kind of movement as it took on Scientology and settled in IRC channels. Over the span of a couple of months in early 2008 Anonymous moved to a new web environment, developed an elaborate organizational structure, calibrated a set of protest tactics, and was represented by spokespersons with clearly defined talking points. Well-structured and strongly connected groups developed synchronized and sustained campaigns with the purpose of winning over the public rather than shocking it. The transformation of Anonymous from a ruthless and unpredictable pack into a protest machine triggered negative feedback. There were bitter complaints about “moralfags” and Housh and his associates saw their infrastructure come under DDoS attacks. One Anon broke every rule in the protest manual by busting into Scientology's New York offices covered in a “thick layer of petroleum” with a “generous admixture of pubic hairs and toenail clippings” – an effort not only to protest Scientology but also to upset what had become an all too predictable movement seeking respectability rather than thrills (Dibbell, 2009).

### **The battle for Wikileaks**

As the battle against Scientology suffered from dwindling momentum and infighting, groups of Anonymous activists initiated other campaigns, for instance providing Iranian insurgents with software to evade surveillance during the 2009 uprising. Coordinating from a designated IRC network hosted in a number of countries to minimize chances of persecution, Anons had struck against a range of targets with DDoS and occasionally SQL injection attacks. In a different campaign, Operation Payback, Anons struck against organizations combating piracy. While Anonymous had now become a label for online activists in pursuit of structural social change, the movement did not converge on a shared goal or gravitate to a particular setting; no campaign drew nearly as much attention and participants as the battle against Scientology. In short, in 2010, Anonymous was a fragmented

movement engaging in a range of campaigns on a number of different platforms – there was no dominant logic.

A qualitative change occurred when, in December 2010, Wikileaks hit the global headlines. “Operation Payback” morphed from a campaign about copyrights into a campaign about Wikileaks. The successful disruption of websites of large financial institutions such as PayPal, Mastercard, and VISA hit the global headlines, creating a positive feedback loop: the number of users in the IRC channels exploded in a matter of days from hundreds to thousands. New recruits provided their bandwidth for DDoS attacks, drew attention to the campaigns on social media, and set up new communication forums. Anonymous did not only scale up but also changed its tone. Instead of engaging in mayhem and shocking unsuspecting internet users, it became more common to identify Anonymous as the true protector of the democratic principles enshrined in the American constitution.

The movement further consolidated its methods. While DDoS attacks had often been used against copyright organizations, now DDoS became a mass tactic as recruits used LOIC to hook their computers into a network controlled by an operator in one of the IRC chat rooms, in effect forming a voluntary botnet. LOIC predates the struggle of Wikileaks by a couple of years but the computer program was key in accommodating new recruits who were willing to participate in the attacks but lacked technical competence to operate botnets or use or write scripts. Targets were selected through instant online surveys. At the highpoints of the attacks, more than 1000 participants reportedly hooked their computers to the volitional botnet, enacting the virtual equivalent of a sit-in (Coleman, 2014).

The image of masses of internet users converging on targets provided a powerful impetus to the idea of Anonymous as a self-organized, leaderless movement. However, there were important inequalities among participants. A few users in control of (non-volitional) botnets provided the majority of digital fire power. On at least one occasion, a channel administrator also manipulated the LOIC settings to make it seem as if the attacks were carried out by masses of Anons while his botnet was in fact leading the attack (Olson, 2012). Although much of the deliberation on targets took place in public channels, more privileged users (those with botnets, hacking capabilities, writing skills, or administrative privileges) coordinated in channels that were invisible to other users and by invitation only. Influential users made decisions in a channel tellingly called #command.

The concentration of power consolidated as a small group of hackers took on Aaron Barr, director of the cyber security company HBGary Federal. Barr had claimed that he had developed a method to identify internet users that was so successful he could uncover the names of Anonymous’ leaders. In response, a group of hackers met in an exclusive chat room, revealingly called #HQ, to attempt to gain access to the servers of Barr’s company. After

a couple of days of work, they defaced his website, took over his Twitter account (renaming it “colossal faggot”), and obtained troves of emails sent by Barr and his associates. Barr’s emails contained all sorts of embarrassing information, including a slide show that proposed to undertake a slandering campaign against Wikileaks.

The reorientation from revolutions in the Middle East to a security company in the United States had been entirely improvised – the hackers decided to go after Barr only after he had presented his research and left his servers vulnerable to attack – but it did provide a prototype for a new model of mobilization: hackers would obtain information by breaching systems and then involve the Anonymous community to communicate and exploit their findings. This new mode of operation was further buttressed by the arrests of dozens of Anons who had been involved in DDoS campaigns as coordinators or attackers.

These developments meant that the masses of Anons lost their functionality for the attacks. The role of skilled hackers, in contrast, grew larger. Not only did they deploy their technical skills, they also became celebrities within the movement. Through self-selection a group had taken shape within a movement. Olson (2012: 218) sketches these success rounds of self-selection:

Their group now consisted of Topiary, Sabu, Kayla, Tflow, AVunit, and occasionally the hacktivist called Q – a concentrated group of elite Anons. AnonOps had been a gathering of the elite in Anonymous; #InternetFeds a group of even more elite; and #HQ was a distillation of that.

After having gradually grown closer, the hackers involved in the HB Gary hack started their own group, called Lulzsec. Lulzsec’s Twitter bio originally stated that the group was there to aid Anonymous but this was later replaced with “the world’s leaders in high-quality entertainment at your expense.” The members of Lulzsec hacked dozens of companies and organizations in May and June 2011, including X-factor, Sony (a couple of times), gaming platforms, the *Sun* tabloid, and contractors for the FBI. In a stark contrast with the flurry of verbose statements made during the campaigns for Tunisia and other Middle Eastern countries, Lulzsec provided minimal and nihilistic explanations for its targets, emphasizing that they did it for the lulz (for laughs). Lulzsec described itself as “the concentrated success of 2005 /b”; there is truth to that. Several hackers in the group had been involved in Anonymous’ world for years and through iterated selection they had now formed this small elite group of approximately six individuals. Later on, some individuals within this group started a new campaign called #antisecc that was specifically directed at the complicity of technology corporations with surveillance and war.

Although the political emphasis changed from Lulzsec to #antisecc, the configuration of power remained the same: a few skilled and well-connected users served as the movement's prime hub. Users within this hub brokered information on vulnerabilities of potential targets, connected different groups and individuals, and played a large role in representing the movement to the media. Lulzsec first and #antisecc later marked a period of power concentration where a group of elite hackers took a position that as central as that of Gregg Housh and his associates during the heydays of the campaign against Scientology: attention, resources, and social contacts were in very important part channeled to and through a small group of elite hackers who functioned as the movement's prime hub. In the end, this became the group's downfall. Sabu, a key figure within the group, became an informant for the FBI after he had been arrested. In court documents, the FBI describes him as an "extremely valuable and productive cooperator" who contributed directly to arrests of other Lulzsec members and spent months assisting law enforcement in the investigation of numerous hacks and hacking groups. The crackdown did not end Anonymous but it did fragment it. Anonymous lived on not so much as an internally cohesive social movement but as a set of symbols and communication channels appropriated by a range of different groups for a range of different purposes. The masks that activists donned at the protests against Scientology had become ubiquitous and showed up in demonstrations from Brazil to Hong Kong and from Turkey to the United States.

### The battle for Trump

While Anonymous revamped itself as a challenger of state and corporate power, the image boards, 4chan first and foremost among them, remained places of masculine *angst* and desires. Some early users had grown older, new teenage boys had entered, but the image boards still served as a release valve where Anons flocked to share jokes and pornography and to express their disdain and fear of feminists as well as racial minorities. As 4chan veteran Dale Beran notes, many Anons were instinctively drawn to Donald J. Trump in the run-up to the 2016 election (Beran, 2019). Donald Trump seemed to represent the troll in flesh, defying norms of political correctness and radiating confident masculinity while at the same time being relatable and entertaining because of his evident and farcical failures. Partly out of ideology, partly out of a taste for mayhem – the two are notoriously difficult to separate – some of 4chan's most active boards came to serve as Trump's clandestine internet armies, relentlessly attacking his opponents while elevating the candidate himself into a meme icon.

While racism, antisemitism, and misogyny have always been endemic to 4chan, the image board and chan culture generally made a sharp reactionary

turn in the 2010s; “post-2012 trolling seemed to have turned darker” (Tuters and Hagen, 2020: 2225). It is from this ecosystem that a dark conspiracy theory emerged. That theory held that the United States are controlled by a cabal of Satan-worshipping pedophiles that uses its control over the “deep state” to sabotage Trump. The source for this outlandish theory – believed by no less than 15 percent of Americans in 2021 (PRRI, 2022: 2) – is a persona known by the moniker of Qanon who first posted on the 4chan image board in 2017 and claimed to possess top-level security clearance. More specifically, Qanon posted on /pol, a sub-board dedicated to “political incorrectness” that had by that time grown into the most popular sub-board on the website (Tuters and Hagen, 2020).

