THE PLATFORM SOCIETY

PUBLIC VALUES IN A CONNECTIVE WORLD

JOSÉ VAN DIJCK | THOMAS POELL | MARTIJN DE WAAL

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Acknowledgments

IT HAS BEEN quite a challenge to write a book on online platforms during a year when the tables on tech companies turned drastically. Between November 9, 2016, and late January 2018, we needed to revise our story on the platform society many times over. And still, we can barely keep up with the many shifts taking place in the world of platforms every single day. By the time this book is out in print, there will undoubtedly have been a few more twists and turns in this story that we have missed; it is impossible to pin down a moving target. Nevertheless, we hope you will appreciate our attempt at providing a more enduring understanding of the public values at stake in the struggle over the platform society.

This book has a precursor in a Dutch report we published in December 2016 with Amsterdam University Press. Although the title is similar, this book is neither a translation nor even a revised version. Prompted by the many fast-paced changes in the platform ecosystem over the course of 2017, we deliberately expanded our analytical scope and wrote this book for a wider scholarly audience than the policymakers we originally intended when we compiled the Dutch report. Over the course of five years, our research leading up to this book has been published in a number of different journals and edited volumes; you can find the precise titles and references in the bibliography. We would like to thank these journals' anonymous peer reviewers who have contributed significantly to polishing our arguments.

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Amsterdam, January 25, 2018

INTRODUCTION

THE "SHARING ECONOMY," the "platform revolution," the "gig economy," "disruptive innovation"—these are just a handful of epithets used to denote the latest transformation of the Internet. The rise of digital platforms is hailed as the driver of economic progress and technological innovation. Individuals can greatly benefit from this transformation because it empowers them to set up businesses, trade goods, and exchange information online while circumventing corporate or state intermediaries. People all over the world can use Airbnb to rent an apartment in a foreign city, check Coursera to find a course on statistics, join PatientsLikeMe to exchange information about one's disease, hail a ride using Uber, read news through Facebook's Instant Articles, or use Deliveroo to have food delivered to their homes. In doing so, users can avoid booking a regular hotel, registering at a university, going to a general practitioner, calling a licensed taxi business, buying a newspaper, or visiting a restaurant. The promise of platforms is that they offer personalized services and contribute to innovation and economic growth, while efficiently bypassing incumbent organizations, cumbersome regulations, and unnecessary expenses.

Some management and business scholars have touted this development the "platform revolution" and focus on the positive economic effects of a technological development they hail as "innovative disruption" (Parker, Van Alstyne, Choudary 2016; Sundararajan 2016). Individual citizens or consumers organize themselves through

online networks, so they are less dependent on legacy institutions or companies such as publishers, news organizations, hospitals, unions, brokers, and so on. The Internet-based utopian marketplace would allow individuals to offer products or services "directly" without having to rely on "offline" intermediaries, whether state or corporate. In the early years of this development, some theorists touted the nascent growth of online platforms as the economic corollary of a "participatory culture" that started with the emergence of social media networks and Web 2.0 in the early years of the millennium (Archibugi, Filippetti, and Frenz 2013; Jenkins, Ford, and Green 2013; Aigrain 2012; Botsman and Rogers 2010b; Bruns, 2008; Leadbeater 2009). The wealth of online social networks enables connectedness, while bypassing existing social institutions; following this line of argument, *connectivity* automatically leads to *collectivity* or connectedness.

We agree that online platforms are at the core of an important development, but we think of them neither as an exclusive economic phenomenon nor as a technological construct with social corollaries. Rather, we prefer a comprehensive view of a connective world where platforms have penetrated the heart of societies—affecting institutions, economic transactions, and social and cultural practices—hence forcing governments and states to adjust their legal and democratic structures (Chadwick 2013; Van Dijck 2013). Platforms, in our view, do not *cause* a revolution; instead, they are gradually infiltrating in, and converging with, the (offline, legacy) institutions and practices through which democratic societies are organized. That is why we prefer the term "platform society"—a term that emphasizes the inextricable relation between online platforms and societal structures. Platforms do not reflect the social: they *produce* the social structures we live in (Couldry and Hepp 2016).

The "platform society" does not merely shift the focus from the economic to the social; the term also refers to a profound dispute about private gain versus public benefit in a society where most interactions are carried out via the Internet. While platforms allegedly enhance personalized benefits and economic gain, they simultaneously put pressure on collective means and public services. Airbnb offers the potential for some individuals to make some money on a spare room and for others to stay in relatively cheap accommodation. But who will pay for the collective costs? Who will enforce fire safety rules? And who will clean the streets after tourists have left? Students are tempted to consume "free" courses on Coursera, but who pays for the teaching effort that goes into producing them? We are often made to think that platforms offer a new societal arrangement, which stands apart from existing social and legal structures. The term "platform society" emphasizes that platforms are an *integral* part of society, where conflicts of interest are currently played out at various levels. We want to highlight how the implementation of platforms in society triggers a fierce discussion about private benefit and corporate gain versus public interests

and collective benefits. It is a discussion that is long overdue; many platforms have grown surprisingly influential before a real debate about public values and common goods could get started.

The subtitle of the book indicates the broader perspective we assume: *what role do online platforms play in the organization of public values in North American and western European societies?* Platforms are neither neutral nor value-free constructs; they come with specific norms and values inscribed in their architectures. These norms may or may not clash with values engraved in the societal structures in which platforms vie to become (or are already) implemented. European societies are rooted in different ideological values from those introduced by many platforms. Many people consider innovation and economic progress to be the primary drivers of a platform-based society. But there are other public values at stake in the process to transfer social traffic and economic transactions to an online connective world. Some of these values have already received much attention, such as privacy, accuracy, safety, and consumer protection. We want medical apps to be accurate and hence safe for users; consumers want to keep some data private, and they want their files and photos to be protected against hackers, fraudulent users, and cyberattacks. Other values that pertain to the common good and society as a whole are just as important—think of fairness, equality, solidarity, accountability, transparency, and democratic control. We want online education to be fair and nondiscriminatory, we want personalized health apps to contribute to equality in treatment, and we may expect from online news sites that they not only deliver accurate reports but also support democratic openness.

The connective qualities of online platforms, however, do not automatically translate into public values. Privacy issues have been a bone of contention between platform owners, state regulators, watchdog organizations, citizens, and lawyers; and they need to be assessed contextually—that means, in the specific context of each application in each social situation in each specific sector (Nissenbaum 2010). For instance, the need for transparency of data flows is important to help law enforcement but may clash with the privacy protection of users or with other public values such as security, discrimination, or taxing duties. Such conflicts may bring to the surface ideological differences between American and European democracies. Whereas many platforms, particularly the dominant ones, are US-owned and operated, European public values are often at odds with the values inscribed in their architectures. Different public values are deployed as strategic arguments in the negotiations between Airbnb owners and local city councils, between Uber and (supra-)national governments—not just in Europe but across the world. None of these values are chiseled in stone or uncontroversial; on the contrary, they are the very *stakes* in the struggle over the organization of platform societies around the globe.

THE PLATFORM SOCIETY: A FEW DEFINITIONS AND A QUICK READING GUIDE

The first chapter will lay out why the "platform society" is a contested concept, using Airbnb as an example. The term refers to a society in which social and economic traffic is increasingly channeled by an (overwhelmingly corporate) global online platform ecosystem that is driven by algorithms and fueled by data. To get a firm grasp of what is at stake here, we will define and unravel what we mean when we talk about "platform" and "platform ecosystem"—essentially metaphorical constructs which have become accepted as catch-all terms.[1] An online "platform" is a programmable digital architecture designed to organize interactions between users—not just end users but also corporate entities and public bodies. It is geared toward the systematic collection, algorithmic processing, circulation, and monetization of user data. Single platforms cannot be seen apart from each other but evolve in the context of an online setting that is structured by its own logic. A "platform ecosystem" is an assemblage of networked platforms, governed by a particular set of mechanisms (explained in chapter 2) that shapes everyday practices. The Western ecosystem is mostly operated by a handful of big tech companies (Alphabet-Google, Apple, Facebook, Amazon, and Microsoft) whose *infrastructural* services are central to the ecosystem's overall design and the distribution of data flows. Besides, we will explain how several types of *sectoral platforms* are developed that often seamlessly integrate with the infrastructural core, not just in market sectors such as transport and hospitality but also in public sectors such as education and health.

Although large platforms, particularly those wielded by the "Big Five" tech companies, may dominate the ecosystem, they are not the only contestants. Governments, incumbent (small and large) businesses, individual entrepreneurs, nongovernmental organizations, cooperatives, consumers, and citizens all participate in shaping the platform society's economic and social practices. Evidently, clashes among actors who all have their own interests take place at various levels: local, national, supranational, and global. Local governments around the world are increasingly confronted with global platforms operating in a gray legal area. The new ecosystem of platforms is distinctly global, and the confrontations that play out at national or local levels are symptomatic of a geopolitical minefield where ideological viewpoints are constantly clashing—particularly in Europe.

While the first chapter theorizes the platform society's organization from a political economy perspective, the second chapter concentrates on the mechanisms platforms inject into social and economic interaction. We have identified three main mechanisms as driving forces underlying the ecosystem: datafication, commodification, and selection. Far from being mere technical or economic processes,

we emphasize the mutual shaping of technology, economic models, and users: while platform mechanisms filter and steer social interactions, users also define their outcome.[2] Understanding the platform society requires a thorough analysis of the ecosystem's dynamics and the techno-economic and sociocultural practices through which they take shape.

As said, the rise of the "platform society" can be characterized as a series of confrontations between different value systems, contesting the balance between private and public interests. Chapters 3 through 6 turn the spotlight on four different sectors of society, ranging from predominantly market-ruled sectors to largely public sectors, asking: *how are platforms and their mechanisms implemented in various private and public sectors in societies on both sides of the Atlantic?* It is very difficult, if not impossible, these days to make a clear-cut distinction between the private and public spheres (Dulong de Rosnay and De Martin 2012). Therefore, we concentrate on how public *values* are contested during the implementation of platforms in each sector, whether predominantly public or private. In fact, a process of privatization often forms the core of these contestations. Each of these four chapters presents a critical inquiry into the premises, practices, and conflicting interests that platforms bring to existing social structures. We explain how online platforms penetrate a specific sector, how infrastructural and sectoral platforms are embedded in the ecosystem as a whole, which (public) values are championed or embattled, how terms for implementation are negotiated, and how they impact the organization of sectors and societies.

Chapter 3 covers the sector of news and journalism. Predominantly a market sector, news indisputably embodies a profound public concern. Key values such as journalistic independence and the provision of trustworthy and comprehensive news reporting have come under mounting public scrutiny as connective platforms have come to steer the conditions of production and distribution. In chapter 4, the focus will shift to the market sector of urban transport, which has been shaken up in many cities around the world by ride-hailing services like Uber and Lyft. We deliberately broaden the focus from taxi services to urban transport as such, a sector rife with private as well as public interests. Chapter 5 investigates the health sector, which is strongly impacted by platforms. Most pressing in the bourgeoning field of health and fitness apps are questions of safety, privacy, and accuracy, which may be squarely at odds with public values such as accessibility to data for research purposes. Chapter 6 concentrates on education by zooming in on data-based online platforms in primary schooling and higher education in the United States and Europe. What effect does the implementation of platforms have on public values, ranging from privacy to accessibility and *Bildung*?

In chapter 7, we will shift our focus from the analytical to the normative and return to the main issue of this book: *who is or should be responsible and accountable for*

anchoring public values in the platform society? The responsibility for a balanced platform society—an open society that anchors its public values in a transparent and accountable manner—rests with all actors involved in its construction: corporations, governments, and civil society actors. While all three are needed to achieve such balance, we will argue that supranational, national, and local governments have a special responsibility in this regard. Particularly in the European context, governments are not just arbiters of market dynamics and level playing fields but can and should be proactive in negotiating public values on behalf of citizens and consumers. Discussing their potential roles, we argue how governments need to adjust their instrumentation for regulation and control to protect a democratically agreed upon set of public values. Finally, it is essential not only to understand the platform society's guiding mechanisms but also to link these to an ideological model in which (European) governments acknowledge their differences with the (US) values inscribed in the architecture of a global platform ecosystem. Platform societies, after all, are not insulated from geopolitical influences; the dynamics of various colluding ecosystems prompt us to look beyond the level of national battles. This global contest is not anywhere near to being settled; on the contrary, it is in full swing.

Perhaps two disclaimers are in place here. Although we try in this book to provide a comprehensive view on the complex issue of negotiating public value in a connective world, *The Platform Society* cannot offer a blueprint of what this world should look like or how academics can solve all kinds of intricate problems that come along with platformization. More than anything, our effort is a multidisciplinary attempt to draw together insights not only from science and technology studies, political economy, and business and management studies but also from media studies and legal studies. Needless to say, we cannot possibly cover all relevant scholarly angles and approaches in one book. We apologize for not being experts in all academic disciplines as we feel most at home on our own turf: media studies. In its omnivorous capacity, however, this book should offer other disciplines food for thought and engagement.

The other disclaimer concerns our object of research which is a moving target. By the time this book is out in print, there will undoubtedly have been new revelations or developments that impact the position of platforms in the digital world order. We can impossibly include or anticipate all the latest "trending topics" in our study, so we concentrate primarily on analyzing and unraveling the underpinning mechanisms of the platform ecosystem. In doing so, we hope to give students and academics an instrumentarium that helps understanding and shaping the platform society.

1

THE PLATFORM SOCIETY AS A CONTESTED CONCEPT

INTRODUCTION

Since the onset of the platform in 2007, the "Airbnb experience" has quickly spread across the globe, where it is currently the market leader in online hospitality services, enabling people to lease or rent out their private spaces. With over 22,000 apartments and flats per year being advertised on the site, Amsterdam has become one of the popular destinations for Airbnb users in 2018. The upsides are clear: citizens can earn a sizeable income by offering their private space to accommodate tourists, and tourism euros benefit the local economy. The city council has also been confronted with the downsides.[1] With popularity came irritation: besides garbage, noise, and rowdy tourists annoying individual citizens, the city was alarmed about safety issues. Private hosts quickly discovered Airbnb as the easiest and cheapest way to rent out their property year-round, triggering concerns of fairness and an uneven playing field for entrepreneurs in the hospitality sector.

While hotels are strictly licensed with regard to safety concerns and contribute to local taxes, platforms like Airbnb defy any label that renders them part of the formal sector: they own no real estate and do not employ hotel staff, so they do not have to comply with the city's rules and regulations. The platform merely enables "hosts" and "guests" to connect online. Repeated requests from city managers to get access to Airbnb's host data, in order to enforce local regulations, were rejected on grounds

of users' privacy protection. After months of intense negotiations, the city's management finally struck an agreement with Airbnb: in December 2016, it was announced that the platform would enforce the city's mandated sixty-day maximum stay limit.[2] According to policymakers, the deal signified a promising first step in exerting the city's governing power to curb the "Airbnb effect" and keep the downtown area livable for citizens.