Qanon’s method was to provide questions and vaguely worded hints for followers to decipher. De Zeeuw and Gekker (2023) suggest that it is unlikely that the boards’ readers believed Qanon’s posts were factually true. Aside from the outlandish theory on Satanic pedophiles and the unlikelihood of someone with top-security clearance sharing government secrets on disreputable websites, Qanon’s claims were often demonstrably false and their predictions didn’t materialize. For instance, Qanon’s very first post announced the imminent arrest of Hillary Rodham Clinton and the mobilization of the National Guard, neither of which happened. Nevertheless, anons in large numbers tried to find answers to the many questions and hints in Qanon’s posts. In De Zeeuw and Gekker’s interpretation, Qanon in its initial stages served as a “God-tier” Live Action Role-Playing (LARP), a game played in the knowledge that it’s fictitious.

As Qanon moved from /pol and 8chan into social media and from there into the mainstream media, it attracted large numbers of partisans and activists actually convinced that they were participating in the uncovering a conspiracy of historic proportions. What began as farce once again turned into tragedy, as followers began to interpret Qanon’s “drops” to uncover the schemes of the deep state and which role Qanon supporters should play in the unfolding drama. Qanon supporters called for and participated in the January 6th insurgency that followed Donald Trump’s defeat in the United States’ presidential elections of 2021.

Much of the literature and commentary on Qanon intends to answer the question why so many were enthralled by claims and theories that were as cryptic as they were outlandish. For our purposes, though, two aspects of Qanon are especially interesting. First, Qanon’s spectacular success at the very least qualifies arguments that digitally mediated crowds generate collective intelligence (e.g., Shirky, 2008) and illustrates that social media provide ample opportunities for manipulation and confusion (Tufekci, 2018). To be sure, there is a certain rationality to the deliberations of Qanon’s supporters. Many individual interpretations of the “drops” are critical, clever, and creative at some level. But collectively the “patriots” following Qanon



self-organized into a collective more akin to a cult than an intelligent crowd. Second, the rise of Qanon marks another period of power concentration. Even though the missives were too vaguely to be considered as instructions, followers nevertheless accepted and spread Qanon's suggestion that a cabal of deep state operatives with diabolic intentions was running the United States. A single persona, performed by an individual or a small team, came to command the attention and loyalty of a massive following.

## Conclusion

Anonymous appears as the quintessential social movement of digital modernity; self-consciously complex and self-organized, and profoundly digital. Movement participants embrace digital technologies as both means and model; they do not merely use technology as a set of tools but also as templates for alternative ways of organizing and being. Just as the literature on complexity, Anons tend to be distrustful of hierarchies, arguing that self-organization generally provides greater efficiency and freedom. It is at this point – where the epistemological, ethical, and political meet – that complexity theory has a strong affinity to Anonymous. They may use different vocabularies and methods but both complexity theorists and Anons see in self-organization, iterative development, and distributed intelligence superior alternatives to top-down command and integral planning.

Considering this affinity, the story of Anonymous' power dynamics presents a cautionary tale for the optimistic notion of self-organized movements. Although the movement has alternately presented itself as “chaotically neutral” or a force for freedom, oftentimes it has served as a reactionary force, acting on fears that white and male supremacy is under threat and must be defended (Beran, 2019). Even though anonymous image boards could be said to approximate a Habermasian ideal speech situation to the extent that participants nominally shed their identities, in practice they have often served as outlets for fears and anxieties experienced by young White men and on occasion developed into juggernauts of the most rancorous strands of Trumpism.

While Anons often picture their movement as a swarm or crowd with emergent collective intelligence, we have shown that the movement periodically experienced advanced forms of power concentration, with small groups of individuals taking up central roles. Anonymous' deep commitment to self-organization and strong aversion to top-down coordination paradoxically leaves mechanisms of power concentration unchecked. Whereas parliamentary democracies or corporate bureaucracies have extensive checks and balances that define and restrict responsibilities and powers, in Anonymous – as in any other organization or movement deeply committed to self-organization – no equivalent mechanisms exist. The same qualities of digitalization

that enable decentralization and democratization also make these movements vulnerable to extreme centralization and appropriation (Törnberg and Törnberg, 2024). The Qanon conspiracy is the sublime expression of this tendency for unchecked power concentration: one unknown and unaccountable persona defined the agenda of a movement of millions. While movements emerging on digital media and embracing complexity tend to present themselves as rightful and democratic challengers of the state and the media, the case of Anonymous suggests that digital modernity's potential for regression is at least as important to acknowledge as its democratic promise.

## Notes

- 1 DDOS stands for Distributed Denial of Service. A DDOS attack involves sending junk packets from a number of computers to clog and disable websites and servers.
- 2 We use pseudonyms except when individuals have been extensively covered by the media.
- 3 Text on a defaced website [www.marchespublics.gov.tn](http://www.marchespublics.gov.tn) (accessed January 22, 2011, offline October 2024).
- 4 Online: <http://anonnews.org/?p=press&a=item&i=369> (offline October 2024).
- 5 Since Housh had become the entry point into Anonymous for both the media and academia, it is easy to overstate his role in driving the demonstrations, but it should be recognized that the elevation of one key person is not an aberration but an outcome of the structural forces driving Anonymous' move out of the image boards: Housh became identified as a result of his involvement in a street protest and became a key figure as journalists and others were looking for a reliable source and a talking head.

# 7

## DIGITAL PLATFORMS

### Complexity and power in the digital economy

If behemoth manufacturing firms defined industrial modernity, and financial conglomerates were at the center of neoliberalism, then giant technology corporations that spread their roots across a range of sectors are at the core of digital capitalism. Recent years have seen the explosive growth of platforms such as Amazon, Google, Airbnb, Facebook, and Uber that provide the core infrastructures of the digital economy and broker the economic exchanges and social interactions of billions of users. By 2018, technology corporations had overtaken finance in terms of market value (Tréguer, 2019: 146), signifying the rise of a new regime of capitalist accumulation – variously referred to as platform capitalism, surveillance capitalism, or digital capitalism – in which a small number of exceedingly large corporations draw on the affordances of digital technology to accumulate unprecedented levels of social, political, and economic power.

The large platforms of today however trace their roots to more egalitarian antecedents. The early ‘sharing economy’ platforms seemed to offer an alternative to the greed and inequities of market-based forms of exchange. Digital technology could be used to organize social infrastructures that could enable scalable forms of “commons” and more egalitarian forms of exchange. The early internet was rife with examples of how digital technology enabled collaboration and coordination without central leaders or gatekeepers – think of Wikipedia, CouchSurfing, CrowdFunding, and Linux. Inspired by such examples, hackers and scholars argued that digital technology was inherently antithetical to enclosure and exploitation, as the possibility to replicate digital creations without additional costs effectively meant an end to scarcity – a core prerequisite for the existing forms of capitalist accumulation (Benkler, 2002; Puschmann and Alt, 2016). A more egalitarian and sharing future seemed inevitable.

But as platform firms would come to reveal, the same features that made digital technology so potent for sharing also made them powerful tools for novel forms of surveillance, control, and extraction that would lay the grounds for an alternative form of accumulation. Digital technology offers a new way of seeing – and new forms of power – which platform firms wield to gain unprecedented corporate influence.

In this chapter, we examine the rise of platforms and survey these new forms of power. How were the capacities of the digital coopted for the intensification of capitalist exploitation? How do platforms accumulate capital? And, what does it mean to *see like a platform*?

We argue that platforms like Meta, Amazon, Alphabet, and Airbnb embody a shift in the nature of power – from the top-down, population-based and categorizing view that characterized high modernity to new forms of power that are bottom-up, cluster-based, relational, and fluid. Whereas self-organization and emergence challenged high modernity’s experts and plans, they are at the very foundation of digital modernity. Platform firms are successful to the extent that they can first animate and then exploit self-organization. In short, platforms represent the weaponization of complexity as the epistemology of a new mode of accumulation.

### **The problem with abundance**

Digitalization surfaced as a major component of macro-economic trends in the aftermath of the 1970s crises, and inextricably intertwined with financialization, globalization, and neoliberalization. Financial products are at the heart predictive mathematical and computational entities – and the global financial system was thus ultimately based on digital infrastructure. To expand financialization, it was thus necessary to expand computational networks and infrastructure. The more sophisticated the algorithms and the more data could be collected, the more social behavior could be brought into the realm of finance (Lohr, 2015; Van Dijck, 2014). But while digitalization was part and parcel of capitalist trends, it over time became apparent that it also posed a challenge to dominant forms of accumulation.

The 1990s and early 2000s saw a range of peer-based movements using the internet to enable non-market-based collaboration. Examples such as Wikipedia or Linux seemed to show the possibility of using code to enable digitally empowered commons, promising to replace market-based and top-down solutions by the “sharing economy” (Puschmann and Alt, 2016) or “commons-based peer production” (Benkler, 2002). Digital technology allows designing the rules of interaction of the digital realm where people meet, thus shaping the mediated social life that emerged within it. The peer-based solutions used this capacity to create a form of social infrastructure for new forms of social organization, functioning as alternatives to both the

market and the state. Wikipedia showed that by enabling users to edit texts through a simple interface, an unprecedented online encyclopedia could emerge. Couch Surfing showed that by enabling travelers to connect with locals, a form of tourism based on conviviality was enabled. Through code, it seemed possible to obviate the need for monetary transactions when sharing resources, knowledge, and experiences. Age-old anarchist ideas of leaderless self-organization could now be realized through a few lines of code.

In addition to enabling sharing and non-market-based forms of collaboration, digital technology seemed to challenge capitalism in more direct ways. Within the existing mode of accumulation, profit depends on scarcity. But digital goods can be copied with near-zero marginal costs. This poses a fundamental problem for existing forms of capitalist accumulation: simply put, how do you charge for a product that can be copied infinitely at almost no cost? How do you profit in the absence of scarcity – a situation that seems inherently more compatible with sharing than with charging?

Some scholars went as far as to speculate that this abundance would bring about a collapse of capitalism and herald the arrival of a post-capitalist utopia (Mason, 2016; Bastani, 2019). The abundance of the digital, they argued, was precisely the technology-driven revolution that Karl Marx had predicted, and would hence usher in a new economic system characterized by sharing, information-driven collaboration, and a shift away from traditional capitalist structures.

If zero marginal costs may appear as an abstract challenge, it was rendered concrete by growing file-sharing and piracy. These movements proclaimed that “information wants to be free” and provided technological means to share software, music, and movies – from Napster to The Pirate Bay. Such sharing appeared to pose a very real threat to the quickly collapsing profits of the record and movie industry.

But while hacker collectives experimented with small-scale digital commons and dreamed of digital utopias, capitalists were hard at work searching for a model of accumulation compatible with the affordances of digital technology. After the 2008 Financial Crisis, they found a solution to their dilemma: the *platform*.

Platforms began in many ways as an apparently seamless continuation of the existing sharing economy. Early Airbnb did not seem fundamentally different from CouchSurfing; Uber was initially similar to the non-monetized ride-sharing platforms that preceded it. As Jim Whitehurst, CEO of the open-source company Red Hat, put it, “Uber has shown how you can actually empower many thousands of people to self-organize” (Whitehurst, 2016). These platform firms sought to support such an interpretation, by drawing on the same language as the movements that preceded them; they presented themselves as part of a “sharing economy,” drawing on its rhetoric of non-monetization, liberation, and convivial forms of exchange. Airbnb

and Uber proclaimed that they eliminate the need of capitalist intermediaries by providing a direct and decentralized way of connecting buyers and sellers. Social media platforms such as Facebook described themselves as representing a move beyond the passivity of traditional mass media and invited citizens to participate, think for themselves, and express their own views. Facebook's Mark Zuckerberg has argued that Facebook has "decentralized power by putting it directly into people's hands" (Zuckerberg, 2019). These firms drew on the same sense of excitement and revolutionary spirit that had built communities around their predecessors. As Dirk Helbing (2015) described it:

While one might think that a largely self-regulating society is utopia, a new kind of economy is already on its way. Social media are networking people and, thereby, enable "collective intelligence." ... Social media platforms, such as Amazon Mechanical Turk make it possible to bring ideas and skilled workers together. As a consequence, this leads to a more direct participation of people in production processes.

(Helbing, 2015: 3)

However, the platforms emerging after the Great Financial Crisis of 2008 did exhibit one fundamental difference compared to their predecessors. Unlike the initial platforms started by volunteers and activists, this new wave was spearheaded by enterprises backed by substantial venture capital. Investors had discerned a lucrative opportunity – a business model well suited for the digital age and a remedy to the dilemma of digital abundance.

The pioneers of the early sharing economy had utilized the social capabilities of digital technology to facilitate leaderless collaboration and eliminate intermediaries. However, unintentionally, they had thereby positioned their platforms as new, pivotal intermediaries. The capital behind Airbnb and Uber recognized the significant power implied by this role.

Platforms are defined by using digital technology to enable buyers and sellers to meet, and thereby become the mediators of these interactions, controlling – even owning – a form of *proprietary market* (Langley and Leyshon, 2017). The platform firms recognized that this gave them unique powers. Powers that would provide a solution to the problem of abundance by creating artificial scarcity – and in the process make them enormously profitable.

### The powers of platforms

The key idea behind the platform business model is to use the control over the market to extract profits. Platforms thus generate profit through a form of rentiership – based on the capacity to control access to these key

resources (Langley and Leyshon, 2017). As Peck and Phillips (2020: 75) argue, platforms can thus be understood as situated in the Braudelian zone of the “antimarket,” constituting a “new machine with an old purpose: that of controlling markets from above and, in the process, generating significant concentrations of political-economic power.” The platform thus effectively represents a solution to capitalism problem of the abundance of digital goods.

Put in simpler terms, while it remains in principle possible to reproduce digital goods without marginal costs, platforms effectively prevent this by using their control of the market to set costs and artificially create scarcity. If you buy an iPhone, for instance, Apple controls the AppStore on which apps are sold and charges 20 percent on all purchases. While there are no marginal costs associated with installing an app, the software ecosystem is fully under Apple’s control, which allows the corporation to extract rents and decide which actors are able to access the market (Van Dijck et al., 2018). The ability of platforms to extract rents is thus predicated on their capacity to lock users into their ecosystem – that is, to create monopoly powers. While the platform firms of today rival in size the steel and rail monopolies of old, the monopoly powers that fuel their growth are fundamentally different in nature. We can point to three sources of the monopoly powers of platforms.

First, the value of a platform for its users is often inherently a function of the number of participants. For instance, social media platforms are only fun to use if there are other users. If you want to sell your used car or find a short-term rental for your vacation, you are best of using the platform with most buyers. The result of this dynamics is a “feedback loop that produces monopolies” (Parker et al., 2016: 6), leading to most mature platform markets being dominated by one or two giants (Peck and Phillips, 2020). Platform firms tend to strategically employ such demand-side economies of scale to control markets.

Second, platforms tend to function as a form of infrastructure on which a range of social and economic activities become dependent. As Rahman and Thelen (2019: 180) observe, “the very idea of the ‘platform’ reflects an aspiration to be the foundational infrastructure of a sector.” Platforms tend to seek to provide basic functions in the economy, entrenching themselves and locking actors into their use. This creates dependence on the services that they provide, which in turn grants the firms substantial leverage (Larkin, 2013). For instance, once a firm has built their software on the computational infrastructure of Amazon Web Services (AWS), it would often require enormous costs to migrate to an alternative service. Platform corporations again pursue these powers strategically, seeking *infrastructuralization*: continually spreading their roots to claim control of infrastructure and extend their data extraction into new areas (Plantin et al., 2018), capturing and

consolidating markets through what Srnicek (2017b: 256) describes as a “rhizomatic form of integration.”

Platforms seek to spread their rhizomatic roots to claim control of the infrastructure on which other actors depend, including powerful actors such as states or public institutions. As platform corporations have thus emerged as the “infrastructural core” (van Dijck et al., 2018: 12) of the global digital economy, they have also become embroiled in geopolitical conflict – emerging as “key pawns in a mounting hegemonic strife” (Bassens and Hendrikse, 2022: 1), in particular between China and the United States. As a result, states seek to support platformization as means of geopolitical influence (Peck and Phillips, 2020).

Finally, the mediating position of platforms allows them to accumulate vast amounts of data. By drawing on advances in AI-based data analysis, the data can be made to provide important business value. The capacity to draw advantages from massive data, scalable at near-zero cost, results in feedback loops generating market concentration – what has been referred to as “digital monopolies” or “dataopolies.” Such extracted data have become so central to the contemporary economy that they are no longer only valued for their direct usefulness – such as their capacity to target advertising or increase efficiencies – but they have come to be seen as valued in their own right. Data has become a key form of commodity, or even a form of capital (Sadowski, 2019). Due to this centrality of data extraction within the contemporary economy, scholars have referred to the contemporary economy as “surveillance capitalism” (Zuboff, 2019), describing a situation in which the accumulation of data has become an imperative in itself – founded on the notion that it will contribute not only to knowing and predicting our behavior but also on directing and controlling it. Other scholars have likened the resulting data extraction to a novel form of colonialism, drawing parallels with historical colonial practices of resource extraction and domination. Mejias and Couldry (2024) have highlighted how the massive collection, processing, and sale of personal data by tech corporations in both the Global North and South echo the extractive economies of historical colonialism, where power and resources were transferred from the periphery to the core. This new form of colonialism is not marked by physical occupation of territory but by the control and use of digital information, leading to new hierarchies and inequalities that transcend geographical boundaries.

As platforms become truly valuable only when they can claim control over a key resource, competition plays out as winner-take-all turf wars which systematically favor capital and scale, in which dominant platforms leverage power in one sector to override competition in others (Cusumano et al., 2020). Platforms tend to seek rapid expansion, the so-called “blitzscaling,” fueled by massive venture capital backing to undercut competition and quickly build a userbase (Langley and Leyshon, 2017). While the literature



has understood this primarily as a means of outcompeting other platforms, it also serves as a strategy vis-à-vis the state, as quick expansion allows the platform to build political and legal power, hire lawyers and lobbyists, and mobilize their user base as a political force (Collier et al., 2018; Culpepper and Thelen, 2020; van Doorn, 2019). Having established a business in a regulatory gray area, the rapid expansion allows companies to present slow-moving lawmakers with a *fait accompli*, while mobilizing overwhelming political and legal power to fight attempts at after-the-fact regulation (Srnicek, 2017a).

A crucial point here is that these stories about the capacities of data and platforms to predict and shape human behavior may or may not be true. Their veracity is, in some sense, beside the point. The stories themselves – and the larger ideology of which they are part – have served to coordinate financial investments in ways that has transformed the economy. The theories and epistemologies of complexity that we examined in Chapter 1 have been central in the influence of these financial stories. It was Santa Fe Institute scholars such as Brian Arthur and the field of complexity economics that brought feedback processes and “network effects” into the vocabulary of economics, leading to the substantial overvaluation of tech firms. This overvaluation in turn enabled platform firms to draw on near unending financial capital to mobilize political and social power, leading to a form of self-fulfilling financial prophecy.