However, a deal with the biggest platform was not enough because Airbnb has many competitors, including 9Flats, Wimdu, BeWelcome, Couchsurfing, HomeExchange, and TripAdvisor, all of which operate under different conditions. In their quest for a solution, city managers had to walk a tightrope, balancing private gains with public interests—weighing the interests of Airbnb hosts against those of regular hotel owners who were accusing the former of illegal hotel-keeping. Besides guarding a level playing field, there was the question of keeping the city affordable to citizens with rising real estate prices. While joining forces with cities across Europe, Amsterdam started looking at various permanent solutions. In October 2017, the city council implemented a local register to regulate the licensing of online tourist accommodation not listed as official hotels or bed and breakfasts. The register formed the preliminary apex of a protracted negotiation with Airbnb and the hospitality sector—a negotiation that continues until this very day.

The invasion of online platforms in the hospitality sector is just one example of the many battlegrounds in a society where social and economic interaction increasingly happens through a digital infrastructure that is global and highly interconnected (Guttentag 2013; Davies et al. 2017; Stabrowski 2017).[3] In this chapter, Airbnb and the disruption of the hospitality sector will serve as a primer to define the stakes of the platform society as a contested concept. We will offer an investigative perspective that pertains to the micro-level of *single platforms*, the meso-level of a *platform ecosystem*, all the way to the geopolitical macro-level of *platform societies*.[4] Platforms cannot be studied in isolation, apart from social and political structures, as they are all (inter)dependent on a global infrastructure that has been built steadily from the early 2000s onward.

As illustrated by the Airbnb case, the adoption of platforms causes a clash between stakeholders over public values. The values at stake in this struggle are not just economic and social but inevitably political and ideological, which is why we also need to look at the role online platforms play in organizing societies in a globalizing world order. The geopolitics of platform infrastructures informs the ways in which power is distributed, not just market power but also state power. Clashes between US-based platforms, governments, and local communities on both sides of the Atlantic are typically disputes over what public values are at stake, how societies want to protect them, and whether the available regulatory instruments are appropriate to

do so. But before we can address questions of governance, we need to comprehend what constitutes a platform, how the platform society emerges, and on which premises it is being built.

PLATFORM ANATOMY: ELEMENTS OF CONSTRUCTION

In the introduction, we defined a platform as a programmable architecture designed to organize interactions between users. Many people think of platforms simply as technological tools that allow them to do things online: chatting, sharing, commenting, dating, searching, buying stuff, listening to music, watching videos, hailing a cab, and so on. But these online activities hide a system whose logic and logistics are about more than facilitating: they actually shape the way we live and how society is organized (Gehl 2011). Now let us first look more closely at the elements that construct a single platform's anatomy: a platform is fueled by *data*, automated and organized through *algorithms* and *interfaces*, formalized through *ownership* relations driven by *business models*, and governed through *user agreements*. We will zoom in on each of these technical, economic, and sociolegal elements to explain the nature of their governance power, before we explore their mechanisms and effects in the next chapter.

Platforms automatically collect large amounts of *data*—both content data and user data (Driscoll 2012; Mayer-Schönberger and Cukier 2013; Turow 2012; Van Dijck 2014). The collection of data is enabled and shaped by hardware and software; devices people use to access platform services often come equipped with software and apps that can automatically collect data. With each mouse click and cursor movement user data are generated, stored, automatically analyzed, and processed—not just Internet protocol addresses and geolocations but detailed information about interests, preferences, and tastes. Large quantities of data are also collected across the Web through the implementation of "social buttons" and "pixels" (Facebook, Twitter, LinkedIn, Instagram, YouTube, or Google+) on websites (Gerlitz and Helmond 2013).

Data provide the fuel for a growing connectivity between platforms. By means of *application programming interfaces* (APIs), platforms, subsequently, offer third parties controlled access to their platform data, giving them detailed insights into user behavior and metrics—information on which they can build new applications or platforms (Helmond 2015; Langlois et al. 2009; Zittrain 2008).[5] Since eBay launched the first open API in the year 2000, its ubiquitous employment has arguably transformed the Web into a data-driven, platform-based ecosystem.

Algorithms are another significant technological ingredient defining the connective architecture of platforms; they are sets of automated instructions to transform input data into a desired output (Gillespie 2014; Pasquale 2015). For instance, Google's PageRank algorithms define the relevance of a web page by calculating the number

and quality of hyperlinks to this page. And Facebook's News Feed algorithms determine the content you will be exposed to, calculated on the basis of the online activities of "friends" and "friends of friends" (Bucher 2012). Platforms use algorithms to automatically filter enormous amounts of content and connect users to content, services, and advertisements. Although platform owners may lift a veil on how their algorithms work, they are often well-kept trade secrets and are everything but transparent. Moreover, algorithms have become increasingly complex and are subject to constant tweaking.[6]

Shifting the focus from technological to economic relations, two particularly important ingredients of a platform's architecture are its *ownership status* and *business model*. To start with the former, each platform has a specific legal–economic status; most distinctively, platforms may be operated on a for-profit or a nonprofit basis, even though such labels often leave implicit who stands to profit from a platform's activities.[7] Airbnb, for instance, is run by a US company with headquarters in San Francisco and satellite offices in nineteen cities around the world; the company is owned by its stockholders, who are, besides its founders, a number of Silicon Valley venture capitalists. Whether a company calls itself "global" or "American" has implications for compliance with regulatory regimes including taxation. Ownership status also has consequences for a site's economic transactions and its social interactions with users. It is relevant for users to recognize owner–consumer relationships, especially because they may change over time. Couchsurfing Inc. is a case in point; the "hospitality site" started in 2005 as the Couchsurfing Collectives, with local teams operating from the United States, Canada, Austria, and New Zealand. When the site changed from a volunteer-based organization financed by donations to a corporation in 2011, many members objected to the shift from a nonprofit "travelers network" to a for-profit "accommodation site."[8] The switch translated accordingly into the selection of a different business model.

Business models in the context of platforms refer to the ways in which economic value gets created and captured. In the online world, value gets measured in various types of currency: along with *money* and *attention, data* and *user valuation* have become popular means of monetization.[9] One of the most pertinent myths is that platform services are "free" because many do not charge for their services. Facebook, Twitter, and Google+ are just a few of the many online social networks that are monetized through automating connections between users, content, data, and advertising (Couldry 2015; Fuchs 2011; Turow 2012). The "free" strategies adopted by many platforms have resulted in an ecosystem where the default mode is to trade convenient services for personal information (Schneier 2015). By automatically collecting and processing user data, platforms can target and profile individual users as well as user groups. Needless to say, demographic profiling and consumer

targeting have long been part of mass media's armamentarium to monetize readers' or viewers' information, but the precision instruments offered by data analytics are far more exact and speedy than old-fashioned methods for profiling (Nieborg 2017). Such automated precision facilitates personalized advertising in real time; for instance, Facebook can identify and target women 20–25 years of age living in a particular region who are searching for a new smartphone.

Single platforms can opt for a range of different business models, creating value out of data, content, user contacts, and attention by selling advertisements, subscriptions, and user data or by charging fees; moreover, they can sell data to other companies or governments in need of profiling information. Airbnb, for instance, charges hosts and guests a fee for each booking, while it also sells user data to third parties for targeted advertising.[10] Couchsurfing works with a membership fee rather than a fee-per-transaction and allows members to freely share information among themselves. When the site changed from a nonprofit to a for-profit status, many of its members objected to adopting a business model that relies on data sharing and advertising. A business model is an intricate part of a site's philosophy, which is in turn reflected in its architecture.

Technological and economic elements of platforms steer user interaction but simultaneously shape social norms. Although a platform's architecture affords a particular *usage* and users are often met with a finite set of possible options, they are not "puppets" of the techno-commercial dynamics inscribed in a platform. Through its interfaces, algorithms, and protocols, a platform stages user interactions, encouraging some and discouraging other connections (Helmond 2015); for example, inserting a "like button" in the right-hand corner of an interface activates more "liking" than an insertion in the left-hand corner. Indeed, one could argue that any major platform is a recalibration laboratory where new features are constantly tested on users (Benbunan-Fich 2016). When Facebook received a lot of criticism concerning its binary approach toward soliciting information about gender and sexual orientation, the company responded by including a range of "other" identity options, including the possibility for users to defy any categorization. Not only did this change make economic sense, eliciting more refined customer information, but it also actively influenced social norms by expanding the conventional binary options.

Another important element in platform-governing methods is its *user* agreement, usually called "terms of service" (ToS). These pseudo-legal contracts define and shape the relationships between users and platform owners, but they are often long, difficult to understand, and subject to constant change, which is why many people check the box without even looking at this "agreement."[11] The ToS does a lot more than just define service conditions: it can be used to impose norms or values with regard to privacy; it may also state which privileges platform owners

have vis-à-vis their customers. For instance, in November 2016, Airbnb put forward an antidiscrimination policy, adding the rule that hosts may not "decline or impose any different terms or conditions on a guest based on race, color, ethnicity, national origin, religion, sexual orientation, gender identity, or marital status" (Airbnb Terms of Service 2016). Another added rule was that users allow platform operators to perform background checks by consulting public databases, including public records of criminal convictions, to cross-reference a host's and guest's personal information. Airbnb is under no obligation to unveil what it learns about its user, other than what the company is legally bound to disclose.[12] So ToSs are important instruments for platform owners to "govern" their relations with users, partners, clients, and other (legal) parties. By the same token, these managerial adaptations to public sentiment beg the question of public legitimacy: platform companies often have to respond to public opinions and react to legal or regulatory demands by adjusting their policies.

Taken together, these technological, economic, and sociolegal elements of a platform's architecture inform the dynamic of platform-driven sociality. Deconstructing the anatomy of a single platform helps us understand how its combined elements govern users and user practices. But although each platform is a separate entity with a unique combination of features, it can only operate as part of a larger ecosystem.

THE PLATFORM ECOSYSTEM: BUILDING AN INFRASTRUCTURAL CORE

Since the early 2000s, an assemblage of networked platforms has evolved that puts lots of power in the hands of a few corporations that nestled themselves at the gateways of online sociality where they control crucial nodes of information services. The epicenter of the information ecosystem that dominates North American and European online space is owned and operated by five high-tech companies, Alphabet-Google, Facebook, Apple, Amazon, and Microsoft, whose headquarters are all physically located on the West Coast of the United States. The platform ecosystem, as we will argue, is moored in paradoxes: it looks egalitarian yet is hierarchical; it is almost entirely corporate, but it appears to serve public value; it seems neutral and agnostic, but its architecture carries a particular set of ideological values; its effects appear local, while its scope and impact are global; it appears to replace "top-down" "big government" with "bottom-up" "customer empowerment," yet it is doing so by means of a highly centralized structure which remains opaque to its users. We will discuss each paradox in more detail below.

Clearly, the platform ecosystem is not a level playing field; some platforms are more equal than others. We would like to distinguish two types of platforms: infrastructural and sectoral platforms. Most influential are the *infrastructural* platforms,

many of them owned and operated by the Big Five; they form the heart of the ecosystem upon which many other platforms and apps can be built. They also serve as online gatekeepers through which data flows are managed, processed, stored, and channeled. Infrastructural services include search engines and browsers, data servers and cloud computing, email and instant messaging, social networking, advertising networks, app stores, pay systems, identification services, data analytics, video hosting, geospatial and navigation services, and a growing number of other services (see Figure 1.1). A second type are *sectoral platforms*, which serve a particular sector or niche, such as news, transportation, food, education, health, finance, or hospitality. We will return to them in a moment, after exploring the powerful position of the Big Five infrastructural platforms.

Alphabet, the corporate umbrella for all Google services, offers a number of key facilities in the ecosystem: a search engine (Google Search), a mobile operating system (Android), a web browser (Chrome), a social network service (Google+), an app store (Google Play), pay services (Google Wallet, Android Pay), an advertising service program (AdSense), a video-sharing site (YouTube), and a geospatial information system (Google Maps, Google Earth). Perhaps just as important but much less visible are crucial services such as Google Cloud Platform, which encompasses fifty-three services, including Google Compute (Hardy 2016). Verily Life Sciences (formerly Google Life Sciences) became an independent subsidiary of Alphabet in 2015. More recently, Alphabet has invested substantially in artificial intelligence by purchasing the British company DeepMind and Sidewalk Labs, an organization to develop urban innovation infrastructure. Alphabet has also consolidated its hardware division by boosting distribution of its inexpensive laptop Chromebook, which has preinstalled Google software packages—everything from browsers and mail to specific apps.

Next to Alphabet-Google, Facebook dominates data traffic as it controls 80% of the market for social networking services, reaching over two billion monthly users worldwide. Facebook acquired Instagram (in 2012) and WhatsApp (in 2014) because it broadened its original demographic and widened its app suite by adding platforms with appealing visual and messaging features. Together, Facebook and Google control more than 60% of online advertising—the dominant component of many Web-based business models.[13] Facebook and Google also control a substantial share of online identification services (Facebook Login), an important entrance to many other services. Moreover, through its popular "family of mobile apps" (Facebook, Messenger, Instagram, and Whatsapp), Facebook has gained substantial control over people's personal information streams.