### Platforms as states

Platforms thus extract profits by challenging the old distinction between the economic power of corporations and the political sovereignty of states: they seek to claim regulatory control over markets through data surveillance, while seceding from state control (Törnberg, 2023). In short, they aspire to enjoy the kind of immunity and exceptionality that has traditionally been recognized only for sovereign states. The result has been that a small number of platform corporations have achieved unprecedented levels of power and wealth. Their unmatched financial resources enable platform firms to make massive investments in infrastructures in anticipation of future gains. One reason that the trope of the “sharing economy” has retained some credibility is that platform firms generally hold off on monetizing their services in favor of expanding their market shares; the platform gives more than it takes up until the moment that a sufficient number of users have come to depend on it.

As the platforms own, control, and manage proprietary markets – rather than merely competing *in* a market – their role is in some ways more akin to states than to private firms, and they tend to take on state-like features. Platforms are fulfilling regulatory functions conventionally carried by public

institutions: they register market participants, set conditions of entry to the market, and set the rules of competition. They guarantee creditworthiness of customers and the efficiency of delivery. They act to enforce market contracts, providing guarantees to both sides that their agreed upon exchange will be fulfilled. They provide and police regulatory guidelines, administering punishments such as fines, reputational costs, or even expulsion from the market. They organize labor relations, setting wages not via state-mobilized minimum salaries or wage bargaining institutions, but through proprietary algorithms. They centralize and mobilize market information, solve market coordination problems, adjudicate disputes, and provide the information needed to assess the quality of goods.

The large platform corporations are thus emerging as a new form of “company-states”: firms with the capacity to shape not only markets, but large parts of our everyday lives (Törnberg 2024). This role has not escaped the firms themselves, many of which view their governance as so central to their business model that they refer to their users as “citizens.” As Mark Zuckerberg pondered in an interview, “In a lot of ways Facebook is more like a government than a traditional company.”

If Facebook and other platform corporations are like states, then how is citizenship defined? As the modernities that preceded it, digital modernity is characterized by a distinct culture associated with its mode of accumulation. Boltanski and Chiapello (2018) famously argued that neoliberalism became associated with an ideological shift that facilitated the acceptance and internalization of new norms of mobility, adaptability, and the entrepreneurial self. Digital capitalism is similarly associated with a “new spirit of platform capitalism,” characterized by a further evolution of the flexibility, network-based organization, and the valorization of autonomy and creativity described by Boltanski and Chiapello, while also introducing new dimensions related to the digital. The platform subjectivity implies that insecure platform-workers are cast as “entrepreneurs,” and platform work is framed as enabling autonomy, passion, and self-directed projects that are limited by traditional employment. Precarity is cast as the ability to be an “entrepreneur of the self” and control one’s time is celebrated as personally liberating. Platforms furthermore bring a further emphasis on cultivating personal networks and building social capital, constructing a “personal brand” and market themselves through social media.

While platform users may come to view themselves as brands or entrepreneurs, they do so in environment that is designed by large corporations in control of digital infrastructures. Corporately planned “smart cities,” such as Songdo in South Korea or Masdar in Abu Dhabi are among the purest examples of such privatization in action, representing the strategy of capturing public services through technopolitical solutions. Smart cities offer a market-oriented approach to urban governance while generating

revenue through service contracts with state bodies, and the extraction of citizen data. As Kitchin (2023) notes, “the state is transformed into a privately owned state-as-a-platform in which a company constructs and controls all aspects of a locale including territory, buildings, infrastructure, service-delivery and governance.” Although Songdo echoes the modernist urbanism of Robert Moses in that it is technocratically governed and integrally planned (Kuecker and Hartley, 2020), it is different in that it envisages a city that will evolve once it has been created. The countless sensors and endless circuits together generate data that is supposed to drive self-organization; “This is a city that may not be fantasized as conscious but certainly fantasized as something capable of intelligence and cognition by way of modulating and measuring the affective states and senses of its many inhabitants...” (Halpern et al., 2013: 281). Platform firms here take over the role traditionally reserved to states as they roll out infrastructures and engage in biopolitics.

As platforms are taking over functions traditionally associated with the state, these firms are seeking to avoid taxation and regulation by claiming to merely offer neutral intermediation. Labor platforms like Uber or MTurk claim that their workers are not employees, but “independent contractors” who are therefore not fully subject to labor laws and welfare state protections (Ravenelle, 2019; Grohmann et al., 2022). This means that the platforms can devolve onto workers costs and risks such as varying demand, lost earnings, responsibility for bodily injury, and damage to tools and assets. Short-term rental platforms such as Airbnb similarly claims that it is merely connecting guests to private home rental, thus bypassing regulations for the hotel sector and shifting responsibility for taxation and legal obligations to their “hosts” (Törnberg, 2021). This is part of a broader strategy, in which platforms – from social media to gig work – use technological designs to target and create regulatory gray areas and develop algorithmic governmentality to shape the market to their interests, while drawing on a discourse of neutrality in order to shift legal responsibilities onto their users (Van Dijck and Poell, 2013).

At the same time as platforms pass responsibilities onto their users, they function as a legal and political front by concealing their users’ identities and mobilizing legal and political power to shield them from regulatory burden. Airbnb, for instance, has been obfuscating hosts’ information to conceal their identity from governments and tax agencies, mobilizing significant lobbying efforts to fight stringent regulation, suing governments and tax agencies, and even organizing their users in “social movements” to push their economic interests (van Doorn, 2019). Platforms thus attempt to effectively *unnest* their proprietary markets from the larger public market of which it is part, making participants subject only to the taxation and governance imposed by the platforms themselves. Platforms, in other words, seek to

operate on the same level as sovereign states – as managers and regulators of markets.

The rise of platforms as key actors in governance should not be understood as simply replacing the role of the state, but rather as complicating the very notion of state. As a recent literature has emphasized, the platform economy is rife with public–private partnerships, and states are often key to supporting and enabling powerful platform firms. In turn, platforms enable infrastructural control over other territories, and to extract profits and data from foreign markets. Platforms thus become part of geopolitical contentions between states – emerging as “key pawns in a mounting hegemonic strife” (Bassens and Hendrikse, 2022: 1). States are hence incentivized to promote the growth and internationalization of their platforms, while protecting their own market from foreign platforms (Peck and Phillips, 2020). TikTok provides an illustrative example: while the platform has grown into one of the most important social media platforms in Europe and the United States, it is not allowed to operate within China itself.

Looking internationally, we can see four general patterns of relationships between states and platforms. First, the United States has been characterized by a relatively *laissez-faire* platform capitalism, in which regulation has primarily taken place within the anti-trust frameworks developed for the vertical monopolies of the Fordist era. Such antitrust regulation focuses on traditional conceptions of monopoly – seeking to protect consumers from rising prices – and is hence largely toothless in facing the democratic and political threats posed by platforms’ amassing of power through data extraction and infrastructural control. While Big Tech and platform firms have seen substantial backlash in recent years in the United States, the response from the gridlocked US political system has primarily been the staging of public hearings in which the leaders of platform firms are made subject to political theater.

In a congressional hearing in January 2024, for instance, Mark Zuckerberg was forced to face the parents of a children who died following sexual exploitation or harassment via social media and was given responsibility for the platform’s suggested role. The CEO of Snap, Evan Spiegel, was similarly faced with parents whose children were able to access illegal drugs on Snapchat. Whereas it is unlikely that these hearings will result in actual regulatory action, they carry an important implicit message: they suggest that platform firms like Meta or Google carry biopolitical responsibilities, beyond even those held by the state itself. The emphasis is not to question the platforms’ right to engage in governance through digital surveillance and control or to question the fact that citizens are “increasingly subject to corporate, rather than democratic, control” (Pasquale, 2018: 2). Instead, the state is used to put public pressure on platforms to responsibly make use of their powers for biopolitical purposes, to stand in for a state that is itself

politically gridlocked and a welfare system that is highly residual. The state is hence succeeding its powers, while engaging in governance through public displays of culture war theater.

Second, the European Union has taken a much more active role in regulating platforms, emerging as the “regulator of the world” (Young, 2015). Bradford (2020) terms the “Brussels Effect” to describe the Union’s capacity to regulate the global market and set global standards across various industries and policy areas, including digital markets, environmental regulation, consumer health and safety, and data protection. In part enabled by the lack of large European platform firms, and in part by having a relatively functional political system, the EU has promulgated regulations that shape the international business environment and shaping global standards. The union’s recent regulatory frameworks include the General Data Protection Regulation (GDPR), the Digital Markets Act (DMA), the Digital Services Act (DSA), and the Artificial Intelligence Act, seeking to, among other, promote individual control over personal data, transparency, data minimization, the right to be forgotten, and ensure “fair competition” in the digital market. The EU has furthermore launched antitrust investigations against Alphabet, Amazon, and Apple.

As Bassens and Hendrikse (2022) argue, such moves are part of defending older non-platform firms from foreign platform competition and seeking to strengthen the zone’s technological sovereignty. While the union may manage to impose standards for the platforms, it is limited by union’s lack of influence over the US corporate-owned core platform infrastructures. The EU can thereby be understood as seeking to go toe-to-toe with platforms. With the rise of populist and EU-skeptic forces within the European Union, it is however unclear for how long the union will continue to do so.

A third path is illustrated by China, where platforms are largely subjugated to the interests of the party-state (Gruin, 2021). The Chinese state has taken an active role in shaping the growth of the private platform economy, with the aim of expanding both its geopolitical and domestic control. China is beginning to draw on private firms to construct state-lead programs for platform-based citizen control, most clearly illustrated in the much-debated Social Credit Scoring system, in which Chinese nationals are evaluated – under the threat of exclusion – through a reputation score which combines social, political, and credit rating data. The platform model’s capacity for control and data extraction are thus made to fuel a repressive state apparatus, suggesting a potential path in which platform power brings the capacity of state control to reach deeper into social, political, and economic dimensions of the daily life of citizens (Caprotti and Liu, 2020; Jiang and Fu, 2018). The state keeps close tabs on platform firms, and not even the most powerful platform leaders in China are able to go against the interests of the state. There are several examples of billionaire CEOs – Alibaba’s Jack Ma,

DouYu's Chen Shaojie, Evergrande's Xu Jiayin – disappearing after criticizing state policies, going against its interests, or simply for becoming too powerful.

Finally, while China and the United States are strategically investing in platforms as geopolitical tools, and Europe is seeking to maintain sovereignty through regulation, many countries in the Global South instead find themselves on the sharp end of these platforms – seeing foreign-operated platforms extract profits from their national markets. Airbnb, for instance, charges a 15–20 percent commission from every booking, thereby extracting value from local accommodation providers in developing countries to the United States, while facing minimal operational costs or obligations. The platforms are hence enabling a form of digitally enabled economic colonization, allowing capital and profits to flow from the Global South to the Global North. Kwet (2019) describes platforms as “reinventing colonialism” in the Global South, as US multinationals exercise imperial control at the architecture level of the digital ecosystem.

While platforms thus represent a privatization of state power, it is more apt to understand the platforms as enabling a new *form* of power which is coming to complicate our traditional understanding of the state. Platforms hence centrally represent a shift in *ways of seeing*, and the birth of a new form of biopower.

### How platforms see

The same features that made the internet so potent for conjuring new forms of leaderless communities also made it a powerful force for surveillance, control, and manipulation. Code and data can be used to design spaces that encourage self-organization and conviviality, but they can also shape behavior to fit powerful interests. The one who controls the platform can shape the behavior of the participants through a form of infrastructural power; deciding what actions are available at a given time, nudging and cajoling, encourage certain behaviors, while dissuading others. Platforms draw their powers from suffusing and intertwining social systems with code – producing sociotechnical assemblages which can be designed and engineered with precision.

The rise of platform-based forms of control represents a new way of exercising power. When Scott (1998) describes how the state “sees,” he focuses not merely on simplification driven by a desire for legibility and control, but on a *particular type* of simplification: statistics and demographic data – which slots reality into fixed categories, variables, and variances, concealing interaction and relations. Scott's state looks down on its population from above, imposing grids and straight lines as seen from the map-makers view.

Platforms embody a move away from this form of power. To get a more fine-grained understanding of the nature of platform power, we can situate it in Foucault's influential periodization of power. Foucault's periodization illustrates how power dynamics have evolved over time, emphasizing the shift from overt physical control to more subtle and pervasive forms of social and institutional control. This framework provides insights into how power operates in different historical contexts and helps us understand contemporary power structures and mechanisms. These regimes of power should be understood as layered rather than consecutive: it is not that old forms of power fall into disuse and become fully replaced, but rather that new forms emerge alongside them, nestling and intertwining, varying in salience across periods and contexts.

Foucault described on three periods of power. First, *Sovereign Power* (pre-modern era, 17th to 18th centuries): in this phase, power operated on territories and was held by monarchs, rulers, and religious authorities, governing through settlement, deportation, and dispossession. It saw its territory through maps and pursued obedience of subject people, often exercised through physical force, coercion, and cruelty.

Second, *Disciplinary Power* (Modern Era, 18th to 19th centuries), which had as its object the human body. Foucault argues that with the advent of modernity, power shifted from centralized authority figures to institutions, such as prisons, schools, hospitals, and bureaucracies. Power operated through surveillance, discipline, and normalization, shaping individuals' behavior and regulating their bodies and minds. This phase is characterized by techniques of control and surveillance, where individuals are subjected to constant monitoring, confinement, and correction.

Third, *Biopower* (Late Modern Era, 19th to 20th centuries), which had as its object populations, measured through statistics and demography. Biopower is concerned with individuals as part of larger populations, focusing on managing, calibrating, and controlling the biological and social life of populations through mechanisms such as government policies, public health initiatives, and demographic control. It involves regulating birth rates, health, and overall well-being on a societal level, extending beyond individual discipline to encompass the regulation of life itself.

Foucauldian scholarship has shown how the modern state was inextricably entangled with the science of statistics and demographics – producing the very concept of a “population” as an object of governance. These data epistemologies were imprinted on the social world, as the state sought to make the world legible to a statistical way of seeing – standardizing, categorizing, classifying, and making measurable, and *fixing, segregating, and concentrating* its subjects in space (Scott, 1998).

In the same way that Foucault (2008: 259) suggests that the disciplinary power was reshaped by neoliberalism, so is neoliberalism now being altered

by the rise of platformization (Cheney-Lippold, 2011; Pfister and Yang, 2018; Pilentić, 2023). As the neoliberal rationality came with an associated ideology and belief in the legitimacy of market rationality in regulating every aspect of human life, so does this platform power come with its associated ideology: what Malaby (2011) terms “technoliberalism,” defined by faith in the legitimacy of emergent effects – “the emergent properties of complex interactions enjoy a certain degree of rightness just by virtue of being emergent” (Malaby, 2011: 56). And faith in the legitimacy of emergent effects, in turn, implies trust in the invisible hand of the platform algorithm.

Building on this periodization, platform power appears as a novel form of power, operating not on populations, but on clusters and flows. It sees its subjects through the lens of relational data analysis rather than survey statistics, representing a fundamental epistemological shift in scientific paradigm (Edelmann et al., 2020; Lazer et al., 2020; Törnberg and Uitermark, 2021). As scholars of “Big Data” have argued, the move from traditional data does not only involve new quantities of data or new tools – but rather, in the words of Boyd and Crawford (2012), “a profound change at the levels of epistemology” (p.665). While the survey data that undergirded regulatory power is constructed for processing through variable-based analysis, requiring pre-compartmentalized data designed to be palatable for a scientific perspective that sees the social world through a lens of averages and variances, Big Data tends to be structured by and for algorithmic processing, implying indexed data structures and traversable networks (Mackenzie, 2012; Marres, 2017). While traditional data slot reality into fixed categories, variables, and variances, concealing its interactional elements (Conte et al., 2012; Lazer et al., 2020), Big Data are relational, interactive, heterogeneous, interactional, and emergent (Törnberg and Uitermark, 2021).

As these epistemologies enter into governance, they accordingly bring about a fundamental shift in governmentality. As Amoore (2023) argues, a significant set of epistemic and political transformations occur when states begin to understand themselves and their problems through the lens of these technologies. As the very notion of a “population” is a fundamentally statistical concept, it is likely to be modulated by new ways of representing subjects as nodes, relations as networks, and communities as clusters, governed through apps, platforms, and devices (Isin and Ruppert, 2020; Törnberg and Uitermark, 2020).

AI and machine learning techniques differ fundamentally from conventional statistical analysis, as they use computational power to generate models based on historic datasets rather than to test hypotheses (Amoore, 2023; Yeung, 2023). While statistical analysis draws on the means and (co-)variances of a set of predefined variables, data science uses prediction models to either identify patterns in data or to “learn” to link input to output through existing examples.

Contemporary AI systems are often based on artificial neural networks (Yegnanarayana, 2009) – large-scale complex networks of interacting nodes



that carry out distributed computation, based on training on datasets that link input to expected output. How or why the networks reach their conclusions is nearly impossible to tell, as the networks consist of hundreds, thousands, or even trillions of parameters, and the capacities of the networks emerge through their mass-interaction. As Amoore (2021, 2023) argues, the use of such associative learning processes is more than a change in the tool set. It changes the foundation of governance by redefining political and social subjects through data and algorithms.

While demographics and statistics erased relations and sought to categorize and classify individuals, the data collected by digital platforms are relational, interactive, heterogeneous, interactional, and emergent. While statistical data was collected periodically, giving a snapshot of a defined population, digital data constitute continuous flows, feeding algorithms that redefine clusters and patterns and seek to modulate their behavior. The power of platforms is enabled by a flow from sensors that are seamlessly integrated into the social fabric, in part because platform firms constructed that fabric around sensors in the first place.

Platforms represent a move from top-down command-and-control to a form of control mobilized through the design of programmable social infrastructure. They exert control by designing these infrastructures so as to generate certain outcomes – drawing on massive behavior data to engineer social systems through infrastructural design. Yeung (2017) refers to this mode of control as “hypernudging,” as digital platforms engage in a rigorous process of designing the architectures to alter behavior in predictable ways. Platforms shape their users through a mix between soft and hard discipline, combining gamification and scores with detailed tracking, algorithmic control, and at times threats of fines and expulsion – all A/B-tested and designed to efficaciously shape user behavior.