Another major player in the ecosystem is Amazon, which vents out one of the world's biggest digital retail platforms, including its extensive logistic network for the distribution of physical goods. It also leads the market for cloud server space and

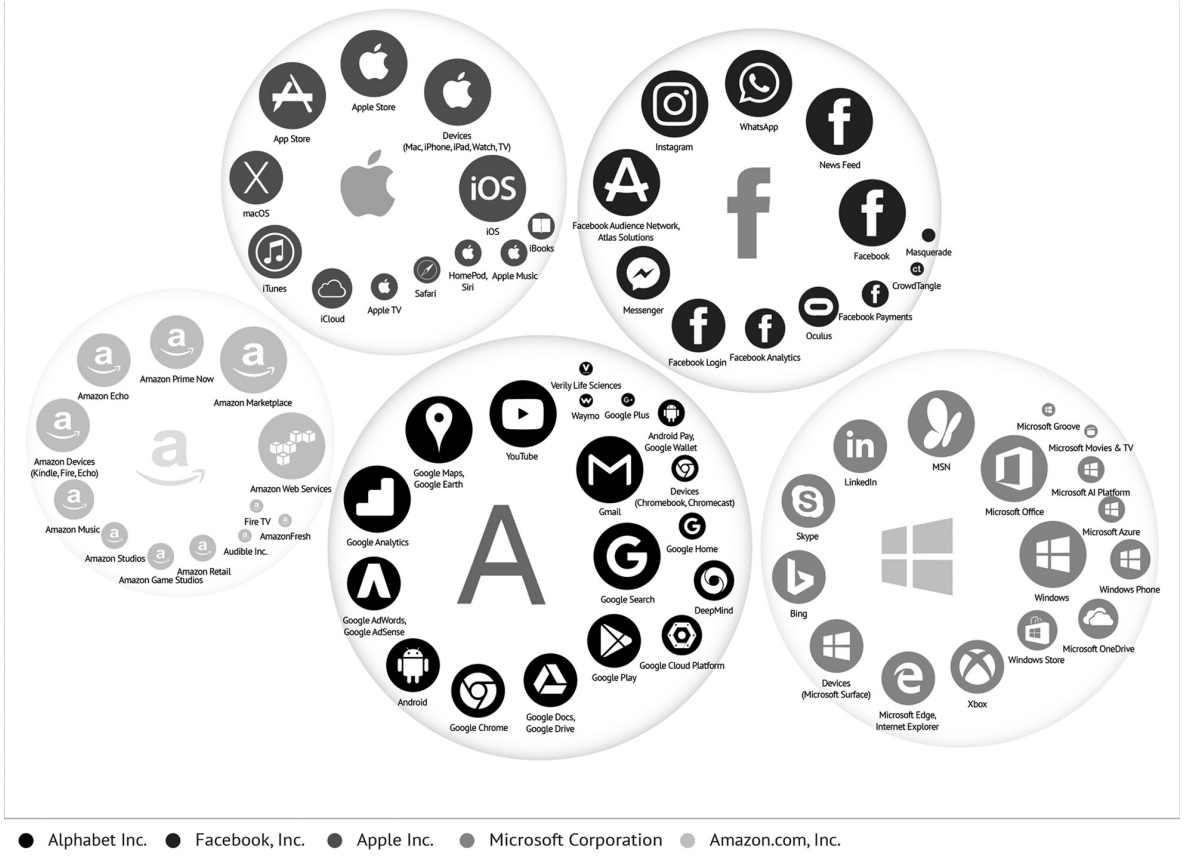

FIGURE 1.1. Schematic illustration of the infrastructural services provided by the Big Five platform corporations. The different services are proportionally represented, depending on their importance for the platform ecosystem (figure designed by Fernando van der Vlist).

software; Amazon Web Services controls more than eighty hubs in various sectors, including services for telemarketing, database management, and analytics. Apple is, of course, a leading producer of mobile hardware (phones, tablets, watches), which harnesses its own operating system and software. The company also runs the second biggest app store in the ecosystem (Apple App Store), offering hundreds of thousands of apps, and exploits its related cloud and streaming services (iCloud, iTunes). Finally, Microsoft grew big on personal computer software in the 1980s and 1990s but has since shifted its focus to online services; LinkedIn and Microsoft Azure (cloud computing) are just two of over sixty platform services operated by the Seattle-based company.

In principle, the platform ecosystem allows all kinds of newcomers to enter; in practice, the unbridled growth of the Big Five's infrastructural platforms has left very little room for competitors to penetrate the *core* of the US-based ecosystem.[14] Virtually all platforms outside of the Big Five constellation are dependent on the ecosystem's infrastructural information services. For instance, Airbnb embeds Google Maps as a standard feature in its interface; it also incorporates Facebook's and Google's identification services to "clear" hosts and guests. The Big Five profit most from the bourgeoning development of sectoral platforms and millions of websites and apps integrated with their basic services, enabling the collection of user data throughout the Web and app ecosystem. Digital disruptors like Spotify and Netflix are dependent upon the Big Five's infrastructure: Spotify's services run on Google Cloud, while Netflix relies on Amazon Web Services. Large segments of the media industries, particularly the game industry, are completely dependent on the app stores operated by Google and Apple (Nieborg 2015). The Big Five are rapidly expanding their presence in virtually all sectors, not just by launching their own specific *sectoral* platforms or acquiring successful startups but also by financing constructions, partnerships, or other alliances.[15] Some of the Big Five companies have recently started to branch out into old-style brick-and-mortar businesses or production services.[16]

Building infrastructural platforms is, of course, not a corporate privilege; but as of 2018, the core of the Western online infrastructure is completely privatized. Historically, the construction of physical infrastructure—whether railways, highways, air traffic controlling systems, or the Internet itself—was always predicated on a mixture of public and private investments. In today's online world, governments, public institutions, and nongovernmental organizations (NGOs) can, of course, operate their own platforms; but it is increasingly difficult to do so as autonomous actors. Platforms not connected to the ecosystem's core can hardly profit from its inherent features: global connectivity, ubiquitous accessibility, and network effects. Public and nonprofit platforms frequently have to rely on Facebook or Google for their login facilities and search-ranking visibility to gain access to valuable

information and reach substantial groups of users. As it stands now, there is no real public "space" inside the corporately run ecosystem. Infrastructural platforms have started to penetrate existing societal arrangements as the ecosystem is increasingly mingling with established institutional structures. To some extent, governments and public institutions, for their functioning, have all become predicated on the use of private online infrastructures—indeed, almost a turnaround from the industrial revolution of the nineteenth century when infrastructures still depended to a large extent on public investments.

Some scholars have argued that the Big Five's infrastructural platforms function more or less as utilities or "superplatforms" because they provide crucial basic information services upon which other sectoral platforms can be stacked or built (Andersson-Schwarz 2017). Indeed, the exchange of goods, services, information, and communication is unthinkable without these platforms as mediators connecting them to users or customers. However, the core of infrastructural platforms is not impenetrable; and other platforms are not exactly "stacked onto" but rather interwoven with or integrated into these core platforms.[17] In their insightful article, Plantin et al. (2016) raise the question of whether the central nodes operated and owned by a few "ecosystem-builders" should be considered platforms, infrastructures, or both. The quintessence of their argument is that all infrastructural services are becoming "platformized," while the major platforms are turning into infrastructures that are inherently essential.[18] As they conclude, the Big Five platform owners have laid the foundation for a system that offers its users convenience in exchange for control over their data, to the extent that the "total infiltration of basic needs also imposes potentially dire political, environmental and ethical risks" (15). Infrastructural platforms can obtain unprecedented power because they are uniquely able to connect and combine data streams and fuse information and intelligence.

SECTORAL PLATFORMS AND THEIR HYBRID ACTORS

Besides infrastructural platforms, we can also distinguish sectoral platforms, which offer digital services for one specific sector, such as health, retail, or transportation. Some of the best-known sectoral platforms have no material assets, have no sector-specific employees, and offer no tangible products, content, or services; they are merely "connectors" between individual users and single providers. Airbnb serves as a connector between "hosts" and "guests," who are both called "users." "Hosts" are not employees or businesses but rather micro-entrepreneurs; and "guests" are not regular customers, according to the quasi-legal definition in Airbnb's ToS. Even though Airbnb increasingly wants to standardize the Airbnb experience, for instance,

by asking its hosts to apply certain hospitality standards, the connective platform claims it does not offer a regular service like a night's stay in a hotel and so does not consider itself liable for this "product."[19] In fact, Airbnb allows user-generated, informal services to be turned into quasi-formal commercial arrangements.

Connective platforms are dependent on "complementors"—organizations or individuals that provide products or services to end users *through* platforms, interlinking different "sides" and hence constituting multisided markets (Evans and Schmalensee 2016; McIntyre and Srinivasan 2017; Nieborg 2015; Rieder and Sire 2014). Complementors can be organizations that are subject to the regulatory bounds of a sector, abiding to legal rules, professional norms, and labor relationships, such as the Hyatt and the Holiday Inn hotel chains. Public institutions and governments, too, may be complementors; for instance, universities and hospitals can function as providers of sectoral products, know-how, and services. Complementors can also be micro-entrepreneurs, offering their (private) car, apartment, or professional skills—for instance, individuals who host their apartment through Airbnb.[20] Legacy complementors can reach a much wider audience through specialized connective services used by potential customers worldwide. In the hospitality sector, Booking.com functions as an online broker between hotel-seekers and brick-and-mortar accommodations offered by big hotel chains as well as small family-owned bed and breakfasts; for these connector services, they charge a transactional fee to hotel owners but not to guests. It is exactly this new class of intermediaries that adds much economic value to platforms but also raises all kinds of questions pertaining to public values such as precarious labor, a fair and level playing field, and public costs. We will return to this extractive relationship below.

The distinction between infrastructural and sectoral platforms is not fixed or set; rather, there is a constant dynamic that drives them toward integration. Infrastructural platform operators are increasingly looking at ways to extend their leverage by expanding into sectoral connectors. Think of Google Apps for Education or Google Scholar, services that are intricately intertwined with, and driven by, Google Search. Apple's Health Kit and Research Kit are aggregator services that tie in patients' and health professionals' data with Apple's infrastructural platforms (e.g., Apple's App Store). Mutual integration, and thus expansion, also happens economically. Tech companies strategically invest in sectoral presence through either acquisitions of legacy companies (e.g., Amazon buying up Whole Foods) or strategic partnerships (e.g., Google having a 20% stake in Uber). What we are seeing in the various sectors is that the Big Five are accumulating technological and economic power from the combination of sectoral and infrastructural platforms. Figure 1.2 illustrates how the platform ecosystem functions almost as a stellar system—a cosmos that revolves around a handful of major planetary stars.

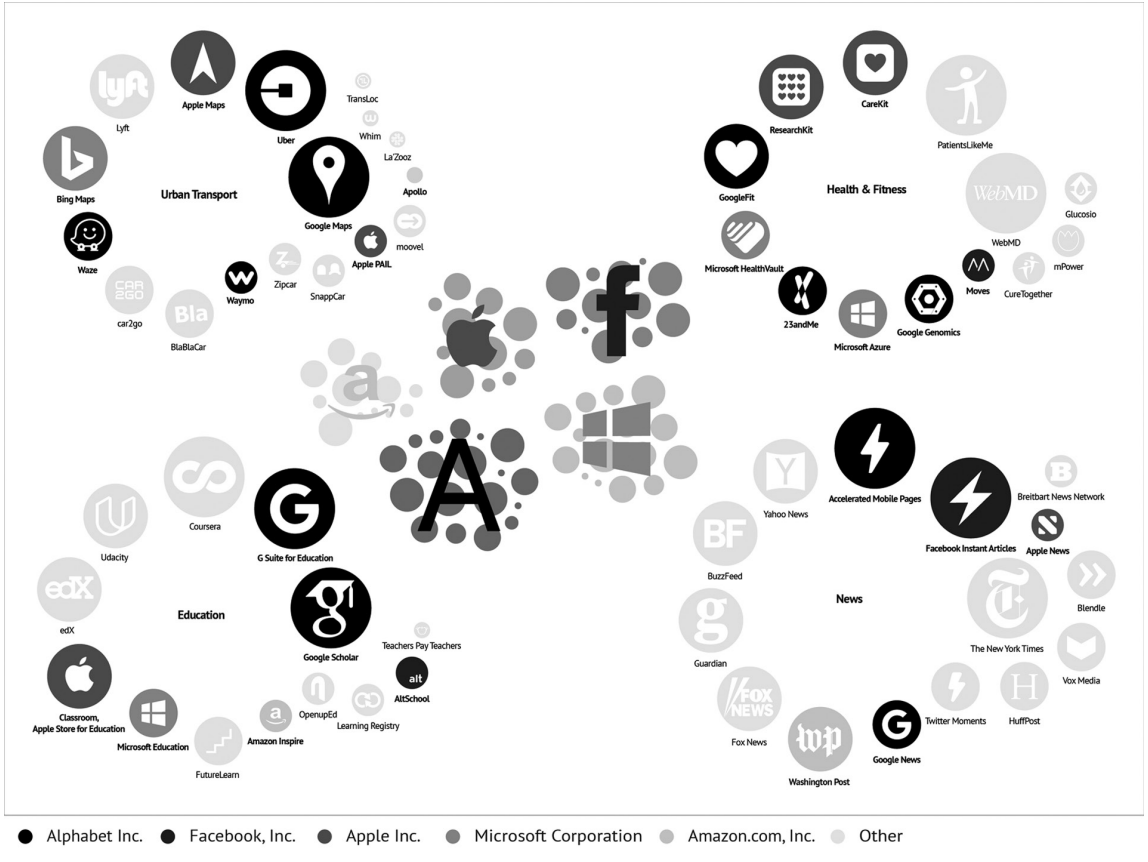

FIGURE 1.2. Schematic illustration of the sectoral platforms developed by the Big Five platform corporations (in bold), as well as the other sectoral platforms and complementors in the four examined sectors (figure designed by Fernando van der Vlist).

Although Figure 1.2 reveals the infiltration of Big Five infrastructural platforms in specific sectors, this representation is unfixed. This is partly due to the volatile dynamics of this system: the status of platforms is subject to continuous change, a process we call "platformization." The terms "infrastructural" and "sectoral" platforms, "connectors," and "complementors" should therefore best be understood as roles and relationships that particular actors take on, rather than as fixed categories. These roles also shift over time and through contexts. For instance, Uber can be understood as a connector when it matches drivers and passengers through its stand-alone platform. However, Uber also finds itself in the role of a complementor when its service is offered as one of many transport providers through an integrated transport platform. If it were to offer its reputation system or mapping data to third parties, it would take on a role as an infrastructural platform. These labels are relevant nevertheless as they express specific power relations in an emerging platform ecosystem.

Platformization then refers to the way in which entire societal sectors are transforming as a result of the mutual shaping of online connectors and complementors. In chapters 3 through 6 of this book, we will zoom in on four specific societal sectors that are currently undergoing platformization. And rather than providing a "fixing" taxonomy (what kind of platforms *are* they?), we will focus on a "functional" taxonomy: identifying platform mechanisms and the mutual shaping between players (how do platforms *work* in specific contexts?). In doing so, we provide an analytical prism that reveals the dynamics *between* infrastructural and connective platforms and *between* connective platforms and complementors.

Identifying the various types of platforms and their interlocking functionalities is far from trivial. For one thing, a functional taxonomy of platforms could be useful to help guide legislators in updating their regulatory frameworks, for instance, with regard to antitrust or competition law. The potential for vertical integration between infrastructural and sectoral platforms is endless, as is the creation of path dependency for users and consumer lock-in. Some platforms' near-monopoly status in the infrastructural core coupled onto sectoral platforms' dominant positions make these companies become "fluid": they introduce a new type of organization, defying classic definitions that are tied to sectors. In order to understand this new dynamic, we need to inspect how infrastructural and sectoral platforms interrelate: sometimes this mutual strengthening works on a technical or computational level, sometimes on a governance or ownership level. More importantly, accumulation of power typically happens *between* sectors as data streams can be manipulated *across* sectors via infrastructural platforms that are sector-agnostic. Think, for instance, of Google's search and advertising services that can be coupled onto its educational platforms.