Digital data thus gives space for forms of diversity, mobility, and individuality that traditional data erased – tracing individuals through thousands of ever-shifting attributes. While traditional data sees order *from above*, digital data sees it *from below*: traditional data imposes grids and straight lines, while digital data allows fractal structures and diversity. This is not to say that digital data representations do not simplify: as new aspects are brought into focus, others become blurry (Andersson and Törnberg, 2018). As we emphasized throughout, *any* way of rendering legible requires abstraction and the bracketing of aspects of the world.

### Complex power

Looking back to the distinction between complex and complicated systems from Chapter 1, we can observe that platform power is in its essence *complex* power. The modern state saw itself through the epistemic lens of a

*complicated* machinery: top-down, hierarchical and bureaucratic, each of their components designed to carry out an organized function that fits into a larger structure. Such systems can be made highly efficient and capable of executing large-scale tasks with extreme precision, but they are at the same time brittle: fragile to internal and external disturbances, and lacking in their capacity to adapt to shifting circumstances (Michod and Nedelcu, 2003). In contrast, the platform represents a *complex* regime of power: organized through a large set of simple interacting components, each “to some degree independent, and thus autonomous in their behavior, while undergoing various direct and indirect interactions” (Heylighen et al., 2006: 125). By controlling the infrastructure on which it unfolds self-organization can effectively be designed, steered, and exploited.

To design infrastructures is to define the rules and goals of the social games that people are playing as they engage in the world. As Thi Nguyen (2020) argues, such games operate in the medium of agency: they have the power to determine not only the mode of interaction, but also the goals and motivations of players – that is, to shape their very subjectivity. To control a social infrastructure is to gain some level of control over the goals and rules governing social life. This is not to suggest that platform power vacates the role of individual agency but rather that it situates and sets the context of agency.

While biopower targeted individuals as part of a population, platform power thus operates on the interhuman and relational level, seeking to algorithmically modify the social rules that govern social behavior. Platform power thus implies a relational approach to control, reshaping the connections and relations between people, leveraging social behavior to generate social pressure for change. While an individual may of course choose not to play or to disregard the imposed rules of the game, this will – as in any game – inevitably imply losing in the eyes of those who *are* playing.

Twitter provides an example of this form of power in action (Nguyen, 2021; Törnberg and Uitermark, 2021b). When we engage in public conversation and discourse, we engage in a complex social activity in which each individual pursues their own goals – implicit, and often rich, subtle, and conflicting. Twitter’s interface constitutes the most profitable answer to the question: what type of game is public discourse? Twitter not only defines how we interact and supplants nuance and diversity with a simple points-based scoring systems to measure our conversational success in terms of numbers of retweets, likes, and followers. By defining measures of success which are irresistible in their simplicity and clarity, Twitter re-engineers our communicative goals. The effects of this are not restricted to the confounds of the platform itself, but as social media have become the chief engine of public discourse in our society, the aims and motivations seep out to redefine public discourse and even political life more broadly – in a process that Couldry and Hepp (2018) refer to as “deep mediatization.”

As Twitter applies this form of power to public conversations, labor platforms like Uber are employing similar strategies for worker control. While purporting to provide a ride-share market, Uber sets the base rates its drivers charge, and limits the ability of drivers to accept or reject these offers – even creating “phantom cabs” to give an illusion of greater supply to push down prices (Rosenblat and Stark, 2016). The Uber reputation system works as a normative apparatus, nudging both drivers and passengers toward a specific behavior through scores, nudges, detailed tracking, algorithmic control, and threats of fines and expulsion – all A/B-tested and designed with precision to shape worker behavior. At the same time, platforms shape subjectivities of workers by having them interact as competitors in a market rather than collaborators in a team, designing interfaces to prevent communication, and seeking to prevent emergence of a critical political subject needed for resisting the platform (Wells et al., 2021).

Platforms hence complicate conventional notions of agency and resistance. As the top-down control of high modernity was predicated on the suppression of agency and individuality, resistance is almost tautologically associated with the expression of individuality and the refusal of compliance. A growing literature on platforms examines how users seek to reclaim their agency from algorithms, illustrating various strategies employed by individuals and communities to subvert, undermine, or work around the constraints imposed by platform algorithms. Such “algorithmic resistance” (Bonini and Treré, 2024) or “data activism” (Milan and Treré, 2019) ranges from simple acts of defiance, like deliberately altering engagement patterns to confuse recommendation algorithms, to more organized efforts, such as collective campaigns aimed at highlighting or challenging algorithmic biases and injustices.

But as this book has served to argue, the control of digital modernity is not founded on homogenization or suppression of difference and individuality but seeks to provide conditions and rules of interaction so as to shape the sum of individual action. Well-designed social infrastructures are resilient to attempts at subversion, in fact, they benefit precisely from participants’ individuality, creativity, and innovative capacity. The agency is already accounted for, and – if well-designed – the systems are designed to be resilient to whatever action the individuals take. Platform control fits into a broader economy of difference where profits are based on depicting commodities as incomparable, which grants value to the unique, authentic, original, and even the transgressive – dimensions of human life inconsistent with modernist homogeneity (Harvey, 2012). Platforms hence seek to encourage – not suppress – differentiation and to some degree uncontrollable cultural processes.

A core difference between complex and complicated control is hence their relationship to agency. While complicated systems appear void of agency

– as individuals are reduced to components of a larger system – complex systems provide ample space for agency and individuality – but are also resilient to its actions. An ant in an ant colony may decide to resist and refuse to participate, but its actions will not affect the functioning of the larger colony. While complicated systems impose control from the top down, platforms impose control by directing and shaping the agency of participants.

Platforms shape user behavior partially in fact *through* participants' imaginaries of their algorithms and attempts to resist and game their rules. Users collectively construct stories about what type of content is promoted by the algorithm, to try to maximize their influence. This is just as accurately described as an attempt at reclaiming agency, or as another way in which the algorithm acts to shape their behavior. Complex power in this sense seems almost oxymoronic: it is not opposed to agency or even resistance but rooted in it. Participants may be well aware of the system in which they operate, but their attempts at resistance are inherently coopted. The only way to win is not to play.

# 8

## CONCLUSION

### The biopolitics of artificial intelligence

Power is based on abstraction, and abstractions rely on metaphors. Our metaphors represent *ways of seeing*: we slot reality into simplifications that allow us to perceive and measure but that also bracket and erase. As the powerful wield abstractions, these abstractions are imprinted on the world. During the industrial era that James Scott examined in the book from which this one draws its name, the *machine* was the dominant metaphor: a structured whole with clearly delineated component parts. Those in power sought to construct large-scale social machineries, modeled on the Fordist factory, with humans representing cogs in all-encompassing institutions.

This book is founded on the premise that we are now witnessing the rise of a new way of seeing: a new mode of abstraction based on a new set of metaphors, informed by the logic of code and computation. Its epistemology is complexity, and its metaphors are swarms, flocks, or ant colonies. It conceives of the world not in variables or grids but as interacting agents, cross-cutting relations, and emergent clusters. Its power relies on platforms, the social infrastructures that mediate our social and economic life.

Each shift in metaphor is associated with a ripple of transformations throughout the economy, society, and culture. Through the chapters of this book, we have sought to trace this emerging modernity in science, cities, media, movements, and the economy. We have seen in each a battlefield of competing ideas, with complexity emerging as an increasingly powerful way of thinking. And like any theory of the social world, the ideas of complexity are not merely descriptions of society: they define how society conceives itself. The social world is reflexively created through our metaphors.

Discussing very different examples alongside each other, as we have done in this book, has its disadvantages but does allow us to see some connections across our cases. We have seen how digital metaphors have emerged in a new interpretation of the social sciences that sees the social world as a seamless continuation of the natural – sharing a common epistemic foundation in that they are both *computational*. We have seen throughout that top-down planning and control are ever more resolutely rejected and that self-organization and emergence are celebrated. We have also seen that “the market” that is at the heart of neoliberalism has not been so much succeeded as a paradigm but that it is being remade – it is increasingly conceived, regulated, and taxed by platform firms. This transition is far-reaching and multi-dimensional. It involves new financial arrangements, types of research, cultures of collaboration, forms of data, and ways of communication. The shifts in these various dimensions cannot be disentangled but form an inextricable constellation, ushering in – partially, contradictorily, yet ineluctably – a new form of modernity.

While the new digital modernity has long been amorphous in its contours, it has in recent years become more crystalized as it coalesced around the rise of artificial intelligence (AI). Unlike the machines of industrial modernity, including classic computers, artificial intelligence is emergent and relies on distributed computation. The rise of AI in this sense represents the culmination of a key shift that we discuss in this book: the move away from hierarchically organized systems of top-down control toward self-organization. However, as we stressed throughout, “self-organization” here is not a spontaneous, undirected process, as it is in natural systems, but a logic of aggregation that is developed and employed toward specific ends as defined by corporate and state proprietors. AI feeds new forms of statecraft that construe and control populations, economies, and democracies in new ways. With Fourcade and Gordon (2022: 95), we argue these shifts demand that we examine “the forms of knowledge and modes of apperception at work within the state itself.” How, then, does the proliferation of AI fit into our analysis of the epistemology of power in the digital age?