Such functional taxonomy could also help politicians and governments decide what responsibilities tech companies carry vis-à-vis their online services and products.

Many governance systems in western European nations depend on a division between infrastructure and sectors, but platforms deliberately blur these categories. Airbnb calls itself a tech company providing a connective service to users in a particular sector, for which it claims to carry no liability or responsibility. As we will explain in the chapters ahead, Airbnb is not the only connective network platform defying the existing societal order. Uber long rejected the epithet "taxi business," hence bypassing regulation that applies to the transportation sector. And Facebook, until 2017, refused to call itself a media organization because it does not produce news content, even if over 40% of its American users receive news through the social network's News Feed (Napoli and Caplan 2017). Setting themselves apart from complementors in specific sectors apparently warrants these platforms' separate status.

However, connective platforms cannot and should not be considered separately from social organizations, sectors, and infrastructures; on the contrary, they have become paramount to the functioning of economies as well as democracies. The very term "complementors" raises the question of *who* complements *whom*: obviously, connectors are dependent on "complementors"—be it businesses, individual citizens, institutions, or governments—to provide the necessary content and services to run their businesses.[21] Uber needs individual drivers with cars. Airbnb needs individual homeowners with real estate. Facebook needs news organizations to produce (accurate) articles. Coursera needs universities with teachers. And all of them need brick-and-mortar, physical services provided by legacy companies, local communities, or national governments. The supply of transport relies on highways, railways, and traffic controllers; streets need to be cleaned, and security for tourist accommodation needs to be enforced; educational platforms could not operate without teachers funded by states or universities. In other words, for their economic success, corporately owned and operated connective platforms are highly dependent on private *and* public investments (Mazzucato 2013).

The instrumental perspective on connectors as mere "enablers" of social and economic activity has thus given way to a new category of hybrid actors: platform operators and users. These terms' "in-betweenness" seemingly warrants connective platforms' bypassing of regulations which are grounded in a societal order reigned by familiar binaries: market versus state, consumer versus citizen, private versus public, for-profit versus nonprofit. Much of our institutional and legal frameworks are still predicated on these binaries, although one may argue that the separation between private and public, market and state, for-profit and nonprofit has never been clear-cut. Indeed, since the late twentieth century, a growing belief in the efficiency of markets has led public institutions such as hospitals and universities to open up to market forces. Nevertheless, it is safe to say that even if the marketization of public sectors started long before the advent of platformization, the emergence

of the online ecosystem has accelerated further blending. The deliberately hybrid status allows platform operators and users to bypass regulation or escape professional norms and standards to which most sectors are subjected, either by law or by custom, thus creating a legal and social gray area to negotiate their position with regulators and legacy competitors. Figure 1.3 sketches the tension between market, state, and civil society actors—a tension that, as we will argue later in this chapter, revolves around *values*.

Governing the platform society cannot simply be left to markets, if only because its infrastructure has come to penetrate all sectors, private *and* public. Governments have always played distinctive roles in the regulation of market sectors, locally and nationally; they have also allowed for self-regulation, outsourcing enforcement to professional organizations.[22] Vice versa, governments and public institutions have always cooperated with commercial parties to perform their public jobs. In the platform society, though, these relationships are becoming increasingly complex and

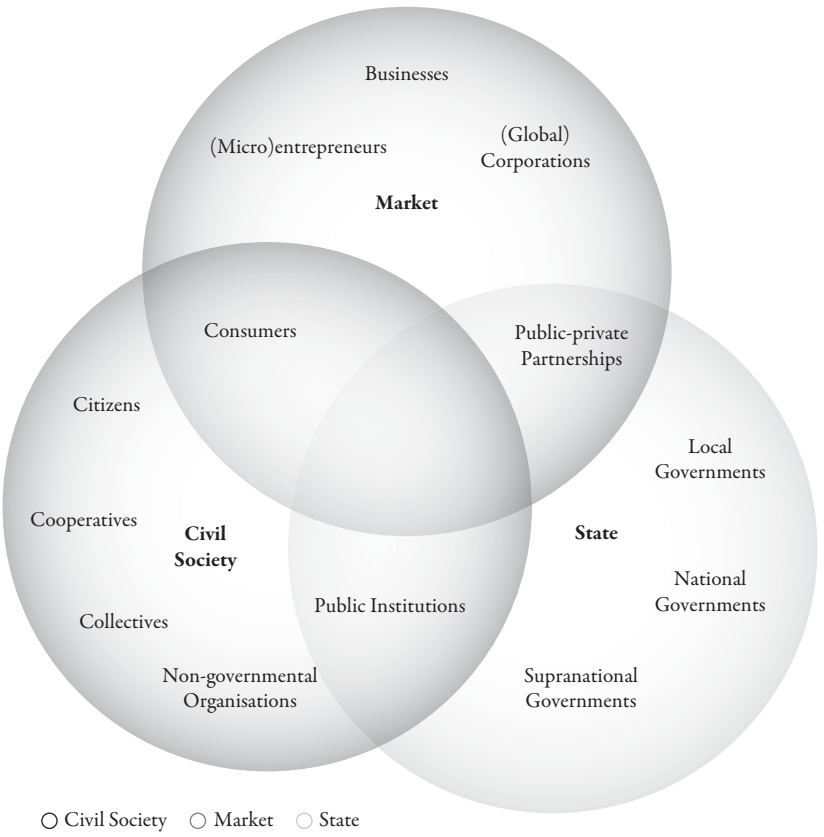

FIGURE 1.3. Schematic representation of the actors from market, state, and civil society who shape the platform society; private and public actors cannot always be sharply distinguished and are partly overlapping (figure designed by Fernando van der Vlist).

interdependent. As legal scholar Julie Cohen (2016) observes, "Markets are fluid and interconnected, information services sit within complex media ecologies, and networked platforms and infrastructures create complex interdependencies and path dependencies" (375).

We should not accept the hybrid or fluid reality of platform ecologies as an excuse to get rid of presumably obsolete distinctions between public and private, state and market; on the contrary, these distinctions are still very meaningful when it comes to grounding societal orders. Now that a large part of the world is getting used to an infrastructural ecosystem which is principally designed, owned, and operated by global private corporations, we need to be extra vigilant as to what happens to public values and the common good. The ecosystem itself—the way it is cemented in its architecture of algorithms, business models, and user activity—is not neutral; on the contrary, the ideological tenets inscribed in the ecosystem's architecture put a formidable stamp on what constitutes public value and whose interests are served. In chapter 2, we will explain in detail *how* these mechanisms work *to what effects*. First, we need to explain in more detail what we mean by "public value" and how this is contested in a platform society.

PUBLIC VALUE AND PRIVATE INTEREST

"Public value" is the value that an organization contributes to society to benefit the common good (Moore 1995). The common good is often translated in a number of propositions that are achieved through collective participation in the formation of a shared set of norms and values (Bozeman 2007). Needless to say, public values and the common good are historically and ideologically variable; they are the stakes in a democratic debate about the foundations of society. Creating public value is not the sole privilege of the public sector: any type of actor mentioned in Figure 1.3 can contribute. Ideally, the creation of public value for the common good should be the *shared responsibility* of all societal actors—companies, citizens, and governments alike (Helberger, Pierson, and Poell 2018). State actors and public institutions, though, are historically the designated custodians of the common good in most Western democracies. Governments have cemented democratic values into laws and regulations that they are entitled to endorse, even if some parts of maintenance and enforcement are outsourced to the private sector. Protection of the common good is partially entrusted to independent institutions, which are subject to public scrutiny. Some agreed-upon social norms and public values are assigned to professional routines or ethics codes—think of journalism or health research. And, last but not least, a large number of civic society organizations independent from market or state work toward defending the common good.

In the platform society, the creation of *public* value toward the common good is often confused with the creation of *economic* value serving a nondescript amalgam of private and public interests. Corporately owned and operated platforms often claim their online services benefit "the public" in general, without specifying their own interest (Hoffmann, Proferes, and Zimmer 2016). Indeed, such claims are nothing new: throughout the twentieth century, media giants and pharmaceutical companies have cloaked themselves in a declared public benefit when it comes to information or health services. Online platforms have adapted and expanded this argument by claiming they can substitute for the role that governments and communities play by assisting the self-organization of people online. Platform enthusiasts tend to foreground broad societal concerns while implicitly pushing an ideology concerning the role of states versus markets. Read, for instance, the following endorsement of Tyler O'Neil, an Uber proponent who works for a prominent conservative think tank, The American Enterprise Institute, and who champions platforms as a novel entity:

> Rather than *push top-down efforts* to keep cars off the road—like narrowing streets, roping off certain lanes for carpools, or taxing drivers with hefty fines—Uber takes a *bottom-up approach* by providing consumers who *care about reducing emissions* with more opportunities to carpool, using their smartphones. . . . big government policies are far from the best way to steward the earth. Instead, companies like Uber are charting a new course—*empowering customers* to make their own decisions and choose their own ways to make *the world a better place*. (O'Neil 2015, emphasis added)

What we see in this endorsement is a double attempt to push private interests under the flag of public value and the common good: "top-down" and "big government" are pitted against "bottom-up" and "empowering customers" in the joint effort to reduce carbon emissions. Uber is positioned as a neutral connector, facilitating citizens in achieving a common goal. Implicit in this perspective is the claim that private parties like Uber are better at defending the common good than governments that are inefficient and cumbersome—big government standing in the way of efficient and effective governance. "Platforms" appear to be a synonym for "efficiency"; by virtue of their alleged leanness and openness, they can make "the world a better place" because they get rid of costly overhead and enable citizens to act as independent, autonomous individuals. Such a statement typically reflects a neoliberal articulation of the state as the enemy of private individuals and businesses.

The promise here that connective platforms are better than states and legacy companies at creating not just economic value but public value gives ammunition to the argument that they rightfully disrupt societal order and claim the new ecosystem

as an opportunity to liberate users from the shackles of "big business" and "big government." Peculiarly, supporters like O'Neil tend to present the platform ecosystem as a new vehicle *run by users* rather than by operators; they also tend to present the platform ecosystem as inherently transparent, even if this system hides its algorithmic black boxes and business models from public scrutiny.[23] The embalming promotional rhetoric implicitly dismisses democratically governed institutions and regulation as inefficient obstacles to a platform utopia—a political–ideological subtext that presumably informs the right to create a legitimate hybrid category of platform operators and users.

It is often difficult, if not impossible, to tell a platform's dedication to creating public value by solely looking at its promises. Platforms often claim they serve the common good: they want to make neighborhoods safer, enrich the tourist experience, make children smarter, or diminish waste and energy use by stimulating the exchange of lawnmowers between neighbors. It is important, though, to investigate these claims. When analyzing a major paradigmatic shift such as the platformization of society, it is inevitable to recognize the plurality of values, their justification logics as well as the diverse conceptions of the common good attached to these logics.

Pursuing such an analysis, we need to understand platform infrastructures, economic models, and discourses as *performative*. As we will show throughout this book, platforms do not simply connect social and economic actors but fundamentally steer *how* they connect with each other. In this process, platforms construct new value regimes and economies. Such an observation corresponds with how economic sociologists discuss the performativity of market infrastructures and economic models (Boltanski and Thevenot 2006; MacKenzie 2007, 2009; Stark 2009). Their work shows that economists not only analyze and model economic processes but, in doing so, contribute to the construction of these very processes. Furthermore, economic sociology explores how the materiality of technical infrastructures matters in the operation of markets, demonstrating, in the tradition of actor–network theory, that these infrastructures effectively become key economic actors. Software systems, stock tickers, and graphical representations are more than just "measuring" instruments; they structure economic transactions and the production of economic value. In a similar way, online platforms intervene in and reshape value regimes and economies.

It is very important to articulate *which public values* are at stake in *specific contexts* and relate them to *specific interests*. As we have seen in the example of Airbnb, the interests of citizens, city managers, users (hosts and citizens), and platform operators are often contradictory. Platformization raises typical consumer concerns, such as safety, accuracy, and privacy, which often clash with the values of platform operators, who are interested in generating user data and extracting monetary value out of online connections. Individual interests and value systems may also clash in their

different roles: an individual can be a host or user at the same time, loathing the excesses Airbnb guests create in some parts of the city while benefiting from the platform as micro-entrepreneurs or when they are tourists themselves in other cities.

Beyond individual consumer concerns, some wider societal values enter the negotiating battle—values like fairness, equality, collectivity, independence, and democratic control. For instance, who should pay for enforcing public policies concerning safety and security? Airbnb has started to collect tourist taxes from its customers, like regular hotels do; but hotels also pay (local) property taxes to cover a range of collective expenses, which is something Airbnb does not do because it does not own property. And hosts, while paying property taxes on the houses they own, do not pay the commercial tax rates charged to hotels. If Airbnb rentals do not contribute their fair share to local tax revenues, citizens rightfully complain about Airbnb putting an undue burden on their taxation. The city's clash with platform operators and users exemplifies how *connective* platform strategies may undermine the *collectivity* of social structures.

The implications of platformization often reach beyond the local level, affecting a nation's welfare and its sociolegal order. For instance, more temporary rentals in downtown Amsterdam inevitably raise real estate prices, benefiting homeowners in affluent urban areas. Airbnb tourism may hence lead to more economic inequality between citizens because homeowners profit more than renters in public housing and because most revenue generated from tourists does not flow into low-income or suburban areas. In addition, access to affordable housing may be limited if housing prices and rents increase due to a mounting pressure on the local housing market (Stabrowski 2017). So besides fairness in taxation and antidiscrimination, there are other societal values to be accounted for, including affordable housing and mending economic disparity.

The questions *whose interests* a platform's activity serves, *which values* are at stake, and *who benefits* are central in disputes concerning the creation of public value in the platform society. Local governments play an important role in this negotiation, first and foremost as regulators or enforcers but also as significant stimulators of public value. For starters, local authorities may design a comprehensive approach to an entire temporary housing sector, rather than regulate single hospitality platforms or merely focus on illegal hotels. In Amsterdam, some policymakers argued the city could take advantage of online platforms by introducing a flexible zoning-cum-licensing system that helps diminish the wealth gap between citizens. For instance, if the city wants to uplift its suburban and economically disadvantaged neighborhoods, why not grant hosts in those areas a ninety-day permit and restrict the crowded downtown areas to thirty or even fifteen days? Another suggestion was to have a number of large cities develop software that offers the functionality of Airbnb and mandate all

short-term rentals to be arranged through this city-owned-and-operated hub (Orsi 2015). In other words, local governments can actively shape the realization of public value through platformization if they take an active and comprehensive approach.

A platform society is not a given but a dynamically evolving societal arrangement where public values are constantly shaped by different actors. Ideally, the platform society is a negotiable social contract that holds all parties accountable to its creation and enforcement. Shared responsibility may be a noble ideal, but it is not a reality. The current struggle about the platform society's values and common good happens simultaneously at local and national levels, not just within sectors but also across and between sectors. Some value contests are typically fought out at the city level, while others warrant national intervention. For instance, connectors' tendencies to withdraw from sectoral responsibilities by refusing to employ workers or contribute to social benefits (e.g., Uber drivers) may lead to undermining societal values such as solidarity and a level playing field. National articulations of public value and the common good can obviously be different from local ones, urging for more alignment. By examining various local and national clashes and relating them to supranational and global contestations over public value and the common good, we try to disclose underlying patterns informing these discussions.

THE GEOPOLITICS OF PLATFORMS IN A CONNECTIVE WORLD

Analyzing the platform society at the micro-level of single platforms and at the meso-level of the ecosystem is vital to understand the macro-level of geopolitics. To understand the global dimension of platform power, we need to take into account how these levels are intertwined. The world of online geopolitics is divided in roughly two political–ideological hemispheres, each of which is governed by its own ecosystem, cemented in economic models that are opposites. The majority of successful infrastructural platforms that channel the world's online social and economic traffic are either US or Chinese. Few of the core platforms originate in western Europe or Russia, and hardly any of them were built in Africa, Latin America, Australia, or Southeast Asia.[24]

In geopolitical terms, the power of the infrastructural core of the platform ecosystem dominated by the American Big Five is counterbalanced only by a China-based ecosystem, operated by a handful of Chinese players, most notably Tencent, Alibaba, Baidu, and JD.com—companies whose products and enterprises are for an important part controlled by the state.[25] The American and Chinese ecosystems dominate their own geopolitical spheres and are rooted in opposing ideological views (Ramos 2013). In the American (or Anglo-Saxon) market model, corporations ally with consumers to embrace free market principles and to minimize government interference, while civil society interests are negligible. The Chinese model

favors corporate platforms indirectly controlled by the government—a form of state capitalism where citizens, NGOs, and other civil society actors play a subservient role in the negotiation of public values. Over the past years, American technology companies have tried to make an entry in the Chinese system, but when they did break through the "Chinese firewall" they were faced with censorship and hacking issues.[26]

While acknowledging the huge and mounting importance of the Chinese ecosystem and its players in an online world, this book concentrates on the North American ecosystem and more particularly on its impact in Europe and the United States. Over the years, the US-based Big Five tech giants have more or less successfully expanded their platform services into Europe, Africa, and Asia.[27] In western European countries, there have been a number of legal and normative skirmishes between American platforms and governmental bodies in charge of regulating market sectors or social arrangements (Jin 2015). These clashes have spurned a series of interrogations concerning the power of platforms vis-à-vis the power of governments. When platform operators clash with governments, these conflicts virtually always embody an ideological confrontation concerning public value or the common good.

As stated before, the American platform ecosystem comes with a specific set of norms and values inscribed in its architecture, encoded in data policies, algorithms, and business models. Inscribed in the corporate ecosystem is a libertarian set of values, where individuals have the prime responsibility to organize their own lives in self-selected communities, with few obligations toward state-organized collectivity. These ideological values often remain implicit until platforms meet resistance, particularly when trying to penetrate sectors and markets *outside* the United States. Most European countries tend to prefer a society organized by government and citizens in cooperation with private companies and civil society actors, where public values are guarded by public institutions and collective arrangements are mired in the solidarity principle. But what does the permeation of the American-based platform ecosystem mean for democratic public values in countries on both sides of the Atlantic? And how can democratic values, sprouting from European social-democratic traditions, be sustainably anchored in platform societies?[28]

Our focus in this book is not so much on developing a normative governance model for the platform society but rather on analyzing negotiations in the process of platformization in order to reveal underpinning mechanisms, patterns, and stakes. In western European countries, the clash between neoliberal market values and democratic collective values constantly plays out on local and national levels. Local and national clashes pitting platform operators against governments have been taken all the way up to international courts. In recent years, there have been various face-offs between European governing bodies and American platform owners over public values

such as privacy, security, and citizens' right to control their own data.[29] The ideological values injected through the ecosystem are both validated and contested by users, citizens, and regulators. We cannot simply cast aside western European models of societal organization as "outmoded" or "disrupted"—even if they are in many ways ill-equipped to govern the new platform-based society. Instead, we try to reflect more profoundly on the shared responsibilities of all actors in organizing a platform society, raising and answering questions of accountability and democracy, of transparency and trust.

As described in this chapter, the platform society involves an intense struggle between competing ideological systems and contesting societal actors. Therefore, the main question driving our research—*what role do online platforms play in the organization of public values in American and western European societies*?—is a step up to addressing a more urgent issue: *who is or should be responsible and accountable for governing a fair and democratic platform society?* Responsibility and accountability do not solely rest with the institutional and legal frameworks that scaffold societies. Companies, too, share this responsibility. When Uber defines itself as a "digital service," it thus escapes the accountability that comes along with being a sectoral employer; but it also evades a social responsibility for paying collective dues to cover social security or pensions. Underlying this tactic is an ideology that individuals have to fend for themselves. By the same token, Alphabet's vertical integration of infrastructural and sectoral platforms (and horizontal integration of platforms) allows Google services to elude the antitrust regulatory restrictions that governments have put in place to prevent monopolies and thus protect consumers (Taplin 2016). Questions of accountability and responsibility address both corporations and states, consumers and citizens (Broeders and Taylor 2017). They apply to all levels: from the implementation of single apps in particular contexts, such as schools or cities, to the supranational level of the European Court.

Inquiries concerning responsibility and accountability specifically address large platform operators. Who is responsible for the distribution of extremists' ideas through social media (Herrman 2016)? Who is responsible for the circulation of misinformation? Who is accountable when citizens start fighting after a user has distributed a call to arms? Who is to blame when a medical app relying on user-generated data turns out to be inaccurate? Who can be held accountable, if not liable, when young children get inundated with online ads for sugar-coated sweets? In recent years, some of the major platform operators have come to realize they can and should be held accountable, if only because they could lose the user's trust. The platform society is not an ideal world order in which companies are perfectly able to regulate themselves and users are all equally engaged to support the common good. It is not a society where technology renders economic and social traffic perfectly transparent so that governments can withdraw. On the contrary, platform societies,

to some extent, are becoming opaquer *because* social and economic processes are hidden inside algorithms, business models, and data flows which are not open to democratic control (Pasquale 2015).

The Big Five companies that constitute the infrastructural core of the ecosystem upon which the platform society is built have a special responsibility in this respect. Over the past ten years, they grew big by avoiding or bypassing institutional and governmental structures. The platform society's most valuable players are not famed for their commitment to public value or the common good (Manjoo 2017b). In Europe, particularly, the Big Five have been taken to court on antitrust charges (Google), preferential tax treatment (Apple), and breach of privacy rules (Facebook) (Scott 2017). Many of these court fights have to do with platforms usurping a hybrid status; many of them also rely on legal exemptions that were put in place in the 1990s in order to spur innovation in what was then a budding, immature market (Foroohar 2017). However, the Big Five companies can no longer take for granted their initial treatment as affable start-ups working in the interest of individuals and communities. Instead, they increasingly present themselves as social actors that may have private stakes in the ecosystem but that have responsibilities akin to governments when it comes to procuring public value. In February 2017, Mark Zuckerberg published a manifesto that laid out his world view as a businessman-turned-statesman, spreading the message of public value to Facebook's two billion users worldwide:

> Today we are close to taking our next step. Our greatest opportunities are now global—like spreading prosperity and freedom, promoting peace and understanding, lifting people out of poverty, and accelerating science. Our greatest challenges also need global responses—like ending terrorism, fighting climate change, and preventing pandemics. Progress now requires humanity coming together not just as cities or nations, but also as a global community. . . . *In times like these, the most important thing we at Facebook can do is develop the social infrastructure to give people the power to build a global community that works for all of us.* (Zuckerberg, 2017, emphasis in original)

Facebook emphatically presents itself as a "social infrastructure" that helps people to build a "global community." Remarkably, though, the manifesto does not mention any other actors involved in this transformation. No established institutions or governments are apparently involved in keeping global peace and fighting terrorism; no civil society groups are mentioned as participants in a global community. And, since the remainder of the manifesto deals mostly with the need for a healthy news and information ecosystem, it is remarkable that Facebook's chief executive officer omits the role of established news organizations that are responsible for a large chunk of the

content distributed by the platform. Ignoring important *institutional* pillars of trust—whether state or market—makes one wonder how Facebook, as one of the most influential platforms in the ecosystem, expects to negotiate important public values such as the accuracy and independence of news with societal actors.[30] Once again, it is crucial to scrutinize these claims in terms of private (corporate) interests and public value: whose interests are served, and what public values are at stake in this claim?

As platformization continues to penetrate more sectors of society, the distinction between private and public is increasingly glossed over as an irrelevant societal classification, whether applying to individuals or to collective entities. Another disconnect that should trigger critical inquiry is major platforms' innate interest in *global* markets and worldwide reach of customers, while ignoring, bypassing, or battling *local, national*, and *supranational* levels of social organization. Of course, such preference for a global user base of individual consumers epitomizes operators' interest in the economic value of scaling, rather than in the public value of civic engagement. Notwithstanding their differences in scale and scope, city councils and government agencies increasingly team up with global corporate platforms to tackle urgent societal problems like urban safety, efficient transportation, optimal healthcare, or affordable online education. Local regulators and city councils are understandably more interested in the immediate local impact of platforms rather than the way global platforms affect the national or supranational world order in the long run. However, these levels are inextricably intertwined. Uber's attempts to disrupt a local urban transportation market are also attempts to tip the balance from state power to corporate power. And Facebook's claim to create a global community, while perhaps laudable in itself, betrays an expansive neoliberal world view that implicitly questions the relevance of governments and states in organizing liberal democracies.

The very institutions and professional organizations that were once instated to anchor trust and sustain democracy no doubt need to be upgraded to meet the new challenges of a platform society. But before they can do so, governments and public institutions need to understand not just the dynamics of platforms and how they work but the ideological premises on which they function as well as the social implications of their operation. Addressing those larger questions of responsibility and accountability requires a fundamental understanding of *how* the platform ecosystem works. Therefore, in the next chapter we will lay out an analytical instrumentation that helps dissect the technical, economic, and social dimensions that drive the platform ecosystem. Understanding how platform mechanisms reshape societies may in turn help us understand how societies can govern platforms. Platforms are too important to leave their regulation to self-labeled operators and users; civil society, citizens, and governments have big stakes in a fair, democratic, and responsible platform society.

2

PLATFORM MECHANISMS

INTRODUCTION

In the summer and early fall of 2011, the Occupy protests in New York and Boston were starting to gather momentum. Yet, despite the vibrant protest activity, the dominant Twitter Occupy hashtags #OccupyWallStreet and #OccupyBoston never made it into Twitter's trending topics lists of either New York or Boston. Some protestors began to suspect a conspiracy to ban the Occupy movement from public discourse. They accused Twitter of manually manipulating its trending topics feature (Gillespie 2012; Lotan 2011). As it turned out, Twitter was not part of any conspiracy; rather, the protestors inadvertently stumbled across the intricate methods through which the platform algorithmically organizes user content. In contrast to common perception, trending topics reflect not simply the frequency of a particular term but rather its increase in usage. Only a dramatic increase will land a term in the trending topics top ten (Lotan 2011).

While social media are often portrayed as activist "tools," Twitter is by no means the only platform that frustrates activists' efforts to gain public visibility. In August 2014, during protests in Ferguson, Missouri, following the killing of an unarmed black teenager by a white police officer, it was Facebook that was accused of algorithmically burying activist activity. At the time, the sociologist Zeynep Tufekci

(2017) noticed that while updates about the Ferguson protests and especially about the excessive use of police force were omnipresent in her Twitter timeline, no such updates appeared in her Facebook News Feed. This was especially striking as she was connected with largely the same people on both platforms. Yet, apparently, the user activity triggered by the Ferguson protests did not meet Facebook's criteria of algorithmic relevance.

What these brief anecdotes show is that social media platforms are never neutral "tools": they make certain things visible, while hiding others. To understand the outcomes of the algorithmic filtering process in these examples it is necessary to untangle how various platform technologies in congruence with economic models and user practices shape social activity across economic sectors and spheres of life. Together they are articulated in three platform mechanisms we have labeled "datafication," "commodification," and "selection." The interplay between these mechanisms can be decisive for the actors involved. For example, the protestors in the above anecdotes strongly depend on public attention. Social media virality can transform a small protest into a national movement, whereas invisibility condemns it to obscurity. Thus, platform mechanisms affect the fortunes of social movements, as they do of many other social actors: from apartment hosts on Airbnb to taxi drivers on Uber and from newspapers on Facebook to students on Coursera.

This chapter analyzes how platform mechanisms work through the interplay between *technologies*, in the form of data structures, algorithms, and interfaces; *commercial strategies*; and *user practices* developed by individuals, as well as by corporations, state institutions, and societal organizations (Van Dijck and Poell 2013). To understand how the rise of online platforms affects the organization of society, it is essential to systematically untangle how platform mechanisms upend established institutional arrangements and at times put traditional public values under pressure. Such mutual shaping of platforms and society is not predetermined or irreversible. On the contrary, platform mechanisms can work very differently depending on how technologies, economic models, and practices are deployed and implemented. Currently, the Big Five platform corporations very much shape the core technological infrastructure, dominant economic models, and ideological orientation of the ecosystem as a whole. Moreover, they steer how sectoral platforms, societal institutions, companies, and billions of users interact. Notwithstanding the concentration of economic resources, standard-setting power, and ideological dominance of these core platforms, we will argue throughout this book that alternative articulations of key platform mechanisms are possible.

DATAFICATION

According to Mayer-Schönberger and Cukier (2013), "datafication" refers to the ability of networked platforms to render into data many aspects of the world that have never been quantified before: not just demographic or profiling data volunteered by customers or solicited from them in (online) surveys but behavioral meta-data automatically derived from smartphones such as time stamps and GPS-inferred locations. More specifically with regard to online platforms, every form of user interaction can be *captured* as data: rating, paying, enrolling, watching, dating, and searching but also friending, following, liking, posting, commenting, and retweeting. In early studies, such data were often considered a by-product of online platforms; as platforms matured, technology companies gradually transformed into data firms, turning data into prime resources. Datafication endows platforms with the potential to develop techniques for predictive and real-time analytics, which are vital for delivering targeted advertising and services in a wide variety of economic sectors.