### Seeing like an artificial neural network

AI emerged through the meeting of three concurrent developments: the platforms’ unprecedented accumulation of data, the decades old technology of artificial neural networks, and advances in parallel-processing hardware developed for rendering video game graphics. AI played a pivotal role in the data analytics techniques that helped platforms make use of their petabytes of data. As AI made their data valuable, platform giants like Google, Microsoft, and Meta in turn pumped vast investments into development and innovation around AI. The firms established dedicated research labs and

fueled cycles of technological development. These technologies are not only what enables much of the functioning of the platforms, but just as importantly, it is the engine that drives tailored advertising by transforming user data into a prediction of the most effectively targeted ad. AI is what enables the platforms to see through digital data.

AI has in recent years seen growing use for governance also outside the realm of platforms, as states and public institutions are increasingly experimenting with AI as a method of governance. From welfare (Dencik, 2022; Jørgensen, 2023), to taxes (Reutter, 2023), to borders (Amoore, 2021), AI techniques and large-scale data are being leveraged to predict, profile, preempt, and even make decisions within the public sector. Some scholars argue that we are standing on the precipice of a fundamental transition to an algorithmic and data-driven paradigm of governance (Yeung, 2023), in which “systems of social protection and assistance are increasingly driven by digital data and technologies that are used to automate, predict, identify, surveil, detect, target and punish” (Alston, 2019). Other scholars speak of the rise of a “new public analytics,” in which decision-making is partly or fully automated through the processing of vast quantities of data (Dencik et al., 2019; Yeung, 2023). AI is particularly employed in the governance and control of populations of the Global South. Molnar (2021) argues that vulnerable populations tend to be used as the “technological testing grounds” for datafication and AI innovation, while Amoore (2023: 8) shows that firms strategically test and develop controversial new forms of digital technology, surveillance, and control in the Global South in a “twenty-first century variant of the ‘boomerang effect of colonial practice’” (Amoore, 2023: 8). The borders between the Global North and Global South, too, are controlled and indeed created through new technologies relying on biometric data extraction, satellites, and AI (Beduschi, 2021; Madianou, 2021; Molnar and Gill, 2018).

While the powerful applications of AI are recent, the chief technology that underlies contemporary AI is decades old. Artificial neural networks were first developed by the cyberneticists Warren McCulloch and Walter Pitts (1943) in the mid-20th century. The technique is inspired by the biological neural networks in the human brain, processing information through a range of simple parallel processing (Yegnanarayana, 2009). These systems are based on large-scale complex networks of interacting nodes – “neurons” – that are connected through a link with an associated weight – “synapse” – which is adjusted through a learning process. When data is fed into a neural network, it moves through multiple layers of these interconnected neurons, transforming the input data at each layer and ultimately producing an output. The data is fed into the first layer, and then moves through several hidden layers, before arriving at an output layer, which represents the final prediction. Neural networks are carrying out a distributed form

of computation that is fundamentally different from the logic of traditional computers. It is a move from the rule-based logic of algorithms to a way of seeing that is based on categorization, classification, and association. We can point to three associated shifts in biopolitics resulting from AI.

### 1. From variables to patterns

As we discussed in Chapter 2, statistics was key to the rise of the very notion of the modern state. It has historically been a defining tool for governance, serving as a foundation upon which populations can be rendered visible, understandable, and manageable. While statistics and AI-based techniques such as machine learning may superficially appear similar, they represent profoundly different epistemological lenses.

Statistics operates under a foundational framework anchored in hypotheses testing, probabilistic models, and predefined relationships between variables. Statistics begins with variables: pre-defined categories and attributes that are imposed on subjects to enable collecting, categorizing, and analyzing information in a structured way. These variables are taken to represent some aspect of the world that the researcher believes is relevant for a phenomenon – like age, gender, income, ethnicity, or occupation. By defining variables, the statistician can produce a coherent, albeit abstracted, representation of the vast array of individuals.

Having defined variables, the statistical study sets off to test a pre-conceived hypothesis about the nature of a phenomenon. The testing is founded on identifying sources of variance among variables, used to draw inferences about broader populations based on a sample of data. The world, through the lens of statistics, is perceived through relationships between variables within a sample of individuals that are taken to represent a larger population.

The nature and properties of statistics can be seen in the modern state and its forms of governance (Desrosières, 1998; Foucault, 2008). Statistics and its data epistemologies shaped the social world, as the state standardized, named, measured, and confined its subjects, seeking to impose the vision of its statistical way of seeing on a territory (Scott, 1998). The modern state is defined in relation to its “population” – a statistical concept that has been transformed into an entity in itself, with properties, attributes, and behavior. While the premodern state was characterized by the sovereignty over territories or individual bodies, the modern state was defined by regulatory power over populations. By collecting, aggregating, and analyzing data about births, deaths, health, education, employment, and other demographic factors, the state could identify trends, make predictions, and implement policies to manage the “social body.” This quantification of the population, while enabling more effective governance, also sustains a form of power that is diffused and pervasive. The “population” becomes both an



object and a subject of governance – its behavior can be influenced by state policies, and its statistical representations can in turn shape those policies.

AI, in contrast, represents a very different epistemology. It does not begin from predefined variables but can process flexible and poorly structured data. While statistics requires episodic data, fixed and well-structured, AI enables analyzing constantly streaming and unstructured data (Isin and Ruppert, 2020; Törnberg and Uitermark, 2020). Its subject matter is not a representative population with predefined attributes but identifying patterns and clusters within flows of data.

AI furthermore does not seek to test preconceived hypotheses, but to “learn” patterns from historic datasets, prioritizing predictive accuracy over interpretability (Amoore, 2023; Yeung, 2023). While statistical models require assumptions about data distributions or the functional form of relationships, AI-based models can flexibly adapt to complex, non-linear patterns in large datasets without an explicit predefined model. While statistical analysis draws on the means and variabilities of a set of predefined variables, machine learning uses prediction models to either identify patterns in data or to “learn” to link input to output through existing examples – representing the world as a dynamic and complex web of interrelationships. AI thus moves beyond the notion of variables to clusters, patterns, and features.

The shift from statistics to AI as a tool for governance has fundamental implications for biopolitics. While populations are predefined and produce data through sampling, the data that fuels AI are collected from apps, software, and sensors that often exceed borders. The statistical state operates on a form of governance that begins from theory and can thus be made subject to critique. Race, for instance, can be operationalized – crudely – as a variable and can be included or excluded in decision-making processes – and be made subject to debate and problematization. Through the AI lens, race instead appears as a cluster of outcomes: a family resemblance category that does not stem from theory but emerges from combinations of “features.”

AI is notoriously racially biased. In a landmark study of automated facial analysis, Buolamwini and Gebru (2018) found that the algorithms disproportionately misclassified darker-skinned women (with maximum error rates of almost 35 percent) while lighter-skinned males were the least likely to be misclassified (with a maximum error rate of less than 1 percent). While in this instance, the researchers could track with precision the biases inherent in the software, it is in the nature of AI that automated processes of categorization and classification are difficult to scrutinize. This goes back to the example of redlining with which we started this book. “Digital redlining” parallels the historical practice of denying services to marginalized groups based on their race and location but, instead of overt discrimination, algorithms identify complex combinations of features that function as proxies

or correlates for race (Friedline and Chen, 2021). This results in discriminatory consequences that do not explicitly draw on race as category and thereby evade existing anti-discrimination legislation. As Zeynep Tufekci (2024) argues, this problem of unaccountability remains when AI is purposefully designed not to discriminate according to familiar categories such as race. When AI sorts people, such as applicants for jobs, it will invariably yet opaquely discriminate based on arbitrary criteria. It is at that moment that AI does not just discriminate but also precludes the possibility of a debate on the political choices and assumptions that go into given decisions. Briefly put, by stripping theory from governance, AI is erasing the possibility of politics as it is currently conceived.

## 2. From rules to associations

While AI is computational, it also represents a fundamentally different form of rationality from the conventional algorithm-based computational paradigm. Conventional algorithms are based on collections of “if-then”-style rules: if a certain condition or set of conditions holds true, then a consequent action or series of actions is executed. This form of logic fits neatly into the paradigm of rational bureaucracies and rule-based governance, which emphasized principles such as predictability, standardization, and consistency. Such aims were achieved through an architecture of standardized procedures and protocols, much as a computer program operates on a pre-defined logic and instructions. The rationality and neutrality of computers offered a perfect analog: a way to ensure that given a particular input or condition, a predictable and consistent output would follow. As Amoore (2023) argues, the postwar social and international orders were founded on such definitive and conclusive algorithmic procedures (MacBride, 1967). In this light, the advent of computers and their inherent logic can be seen not just as a technological revolution, but also as a reflection and reinforcement of the broader societal shift toward rationalization and methodical structure in the 20th century. The high modernist state was, in short, characterized by this paradigm of computation.

The rise of AI represents a shift away from this rule-based computational paradigm. This move was in part necessitated by the inherent limitations of the rule-based logic. While algorithms enable the construction of highly sophisticated and precise systems, they fail when met with tasks that may seem relatively simple. Take, for instance, the task of recognizing a picture of a cat. A digital picture consists of an array of millions of pixel color values, and manually describing the rules for when the combination of those pixels describes a cat is virtually impossible. In contrast, neural network-based AI techniques do not require explicit rules, but “learn” associations from large numbers of examples. One simply “trains” the algorithms by feeding it vast

datasets of pictures that contain cats. The neural network finds an optimal configuration of weights that map the input data to the target output: a function that optimally separates the cats from the non-cats, encoded as millions or even billions of “weights” or “parameters” that connect imagined neurons in a large network.