While datafication can be understood as a techno-commercial strategy deployed by platform owners, it can concurrently be regarded as a user practice. Platforms systematically collect and analyze user data; they also constantly *circulate* these data through application programming interfaces (APIs) to third parties and through user interfaces to end users, enabling them to trace the activities of friends and colleagues, keep track of public events, and participate in the online economy. The first part of this section focuses on the capturing of user data and the second part on the circulation of these data.

Capturing

Collecting data about consumers and citizens is by no means a new practice. Public institutions and corporations have historically depended on demographic and audience data (Driscoll 2012; Hacking 1990; Napoli 2011; Turow 2012). With the rise of online platforms comes both an intensification of data collection practices and, as we will discuss next, a commodification of activities, exchanges, relations, and objects that previously were not quantified or were informal, ephemeral activities. Personal interactions and everyday economic exchanges are now captured through the standard datafied practices of friending, liking, sharing, rating, and recommending. And by virtue of integration with sectoral platforms, a whole new range of practices, such as playing, renting, driving, and learning, are tracked by infrastructural platforms as well.

The technological architecture of platforms premeditates real-time gathering and analysis of user data through standard buttons and through the deep integration

of data analytics software in third-party apps and websites. Every activity of every user can be captured, algorithmically processed, and added to that user's data profile. Posting a message or review, rating a ride or an apartment, clicking a like or retweet button, and following, friending, or unfriending other users are often regarded as mere social activities; but they are also data signals that allow platform corporations to profile demographic, behavioral, and relational characteristics of users (Andrejevic 2013a; Kitchin 2014; Nieborg 2017; Van Dijck 2014).

Behind seemingly lightweight forms of social interaction hide complex technological infrastructures where data are continuously aggregated and analyzed to more effectively connect users with services and advertisements. For example, anytime a user clicks a "social plugin" such as the "like button" on an external website or on Facebook itself, this activity is processed in a number of ways. First, it is displayed on the user's News Feed, which makes the liked object available for further engagement. Subsequently, additional activity data flow back to metrics associated with the liked object. These are still the publicly visible data flows. Processed as aggregate data, though, user activity is invisible to end users. Through Facebook Insights, webmasters and administrators of Facebook pages and groups are provided with such aggregated data, including total number of likes, shares, and unique users, as well as the overall demographic characteristics of the user base. Most importantly, the Facebook corporation itself algorithmically processes all user data produced through liking, sharing, commenting, etc. (Gerlitz and Helmond 2013). Facebook recycles these data in the form of targeted advertising, "Trending topics," "relevant" content, and as a constant stream of friend suggestions. Thus, the ability of citizens and societal organizations to monitor public activities and sentiments is fundamentally based on the systematic and automated collection and analysis of *every* form of user activity.

An important part of the attractiveness of online platforms lies in the assertion that data are "raw" resources merely being "channeled" through online veins, allowing a wide variety of actors to monitor how users think, feel, experience, and intend particular things. From this perspective, platforms such as Facebook, Uber, and Coursera capture and measure these sentiments, thoughts, and performances. However, data are never completely untouched or unstructured to begin with, or as Gitelman (2013) emphasizes, "raw data" is an oxymoron; data are always already prefigured through a platform's gathering mechanisms. Platforms do not merely "measure" certain sentiments, thoughts, and performances but also trigger and mold them, most visibly through their user interfaces (Gitelman 2013, 2–3; Kitchin 2014). While features such as "rate," "answer," "comment," "share," "like," "retweet," "friend," and "follow" appeal to basic human emotions and interactions, the underlying technologies greatly shape how users interact with each other and what kinds of data

signals they produce. The way in which services are developed and media objects circulate on the basis of such signals in turn depends on the algorithms used to "weigh" the different signals. In short, platform data are not raw but precooked. Datafication means that online activity is to a high degree technologically standardized to enable the automated processing of user signals.

The economic and public value of datafication is especially located in the *real-time* dimension of data streams. Platforms claim they can instantaneously track individual and group behavior, aggregate these data, analyze them, and translate the results to users, marketers, and advertisers, as well as to a wide variety of public institutions, organizations, and corporations. Real-time analytics of social media data are, for example, increasingly deployed in political campaigning and civic engagement, providing politicians and activists insight in personal preferences, trending topics, and evolving public sentiments. These insights, in turn, allow these actors to modulate their "message" to more effectively target voters and supporters (Karpf 2016; Kreiss 2016; Tufekci 2014).

Circulating

Platforms can function as an ecosystem because data are constantly exchanged between a wide variety of online services. Positioned at the center of this ecosystem, the Big Five infrastructural platforms very much control the circulation of data to and from sectoral platforms, websites, apps, and the mass of users. The main way in which they do so is through APIs, which allow third-party applications to access platform data. As Qiu (2017, 1720) explains, through APIs third parties "can remix and remake proprietary data owned by corporations such as Google, Facebook, and Twitter into new applications and programmes." A prominent example of this is the set of Google Maps APIs, which is used by large numbers of third-party applications to gain access to geographic data and interactive maps. In this way, rich application ecosystems grow around each major platform and its different APIs, enabling other actors to participate in the platform economy. APIs effectively function as platform-governing instruments, providing "controlled" access to data. This means that third-party applications and programs can only use part of the data captured by the platform (Bucher 2013). Third parties can often only gain more extensive access through engaging in formal partnerships (e.g., Acxiom, Experian, and Quantium) or by gaining access to paid data services, which have become a core part of platform business models.

The most visible way for end users of platforms to circulate data is through their graphical user interfaces (Berry 2011; Gerlitz and Helmond 2013; Van Doorn 2014). Every platform offers its users a broad range of metrics. Social media typically allow

users to see who liked and shared their messages, photos, or videos, and survey what their "friends" and "followers" have been up to. E-commerce and collaborative consumption platforms provide insight into what other users or customers have searched for or bought ("customers who bought this item also bought . . ."), as well as how they have rated particular products and services ("four out of five stars"). These metrics are more than simply instrumental. Prominently displayed, they have an affective quality, prompting users to take action. Like, share, retweet, buy, and rate buttons enable further data collection and enhance user profiling and personalized advertising services.

It has been argued that the continuous data exchange through platforms enables a new kind of consciousness—an "ambient virtual co-presence" where users are aware of what others are doing, experiencing, and exchanging (Ito and Okabe 2005). This can especially be observed in the news sector, where the continuous stream of updates and emotions has been understood as a form of "ambient journalism" (Hermida 2010). Metrics provide insight in unfolding public events and evolving public sentiments, as will be extensively discussed in chapter 3. Particularly during large public events, such as elections, protests, or natural disasters, the many posts, status updates, pictures, and videos on online platforms comprise a constant flow of news updates, ostensibly providing insight in how users "feel" about an event. In those situations, platform data appear as a sort of primary news source and barometer of public sentiments, with users simultaneously acting as news consumers, eyewitnesses, reporters, opinion makers, and editors (Bruns 2011; Murthy 2013; Poell 2014).

Data streams involve end users and platforms but also engage a wide variety of societal institutions and organizations. The question of how societal organizations are going to integrate datafication mechanisms in people's daily routines is crucial to the realization of key public values in the coming years (Kennedy 2016). Do newspapers and online news sites organize the selection and production of news around "trending topics," or do independent editorial judgments remain the guiding principle? Do educational platforms promote datafication in every step of the learning process, or is this process primarily controlled by teachers and schools? And how are city governments building on datafication in the development of smart city applications? Do they use traffic data from commercial platforms such as Uber, or do they collect their own data?

In sum, the mechanism of datafication is beginning to play a central role in the configuration of social relations. Platform corporations expand their collecting and processing of data to track and predict an ever wider variety of users' performances, sentiments, transactions, informal exchanges, and activities. The social, economic, and public value of data exchange is inscribed in its real-time and predictive character,

allowing platform operators to *directly* track and influence streams of traffic, public opinions and sentiments, or, for that matter, students' cognitive advances. The business models of these platforms, in turn, inform how platforms technologically steer the flow of data. This brings us to the mechanism of commodification.

COMMODIFICATION

The mechanism of commodification involves platforms transforming online *and* offline objects, activities, emotions, and ideas into tradable commodities. These commodities are valued through at least four different types of currency: attention, data, users, and money. Commodification is intensified by mechanisms of datafication as the massive amount of user data collected and processed by online platforms provide insight into users' interests, preferences, and needs at particular moments in time. It also ties into mechanisms of selection as these users are connected with personalized services and advertisements (Andrejevic 2013a; Fuchs 2013; Turow 2012). Commodification includes, but does not equal, business models of singular platforms; rather, the mechanism plays out in the multisided markets created through the platform ecosystem, which connects the infrastructural core with sectoral platforms and a large variety of complementors.

Commodification mechanisms are simultaneously empowering and disempowering to users. Particularly those platforms we have labeled as connectors allow, on the one hand, individual users to market their personal assets or experiences online—be it their apartment, ride, eyewitness report, or video. They help commodify user activity, enabling users to become entrepreneurs in their own right. From this perspective, platforms potentially shift economic power from legacy institutions, such as hotels, taxi companies, newspapers, and universities, to individual users. On the other hand, the same platform mechanisms of commodification involve, as critical political economists have pointed out, the exploitation of cultural labor, the (immaterial) labor of users, and the further precarization of on-demand service workers (Van Doorn 2017b; Fuchs 2010; Moulier-Boutang 2011). Furthermore, these mechanisms lead to a concentration of economic power in the hands of a few platform owners and operators, particularly the ones dominating the core of the ecosystem, because they can strategically position themselves as aggregators and gatekeeping mediators (Fuchs 2013; Srnicek 2016). But how exactly does that work?

Multisided markets

As microeconomic studies show, the economic exchange enabled by platforms (e.g., search engines, video game platforms, social media networks) takes place within

a structure best understood as a *multisided market* (Boudreau and Hagiu 2009; Nieborg 2015; Rieder and Sire 2014; Rochet and Tirole 2006). In such an economic configuration, a platform aggregates, facilitates, and controls the connections and transactions between distinct groups of users: end users are connected with advertisers as well as with service providers or complementors, ranging from microentrepreneurs to news organizations and universities. Of course, there is a strong hierarchy between platforms in their ability to do so successfully. The Big Five platforms dominate the market for infrastructural services, complemented by a few rapidly rising sectoral platforms, as we explained in chapter 1.

To succeed as a multisided market, a platform must link as many users to their respective sides; one dominant strategy to bring end users on board is to offer them free access to the platform, while advertisers and service providers are offered low-cost tools to target end users. Examples of such tools are the Uber app, through which drivers are connected with riders, and the data analytics tools offered by Facebook and Google. As Rieder and Sire (2014, 200) point out, "if these subsidies and/or investments are well designed, powerful network effects and economies of scale can lead to a situation in which the appeal of one side of the market is strong enough to capture the entire market on the other." This effectively means that multisided market structures have a strong tendency toward monopoly. Attracting and connecting large numbers of end users, service providers, and advertisers can generate huge revenues but also require enormous investments. Only a few platform corporations have successfully balanced these requirements.

Platforms as multisided markets function through a number of business models, which involve the commodification of user data, services, and goods. One of the key ways in which user data and attention are commodified is through *personalized advertising*. Not surprisingly, Facebook and Google, companies with access to vast amounts of user data, have built extensive advertising networks (Fuchs 2013). In contrast to the traditional mass media model, platform advertising revolves not only around audience commodification—selling the time audiences spend consuming particular media content to advertisers—but also around the commodification of user data that can be personalized and aggregated in certain time–space locations (Nieborg 2017). In platform-based advertising models, advertising is dissociated from particular content; instead, it is targeted at specific users whose behavior and interests are tracked across the media landscape, in real time and increasingly across different media devices (Couldry and Turow 2014; Turow 2012). Content is, in this economic model, often provided for free to facilitate the collection of user data and to maximize the number of users. Content is typically also not produced by the platform itself but generated by users—individuals or professionals.[1]

The commodification of user data also takes place through the development of *data services*. While most platforms offer data services for free to ensure the participation of third parties in the platform market, a few specialized platforms generate revenue through these analytics services. Particularly prominent are large data companies, such as Acxiom, CoreLogic, and Datalogix, some of which collaborate with the core infrastructural platforms.[2] In specific sectors, such as the news industry, we can also observe the emergence of dedicated data services. Companies such as Chartbeat, NewsWhip, and Parse.ly specifically aim to assist editorial decision-making. The health sector has also seen the quick rise of specialized data services, for instance, OptumHealth, Verisk Analytics, and Oracle Enterprise Healthcare Analytics. These tools and services draw data from different sources to provide news and health organizations with detailed insights into user activity.

Besides advertising and data services, the commodification of goods and services involves monetary transactions. In some business models, platforms primarily generate revenue through *commissions* and *transaction fees*. This model is typically employed by connective service platforms, such as Uber and Airbnb; where Uber charges on average 25% commission over each fare, Airbnb charges a 3–5% service fee from hosts and a 5–15% transaction fee from guests (Airbnb 2018; Edelman and Geradin 2016; Henten and Windekilde 2016; Rosenblat and Stark 2016).

An important variant of this business strategy is the freemium model. In this model, the basic version of a product or service is provided free of charge, but a premium is charged for additional features and functionality.[3] Over the past years, different types of content producers, particularly the game industry, have experimented heavily with freemium. The freemium model is also prominently applied by massive open online courses and by some fitness and health apps, discussed in chapters 5 and 6. Coursera, for example, lets students enroll for free but offers extra services for a fee, such as certificates of completion and proctored exams.

Commodification strategies create platform dynamics that enable and shape economic exchanges while concurrently defining the active participation of a wide variety of users. Charging transactional fees rather than subscription fees or selling data and advertising without charging fees—each choice generates a different dynamic. While there are substantial differences between sectors in how such dynamics take shape, in general we can observe that economic processes across sectors are increasingly being oriented toward *and* determined by platforms. It is precisely through this reorientation and shaping of economic relations that multisided markets are constructed and formerly independent economic actors are transformed into platform "complementors"—complementary to platforms, that is. The news sector, as discussed in chapter 3, provides a case in point. Whereas news organizations previously functioned as two-sided markets in their own right—connecting readers

and viewers with advertisers—they now increasingly have to monetize their content through the commodification mechanisms imposed by the platform ecosystem.

Consequently, the emerging platform economy creates new dependencies and hierarchies. Drawing from a constant stream of user data and advanced technological infrastructures, platforms are more effective than traditional public institutions at linking students with teachers, readers and viewers with news and advertisements, patients with medical institutions, and drivers with riders. Around these platforms, complex systems of interdependencies emerge, with platforms developing into primary gateways to consumers and citizens upon which legacy corporations and institutions become dependent. Thus, while taxi drivers, news organizations, and universities evidently still find ways to reach people without the mediation of platforms, it becomes increasingly more difficult to ignore the evolving online infrastructure that offers one-click convenience and efficiency.

The efforts by individual and institutional users to promote themselves, their content, and their services tend to intensify the commodification of user data, goods, and services by platforms. More clicks means more data traffic, and more traffic means more power to platform operators, particularly the Big Five; data and attention are transformed into value by means of personalized advertisements and transaction fees. While user commodification and platform commodification mutually reinforce each other, there is clearly a huge disparity in power relations. As platform operators develop and control the interfaces, algorithms, and data flows that facilitate and shape the exchange through infrastructural connectors, they can set the economic rules of the game.

SELECTION

Datafication and commodification are closely related with the ways in which platforms steer user interaction through the *selection* or *curation* of most relevant topics, terms, actors, objects, offers, services, etc. Traditionally, experts and institutions, directed by professional norms, played key roles in such selection processes. Journalists determine what is and is not news, guided by their independent professional judgment. Expert reviewers help tourists to make a choice between hotel rooms on offer. And experienced teachers decide which assignments fit a course and which courses fit a curriculum. Online platforms replace expert-based selection with user-driven and algorithm-driven selection. Users now filter content and services by "rating," "searching," "sharing," "following," and "friending." Hence, platform "selection" can be defined as the ability of platforms to trigger and filter user activity through interfaces and algorithms, while users, through their interaction with these coded

environments, influence the online visibility and availability of particular content, services, and people.

From the perspective of users, selection through platforms appears more democratic than expert-based selection. However, selection is not only shaped by user practices but also constituted through often black-boxed techno-commercial strategies. Platforms curate content and user activity through a wide range of interface features and algorithms, the predilection and steering of which are anything but transparent to users. As Gillespie (2014) explains, algorithmic organization has become paradigmatic in a media environment dominated by platforms: we now rely on algorithms just as we used to rely on credentialed experts, even though we know very little about the mechanisms defining those choices. We will now discuss three types of selection that are often at play in platform dynamics: personalization, reputation and trends, and moderation.

Personalization

Platforms algorithmically determine the interests, desires, and needs of each user on the basis of a wide variety of datafied user signals, personalizing the user's stream of content, advertising, and contact suggestions. Personalization depends on "predictive analytics": the ability to predict future choices and trends on the basis of analyzing historical patterns of individual and aggregate data. Although platform algorithms determine what each user gets to see and is offered in his or her Google search results, Facebook News Feed, or Uber app, these automated choices are notoriously difficult to analyze or audit. As carefully protected trade secrets, they always remain partially hidden from view. Moreover, they are constantly modified in response to evolving business models and user practices. And they are performative in that they only act in combination with continuously changing user data, which means that the kind of selection they generate cannot be predicted beforehand (Bucher 2016; Chun 2011; Mackenzie 2005; Seaver 2014). Consequently, it is impossible to determine how platform algorithms exactly work. Researchers can only observe their workings and logics indirectly through various methods: by reverse engineering, by looking at documentation provided by platforms themselves, and through ethnographic research and interviews with software developers and engineers.

Drawing from these kinds of sources, we learn that algorithmic personalization builds on signals of both the individual user as well as larger user aggregates. This is most evident in the case of Facebook's News Feed algorithms. In a 2013 interview, Lars Backstrom, one of Facebook's News Feed engineers, made clear that the Feed's algorithms distinguish between different levels of affinity, measuring how close each

user is to friends, to people they follow, as well as to pages and groups. This measurement is based on personal interactions but also on global exchanges that can outweigh personal signals. Backstrom explains, "For example, if we show an update to 100 users, but only a couple of them interact with it, we may not show it in your News Feed. But if a lot of people are interacting with it, we might decide to show it to you, too" (quoted in McGee 2013). Facebook is trying to strike a balance between private conversation and public communication, between personalization and popularity. In this algorithmic balancing act, time decay also plays a crucial role—recent interactions weigh heavier than older ones—allowing Facebook to identify and highlight trending topics to its users (Bucher 2012). This kind of algorithmic balancing takes shape differently on each platform, depending on its business model. Moreover, it is an evolving process as Facebook and other platforms constantly change how they weigh different signals and what signals they take into account.

Through algorithmic personalization, as well as by giving users extensive options to select, search, filter, and follow, online platforms appear to realize Nicholas Negroponte's (1996) dream of the Daily Me. Around each user, platforms construct a completely personalized environment of services, information, and people. While a dream of convenience for Negroponte, personalized information environments are a nightmare to others, who worry about the societal consequences of personalization. According to scholars such as Cass Sunstein (2009) and Eli Pariser (2011), personalization can lead to social fragmentation, enclosing users in "filter bubbles" which bar them from being exposed to a wide variety of societal values and perspectives. These concerns, more extensively discussed in chapter 3, were again ignited in the aftermath of the 2016 US presidential elections. In the educational sector, a personalized algorithmic approach to learning may benefit individual students but may inadvertently diminish the emphasis on collective teaching and learning experiences. While we share these concerns, it is important to realize that personalization is precisely the reason so many people are attracted to platforms. Customization and personalization also empower users as consumers and citizens, enabling them to quickly find the most attractive offer and the information they are interested in.

Reputations and Trends

Platform selection mechanisms not only personalize what each user gets to see but also identify "trends" among the larger user population and determine reputations of users. Many platforms offer users lists of "trending topics," which are usually not simply a reflection of the most shared content, used words, or bought items but an algorithmic selection of the content, words, and items that generated the largest increase in user engagement. In other words, platform algorithms have a propensity

for virality or spreadability (Cheng et al. 2014; Goel et al. 2016; Jenkins, Ford, and Green 2013). Through cross-fertilization between platforms and followers, particular content and issues can "go viral." The ability to reach millions of people was previously the exclusive privilege of mass media. How and when exactly this snowball effect sets in is the result of an intricate interplay between global user activity and algorithms. Particularly large infrastructural platforms have vested interests in boosting user traffic in order to raise advertising attention and data exchange.

Platforms also play a crucial role in determining the "reputation" of users and services. Users are constantly asked to review each other's behavior and performance, for instance, as deliverers, drivers, guests, teachers, or hosts.[4] In turn, these metrics are fed back to users, allowing them to quickly assess whether it is a good idea to engage in an economic exchange with another user (Ert, Fleischer, and Magen 2016; John 2013; Zervas, Proserpio, and Byers 2015). It is through such selection mechanisms that connectors try to construct interpersonal trust. Reputation rankings provide both consumers, who step into a stranger's car or house, and micro-entrepreneurs, who offer their private space, some minimum assurance that the other can be trusted. While hospitality services and transportation network companies still portray their users as a "community," the massive scale at which these platforms operate make traditional community-based modes of interpersonal trust irrelevant. And as global operators cannot guarantee the safety and quality of the services offered through their platforms in the same way hotels and taxi companies can, they employ reputation ratings to make up for the lack of institutional guarantees.

Reputation metrics are not simply a reflection of the quality and standing of a service provider; their efficacy is shaped and defined by the platform operators that design these systems in the first place. Take Uber, whose rating practices will be discussed in chapter 4. Drivers who fall below a certain rating can be removed from the platform and lose their earning capacity through the platform. In this way, these metrics stimulate drivers to sustain and improve their reputations. So more than instruments of trust-building, reputation metrics are increasingly deployed as instruments to reinforce particular user behaviors, steering activities in key public sectors (Baym 2013; Marwick 2013; Rieder 2016; Van Doorn 2014).

Platform trends and reputation metrics have become vital in today's economy. Consequently, it is not surprising that many societal actors try to affect these selection mechanisms. Micro-entrepreneurs offering rides or accommodation try hard to get a high rating from their customers, and the same is true the other way around. It has been suggested that this dynamic can lead to inflated reviews as users are afraid to get a low rating if they are critical or shut the other out from future work (Bolton, Greiner, and Ockenfels 2013; Fradkin et al. 2015; Zervas, Proserpio, and Byers 2015). Systematic efforts to steer selection mechanisms are often also made during large

public events where users push event-related hashtags so that relevant messages can easily be grouped together and retrieved. And by mass retweeting, liking, and sharing particular messages, users greatly enhance the visibility of these messages (Bruns and Burgess 2015; Poell 2014). In doing so, they build on the technological affordances of social media networks, anticipating the algorithmic organization of user content in "trending" and "most relevant" content. This was clearly illustrated by the Occupy example in the introduction, in which activist groups tried to gain public attention via Twitter's trending topic lists. And then there is the gray market of commercial third parties that "game" platform metrics. "Fake" Twitter followers, app store reviews, and Facebook friends can be bought for a small fee. State actors, on their part, can deploy "bot armies" to redirect attention, spread misinformation, and even attempt to gather people to engage in offline activities (Maréchal 2016; Tufekci 2017).

Moderation

Finally, all major platforms actively moderate what content is shared and who can use their services. This selection mechanism tends to generate a lot of controversy as platforms are often seen to moderate either too little or too much. Prominent examples of *too much* moderation are the many instances in which Facebook and other social media filter historically and culturally significant content because it violates their regulations in terms of the depiction of nudity and graphic violence (Levin, Wong, and Harding 2016). When Facebook repeatedly deleted the iconic "Terror of War" picture of a fleeing naked child after a napalm bombing during the Vietnam War, its removal triggered controversy when a Norwegian news outlet objected to this practice. Also controversial is the deactivation of user accounts because of real-name policies (Youmans and York 2012). In these instances, platforms are blamed for censorship and power abuse. Vice versa, platforms are also frequently accused of moderating *too little* when they fail to promptly remove users and/or content that constitute a threat to public safety. Moreover, the widespread circulation of misinformation has also been considered a failure of platform curation (Manjoo 2017a). In other words, platform moderation practices constitute an intricate balancing act between different actors, interests, and concerns.

Central elements in this balancing act are platform regulations (terms of service), automated technologies, and moderation procedures. To identify users and content that potentially violate regulations, platforms increasingly employ automated detection technologies (Buni and Chemaly 2016). However, given the complexity and contentious nature of content moderation, this process can never be fully automated. Consequently, the major infrastructural and sectoral platforms also rely on

thousands of human moderators or editors to evaluate potentially violating activities and content (Goel 2017). Moreover, these platforms constantly call upon their users to "rate" and "flag" content and performances of other users. These ratings and flags are, in turn, employed to identify and remove contentious content and deactivate users who fail to meet ever shifting and opaque "community standards" (Buni and Chemaly 2016; Crawford and Gillespie 2016). Uber, for example, as discussed in the chapter 4, builds on user ratings to detect drivers who do not satisfy customer expectations.

These moderation practices should be understood within the larger commercial and regulatory environment of the online ecosystem, in which often contradictory economic, political, and social pressures are at work. Platform corporations, on the one hand, clearly have an economic incentive not to be overly restrictive in terms of the content and services exchanged through their channels as this would limit revenue from advertising and commissions. This economic incentive became particularly poignant during the 2016 US elections when so-called fake news widely circulated across social media platforms. Overall, platforms tend to especially respond to controversy: pressured by users and advertisers, they are usually highly motivated to moderate controversial content and practices. Hence, scandals over racist drivers and apartment owners have prompted companies such as Uber and Airbnb to take measures against discrimination. Similarly, in direct response to the 2016 fake news controversy, both Google and Facebook have taken measures against malicious publishers (Wakabayashi and Isaac 2017). The criteria for filtering content and blocking users are constantly evolving, driven by changing societal concerns and ideals.

Given the controversy generated by platform moderation practices, it is not surprising that the consequences of selection dynamics for the realization of key public values have become the object of intense public scrutiny. The deactivation of user accounts on connective service platforms has especially raised concerns about the security of basic labor rights on platforms such as Uber. On social media sites, moderation practices trigger concerns over access to crucial means of public expression. In turn, content filtering or lack of such filtering has set off alarm bells regarding the ways in which platforms potentially limit freedom of expression and undermine the quality of public debate. The extent to which platforms rely on human versus algorithmic moderation has received a lot of attention. Perhaps surprisingly, especially the use of human moderators to filter content has been considered an illegitimate intervention in what many consider user-driven processes, enabled by unbiased technologies. Of course, as Gillespie (2016) points out, algorithms also make choices on the basis of criteria specified by designers. These criteria, as in the case of human editorial processes, are fundamentally "expressions of human values." Thus, when

considering platform selection mechanisms involving algorithms, human editors, or a combination of both, we inevitably need to question the *core values* that guide these mechanisms.

CONCLUSION

This chapter has described three closely related mechanisms and the ways in which techniques of measurement and calculation are integrated in specific modes of governance—a development that should be seen as part of a longer history of calculation and commensuration.[5] To understand how datafication, commodification, and selection tie in with contemporary governance strategies, it is especially important to see how in neoliberal or advanced liberal democracies, calculative regimes of accounting, and financial management have been employed to enable what Miller and Rose (2008, 212–13) call a "degovernmentalization of the state." Through budget disciplines, accountancy, audits, and performance measures, societal organizations and individuals are increasingly governed "at a distance," while at the same time gaining a certain autonomy in decision-making and responsibility for their actions.

It is in this framework of calculative regimes and deregulation that platform datafication takes shape. It allows for performance measurement, as well as the tracking of evolving sentiments, interests, and opinions in ever more spheres of life and in ever greater detail. This ongoing translation of every type of activity in data can be understood as a process of *commensuration*, which Espeland and Stevens (1998, 314) have defined as "the transformation of different qualities into a common metric" through "rankings, ratios, or elusive prices." In the case of online platforms, commensuration takes the form of likes, shares, ratings, comments, friends, and followers, allowing operators to compare, sort, and rank types of activities which were previously considered incomparable and unquantifiable. From this perspective, platform mechanisms of datafication, commodification, and selection are continuous with long-term developments in the relationship between governance and quantification. They strongly correspond with the neoliberal reorganization of government and the penetration of market rationalities and principles in a wide variety of social activities. Platform mechanisms shape *every* sphere of life, whether markets or commons, private or public spheres.

As we will see in the following chapters, the identified mechanisms involve public institutions, corporations, and individuals, who are stimulated to maximize their performance and develop an entrepreneurial disposition in an online world. At the same time, the types of measurement and forms of tracking introduced by platforms, as well as the ways in which these are translated to specific business models and

economic strategies, do not necessarily support established market players. Platformization disrupts both collective public arrangements and entrenched market structures. By introducing new social categories and selection mechanisms, platforms reorganize value regimes and economies. As Espeland and Stevens (1998, 323) emphasize, "commensuration is political: it reconstructs relations of authority, creates new political entities, and establishes new interpretative frameworks."

While the dominant articulation of the three identified mechanisms is ideologically continuous with the neoliberal reorganization of government in the United States and Europe over the past decades, this is not to say that the outcome of processes of platformization is predetermined. The challenge taken up by this book is precisely to examine how these processes take shape and how they can be shaped *differently* to include important public values. The starting point in addressing this question is the realization that the different types of actors involved have a choice in how they integrate platforms in their practices and routines.