AI operates not on the logic of if–then, but on the logic of association and optimization. It operationalizes not strict definitions, but rather Wittgenstein’s (1968) notion of “family resemblance,” capturing categories that have a series of overlapping similarities, without sharing a single common trait. While pictures of cats often feature fur, little paws, or pointy teeth, there is not any one feature that all cat pictures necessarily have in common. Neural networks identify such “features” from sets of pixels – fur, paws, teeth – and draw on these to conclude whether the photo is likely to contain a cat or not. The problem is that it is nearly impossible to know *why* a particular object was categorized in a certain way, or what attributes or features were taken into account, as the function itself consists of nothing more than a large number of weights. Since the networks consist of often millions or even trillions of “weights” deciding the strength of connections between neurons, and the capacities of the networks emerge through their large-scale interaction, it is often impossible to tell how or why the networks reaches a given conclusion. As a result, the systems may use different features than the analysts expect to solve the problem that they are given.

For institutions, the AI paradigm implies a novel way of carrying out functions, operationalizing them not as a set of rules, but as a question of *associations* or *optimizations*. Take for instance a hiring agency that wants to identify the best applicants for a given position. Using a conventional rule-based system, they may define a set of rules to identify promising applicants – such as whether the applicant fulfills the requirements listed on the position. The machine learning solution would instead be based on training the system using a large number of previous applications, allowing it to automatically identify the features that characterize successful applicants. Amazon famously employed this precise approach. However, after some years, they discovered that the AI had found a simple heuristic for identifying which candidates were successful in the historical data: their gender. While the system was not given the gender of applicants, it managed to identify the gender through subtle cues, and then automatically rejected female applicants. This issue went unnoticed for years, underscoring the opacity of these AI-based systems.

When governance is reshaped by AI, association and optimization thus enter into its logic. The systems are often used to rank citizens in terms of “risk,” with tax agencies using the techniques to identify possible tax cheaters, and the Danish government planning to roll out an automated “risk assessment” system for migrant families. In Spain, the public employment

service uses AI-based system to calculate unemployment benefits and to allocate interviews, job offers, and training courses. Among the most (in) famous example is the use of the so-called PredPol (“Predictive Policing”) in the United States, allowing police departments to anticipate potential future crime locations. Drawing from historical crime data, PredPol renders real-time predictions for criminal hotspots. This perpetuates existing biases, like over-policing certain areas, creating feedback loops as the initial prediction is validated by increased recorded crime.

AI thus recasts the work of governance as a series of categorization and optimization problems, according to an algorithm that seeks to optimally distribute benefits and punishments – while concealing the political choices that go into those decisions. When questioned *why* a particular decision was made, there will not necessarily be any other answer than a list of weights of a large neural network, thus reducing governance into merely a technical matter.

### 3. From surveys to sensors

The rise of AI means a shift in the types of data that can be used for analysis. As noted, statistical data is typically obtained through structured surveys distributed to a random sample from a population, yielding datasets with rows of numerical or categorical answers designed for statistical analysis. As a result, data collection through demographics and surveys tends to be structured, deliberate, and episodic, categorizing individuals based on predefined attributes, like age, gender, occupation, or ethnicity. The data gathered is primarily self-reported, limited to the questions asked, and often requires significant effort in design, distribution, and analysis.

The data that feeds AI, in contrast, has relatively lax requirements when it comes to structure, opening for a broader range of data gathering. The data used by AI is primarily collected through “datafication,” in which everyday activities are remade so as to produce valuable data (van Dijck, 2013). Digital data are produced through the ubiquitous presence of sensors, digital devices, and platforms in our lives, which are designed so as to extract data, often in real-time and at scale. A broad literature on “datafication” has highlighted how platforms and media are created for the extraction of user data as the commodity (van Dijck and Poell, 2013). Characteristic of datafication is also that platforms pursue data accumulation without a clear predefined use of the data: seen for instance in Google’s digitalization of a large swaths of all books ever written, which a decade later came to provide key fuel for their AI ambitions.

While demographic and survey data collection required active participation and was often constrained by specific questions or categories, datafication is continuous, passive, and vast, capturing a myriad of details about individuals’ behaviors, preferences, and routines.

From our online searches, social media interactions, and e-commerce behaviors to the sensors in smartphones that record our physical movements, vast amount of data are constantly generated. Unlike the set format of a survey, datafication often captures raw, unstructured data, which can later be processed, analyzed, and utilized in diverse ways. Furthermore, datafication often occurs passively; individuals might not even be aware of data being collected about them as they go through their lives.

As AI spreads as a governance technology within the public sector, we may thus expect an intensified pressure for datafication, with existing public services being digitalized and designed to extract user data. We may furthermore a new wave of digitalization of state documents, with the explicit or implicit aim of feeding future AI systems. The state already has access to vast troves of data, pertaining to healthcare, education, criminal justice, tax and financial behavior, transportation and mobility, and so on. In many cases, these data may not be structured in a way that allows for data analysis. We are likely to see pressures for intensified digitalization of such datasets, to make them valuable for new forms of data analysis.

For instance, we are already seeing a growing use of sensors and automatic data collection at borders. Within the literature on the digitalization of migration governance, a particular focus has been put on the entanglement between algorithmic sorting technologies and biometric data (Baykurt and Lyamuya, 2023). By streamlining refugee registrations, biometrics is seen as alleviating the administrative burden on aid workers. The United Nations High Commissioner for Refugees (UNHCR) has for instance developed a policy on “digital identity” for all displaced individuals, which involves the use of digitized biometric data that can be easily accessed and traced across borders. This digital identity serves as a means of gaining access to employment opportunities, remittances, and banking services, while preventing migrants from acquiring repeated assistance (UNHCR, 2018). Such data should be understood as being collected not merely for the presented purpose, but also for the possibility of future yet unforeseen uses.

### Five questions for AI biopolitics

As AI represents a new epistemology, it appears to be transforming the platform transformation of governance to a broader societal shift. We conclude this book by asking four questions to guide future research into how AI is transforming governance and biopolitics.

*How does AI perpetuate inequalities?* For AI, the past plays an active role in the present, as AI is defined by learning patterns based on existing data – thus tending to perpetuate existing structures, tendencies, inequities, and injustices. Data that have their roots deep in legacies of slavery, apartheid, or colonialism may reappear deeply embedded within the layers of neural

networks. This suggests the need for a genealogy of AI: tracing how these digital artifacts bring yesteryears' inequities and injustices into the present. This is all the more urgent considering that the operations underlying AI's outputs are opaque and complex, meaning that it is challenging to pinpoint which authority or procedure is responsible for decisions.

*Who owns the AI state?* As we have seen, platforms represent the growing influence of private institutions over governance. As AI becomes an important tool of governance, its dependence on products and services from the private sector implies a shifting relationship between private and public. By plugging into a political economy of surveillance capitalism, AI may not only drive the commodification of citizen information, but risks locking governance into the logic of a broader data-driven political economy. The growth of private interests within the public sector is not merely a question of privatization, but of redefining the very notion of public institutions as we commonly understand them.

*What are AI minorities?* Just as statistics produced a form of spatialized "population" to be subjected to governance, so AI produces its own forms of subjects – following its own governance logic of clusters, features, and associations (Isin and Ruppert, 2020). With the rise of AI-based governance, we may thus expect to witness new forms of coding of racial categories (Amoore, 2023; Benjamin, 2020). The concept of clustering undermines the traditional way in which states apply categories and criteria to groups, enabling a more flexible reimagining of the population based on inferred group attributes. The effect is to reimagine concepts like "race" or "gender," transforming them from variables into a collection of emergent features of a neural network (Amoore, 2021). Such reimagining of categories may be made to productively challenge binary divisions, but it also erases the 20th-century guardrails against racism and sexism that relied on notions of fixed characteristics and categories.

*What is politics in the era of AI?* Our political sphere is modeled on the basis of the form of politics that is associated with statistical state. The concepts emerging from statistics provide a theory of governance that can be subjected to politics and contestation. As we have seen, AI does not begin from theories or hypotheses, but seeks prediction based on patterns identified in data and that is embodied in opaque models that offer limited insights into their internal workings and reasoning processes. Such models challenge the very fabric of political life as they disrupt the pathway through which citizens may participate in shaping decisions about their own futures, and risk creating a neo-Kafkaesque form of bureaucracy where decisions are concealed in opaque technical systems. By reducing political decisions into optimization problems, algorithmic systems erase the inherent intractability and pluri-dimensionality of politics, and foreclose the possibility of other ways of understanding the world and other ways of being (Amoore, 2023).

While “explainability” has emerged as a major research endeavor to understand and provide justifications for the decisions or outputs generated by an AI system – the politics that systems would generate are yet to be explored. This raises questions not only about the role of democracy within AI governance, but also about the nature of politics in the AI era.

The questions that we have here raised are not only questions of academic or intellectual curiosity, but fundamentally political issues that will define society in coming years. While this book has pointed to a set of trends associated with digital technology, these trends should not be understood as unequivocal or inevitable. While technological change will inevitably destabilize existing structures and institutions, the direction and implications are not preordained. They are, instead, the result of ongoing negotiations, decisions, and actions taken by individuals, movements, and governments. This realization underscores the importance of critical engagement with technology, not as a passive backdrop to human activity, but as an active participant.

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