Individual end users are most directly confronted with platform technologies embedded in interfaces and algorithms, guiding them to the most relevant, highest-rated, and most shared content and services. The tension between the techno-commercial selection strategies of platforms and the occasionally unpredictable tactics of users is important to explore. Ultimately, the fate of a platform is determined by the collective behavior of users. If many users decide to move to other platforms or pursue content and services offline, a platform can very well fail, unable to produce the necessary network effects and economies of scale. We will return to this point in the final chapter of the book.

We also need to consider *institutional users*: governments, corporations, news organizations, universities, and medical institutions that try to build on the platform ecosystem and integrate their activities in an online world. These kinds of legacy organizations and institutions have historically anchored selection procedures and criteria of relevance in professional routines, formal standards, or ethical criteria. For example, the medical institutions we will encounter in chapter 6 conventionally operate by means of strict protocols when handling patient data about symptoms or treatment; they carefully select appropriate testing and evaluation methods. Such procedures are challenged by online health platforms offering user-generated data that are shaped by commodification and selection mechanisms. If platforms bypass institutional users and their professional standards and procedures, this inevitably raises a number of issues—from privacy concerns to scientific integrity.

Similar kinds of challenges and questions emerge in the other sectors. In each specific case, the question is what the confrontation between established institutional procedures and the selection methods and commodification strategies of platforms means for the realization of key public values. What criteria are used to

determine what is news, and can this selection process be outsourced to algorithms, platform operators, and users? To what extent do ideals of socioeconomic equality inform the organization of transport? If education gets primarily approached as a data-driven process of personalized learning, what are the effects on institutional values defining education as a common good? To properly address such questions, it is vital to gain a precise understanding of how platform mechanisms work in specific sectoral contexts and how they steer individual users and become entangled with institutional procedures.

The Big Five tech companies exert mounting influence over how societies are organized through the platform ecosystem. Their infrastructural services set technological standards, determine economic models, and steer user activity for the ecosystem as a whole, shaping the interaction between sectoral platforms, societal institutions, companies, and citizen-consumers. While it is certainly possible to organize these relations differently, this is by no means a simple task. As we will argue, it takes much more than bottom-up commons-based initiatives, however innovative and technologically sophisticated they might be. To bring substantive change to the workings of the platform society, the infrastructural core of the ecosystem—the way it operates and is being operated—should become open to negotiation and allow other societal actors to influence its underpinning mechanisms. That is why we will now turn to four specific sectors—two mainly market-based and two predominantly public—to investigate how platformization is changing the precarious balance between various social actors in each sector; we will use datafication, commodification, and selection as analytical prisms to help understand how the ecosystem works to rearticulate power relationships.

3

NEWS

INTRODUCTION

In May 2016, Facebook's "trending" news section became an object of contention when the technology site Gizmodo revealed that the social media corporation employed a team of editors to guide the trending algorithms. Moreover, Gizmodo claimed, citing a former member of the team, that these editors "routinely suppressed conservative news" (Nunez 2016). These revelations immediately attracted global media attention to the fact that the social media corporation employed human editors, in what many assumed to be an automated process (Carlson 2017; Gillespie 2016).

Strikingly, a couple of months later Facebook was reproached for providing *too little* human editorial oversight. In the run-up to the 2016 US presidential elections, a spike could be observed in the online circulation of misinformation, made to look like legitimate journalism. Much of this "fake news" circulated on Facebook.[1] Analyzing news-sharing activity on the platform, BuzzFeed's Craig Silverman demonstrated that the top twenty false news stories were generating more user engagement than the top twenty stories from major news outlets (Silverman 2016). Nearly all of the stories labeled false were pro-Trump, and many came from websites run from Macedonia. Trying to make quick money, young Macedonians were aggregating and plagiarizing content from right-wing sites in the United States,

adding sensational headlines, and circulating links to these stories on Facebook and other social media. When such content went viral, it generated substantial revenue through online advertising networks such as Google AdSense (Silverman and Alexander 2016).

Facebook received a lot of criticism for allowing such activities; some detractors even suggested that the social network had contributed to the outcome of the presidential elections. Confronted with such charges, Facebook initially denied responsibility (Tufekci 2016). Yet, as criticism continued to swell and more research became available showing that Facebook indeed substantially contributed to the development of an insulated right-wing media system, the company began to slowly accept more responsibility for the quality of news circulating on the platform (Benkler et al. 2017; Manjoo 2017a). In January 2017, it announced plans for what it calls the "Facebook Journalism Project," a project that aims to establish "stronger ties" with the news industry and "equip people with the knowledge they need to be informed readers in the digital age."[2] The initiative can be seen as a continuation of long-term efforts to entice the news industry to organize its production, distribution, and monetization strategies around Facebook. At the same time, it signals Facebook's active involvement in governing the news *sector* as part of the larger ecosystem. This shift is also exemplified by the company's efforts to collaborate with fact-checking organizations and its hiring of three thousand new monitors on its "community operations team" to help weed out inappropriate, offensive, and illegal content (Goel 2017).

The trials and tribulations of Facebook point toward two closely related developments. On the one hand, infrastructural platforms are making extensive efforts to become central nodes in the production, circulation, and commodification of news by developing new data services and news-related features. They do so while struggling with their editorial function and responsibility in the news sphere, lacking the necessary journalistic expertise and possibly interest in the principles of professional journalism to adequately fulfill this role. Especially Facebook has publicly wrestled with this role. Consequently, the company has repeatedly emphasized that its prime objective is to connect users with posts from their friends and family (Isaac and Ember 2016; Mosseri 2018). On the other hand, a wide variety of online news content producers—from legacy media organizations to producers of disinformation—target online platforms to distribute and monetize their content. To achieve maximum network effects, they tend to rely increasingly on the infrastructural services of the Big Five platforms. As this chapter will show, this means that the production of news becomes progressively tailored to obey the mechanisms and organizing principles driving the platform ecosystem.

The key question is how these developments reshape public values in the news sector—values that have historically guided the journalistic profession and are

deemed of vital importance to journalism's role in democratic politics. *Journalistic independence* is at the core of news media's ability to keep politicians, governments, and corporations publicly accountable. For this reason, the so-called wall between church and state—between the editorial and the business sides of news production—has always been considered crucial. The value of *accurate and comprehensive news coverage* has been promoted to ensure that major societal developments and events, as well as the opinions and perspectives of a broad range of social actors and groups, receive general public attention (Bennett, Lawrence, and Livingston 2007; Hampton 2010).

The realization of such values comes under pressure in the platform ecosystem which revolves around personalization, potentially isolating users in their own cultural and ideological filter bubbles (Sunstein 2009; Pariser 2011). Both professional values have, of course, always been compromised by commercial and political pressures resulting from the necessity to maximize advertising revenue as well as from journalists' structural dependency on government sources for vital political information (Barnett and Gaber 2001; Bennett, Lawrence, and Livingston 2007; McChesney 2004; Tumber and Palmer 2004; Schudson 1978; Underwood 2001). But, as we will argue, the platformization of news not only intensifies these pressures but also further complicates the realization of crucial journalistic values.

THE PLATFORMIZATION OF NEWS

The current ascent of social media platforms as central actors in the news sphere should be seen in the light of the evolution of platformization sketched in chapter 1. As one of the first societal sectors, news was transformed through the development of online platforms in the late 1990s, when traditional news distribution and revenue models suffered from the rise of search engines, news aggregators, and classified advertisement websites. This is effectively a history of the "unbundling" and "rebundling" of news content, audiences, and advertising. It is important to trace this history to understand how the contemporary news ecosystem is constituted through a variety of platforms, of which social media are only one type. Each of these platforms presents different challenges and opportunities for news organizations trying to reach audiences and generate revenue.

As Nicholas Carr (2008, 153) points out, the newspaper as a product is a bundle of news stories and advertisements. Although bundling was born out of economic necessity, driven by the high costs of producing and distributing news, the bundle was what people subscribed to and what advertisers paid for to catch readers' eyes as they flicked through the pages. A major step in unbundling this configuration

was the development, from the mid-1990s, of *classified advertising websites*, such as Craigslist and eBay. Classified ads had long been an important source of income for the newspaper industry, so these sites meant an undermining of one of the sector's prime business models (Anderson 2009; Hirst 2011; Turow 2012). The migration of these ads to specialized websites should, however, be seen as only the first step in what Carr calls the "great unbundling."[3]

The rise of *search engines*, in this regard, was a more complex and unsettling development. Like classified ad sites, search engines disrupt the news content–advertising relationship. From the early 2000s onward, search engines, with Google leading the pack, quickly acquired a dominant position in online advertising, undermining the ability of news organizations to generate advertising revenue (Statistica 2017). Yet, as Carr (2008, 153) points out, search engines also unbundle the content–audience relationship by allowing users to directly find and access single news articles and videos, circumventing the "front page" altogether.[4] While such search engine traffic generates new revenue opportunities for news organizations through advertising, it also changes how they distribute and monetize content. Each individual story, "becomes a separate product standing naked in the marketplace" which "lives or dies on its own economic merits" (Carr 2008, 154). Of course, the rise of search engines also means that news organizations start to lose control over the curation of news. Most professional news organizations pride themselves on providing accurate and comprehensive news coverage. If users consume isolated news items rather than the entire bundle, why would individual outlets provide a complete and inclusive news offering?

The process of unbundling has been further propelled by the development of a wide variety of *news aggregators*, which collect content from different news sources, such as online newspapers, blogs, podcasts, and video blogs (vlogs). Prominent examples of news aggregation websites are Google News, Apple News, and Yahoo News. Also important are Web-based and application-based feed readers, such as Feedly, Flipboard, and Digg, which allow users to aggregate RSS feeds from different news outlets. Like search engines, aggregators unbundle content and audiences, providing direct access to individual news items. At the same time, of course, the added value of these sites is that they "rebundle" this content in one location. Rebundling makes the aggregator, rather than the original news outlets, the prime gateway to access news. Consequently, control over news selection is further shifting from news organizations to platforms.[5]

This brings us to *social media platforms*, such as Facebook and Twitter. Since 2004, they have rapidly become central nodes in the platform ecosystem, where they effectively function as news aggregators but with a few twists. Whereas traditional news aggregators employ professional editors or algorithms to select content from a relatively

limited set of professional news publications, on social media everyone can share news or other content from anyone and from anywhere. This means that what is shared tends to be a much more heterogeneous and fortuitous content mix, containing news from mainstream news organizations but also from the widest variety of other sources, including regular users and producers of disinformation. In this regard, social media not only undermine the control of news organizations over the selection of news but also fundamentally undermine the privileged position of professional journalism.

Given their rapidly growing popularity, social media have enormously boosted the process of unbundling, making it an inescapable reality for all news organizations. In 2012, only a small minority of Internet users in the United States and Europe received news through social media (Mitchell and Rosenstiel 2012; Newman 2012). A few years later, in 2016, the Reuters Institute found that 46% of the population in both the United States and the European Union used social media as a source of news.[6] An important driver of this development is the growing popularity of smartphones. As Reuters observes, "people use social media more on the smartphone, whilst they are less likely to use a branded entry such as a website or app" (Newman, Levy, and Nielsen 2016, 15).[7] In practice, this intense use of social media for news consumption means that Facebook is progressively dominating the distribution and selection of news, which is reflected in its advertising revenue. [8] In combination, Facebook and Google now command a 60% share of the total digital advertising revenue in the United States, leaving all other online platforms *and* news organizations combined a 40% minority share (Bruell 2017).

These percentages are a poignant illustration of the complex situation in which many news organizations find themselves today. As the content–audience–advertising configuration is unbundled and rebundled through platforms, news organizations increasingly lose control over how news is distributed, monetized, and curated (Nielsen and Ganter 2017). The next step in this development appears to be the actual hosting of news content on platforms. Facebook's Instant Articles, Apple News, Twitter Moments, Snapchat Discover, and Blendle all facilitate the native consumption and monetization of news content. Rather than drawing audiences to their own websites, news organizations hand over their content to platforms, where it can be consumed, bought, and connected to advertisements (Bell et al. 2017). Although such development seems to take Carr's great unbundling to its logical conclusion, it does not mean that this is how the news ecosystem will ultimately be organized. Much depends on how news organizations strategically manage their operations in relation to the advances of platforms. The next sections explore how these interactions shape the mechanisms of datafication, commodification, and selection, transforming the news process and potentially shaping journalism's role in society and democratic politics.

QUANTIFIED AUDIENCES

In the unbundled news sector, datafication involves a wide variety of actors. Due to the many different paths through which today's audiences consume news and leave a data trail, a wealth of audience metrics have become available, spawning a number of measurement and data services. Historically, the news and media industry has, of course, always been characterized by audience monitoring, especially in parts of this industry that depended on advertising. Yet, it is only with the development of the networked infrastructure that the fully quantified audience has become a reality (Anderson 2011; Napoli 2011; Usher 2013). Given the unbundling of the content–audience–advertising string, it is essential for news organizations to trace how each piece of separate content circulates online. This section first discusses the various audience measurement services available to the news industry and examines how digital news publishers and legacy news media integrate these services into their operations. From the perspective of public value, this is particularly interesting because a fully data-driven news production and distribution process potentially conflicts with journalistic independence and comprehensive news coverage, putting additional commercial pressure on journalists to produce content that triggers user engagement. Moreover, the integration of platform data in news operations effectively creates path dependencies as the data infrastructures of the Big Five platforms shape the scope of editorial decision-making.

Overlooking the landscape of audience measurement services, we first encounter a number of traditional firms, such as Nielsen NetRatings and comScore. These firms trace online media use by installing tracking software on the computers of a group of carefully selected Internet users, whose habits are extrapolated to reflect a broader population—a method that has long been deployed to measure television audiences. Second, there are also, not surprisingly, a number of services that build on the affordances of the Web. Companies such as Google Analytics, Omniture, Hitwise, and Quantcast trace audiences through server data from websites or traffic data from Internet service providers (Cherubini and Nielsen 2016; Graves and Kelly 2010; Turow 2012). Although newsrooms use these services that cater to a broad range of companies and organizations, they are not specifically designed for editorial decision-making. The same can be said for many of the data services developed by social media corporations which allow for the tracking of general audience engagement and demographics.[9]

In recent years, general audience measurement services have been complemented by new tools that specifically aim to assist editorial decision-making, such as Chartbeat, NewsWhip, Parse.ly, OutBrain Engage, and CrowdTangle. These tools draw data from different online platforms to provide news organizations with

detailed insights into how users engage with and share their content across the platform ecosystem. Chartbeat, for example, provides news organizations with real-time analytics focused on audience attention. Through its dashboard, editors, guided by real-time audience metrics, can A/B-test headlines and formats of news items, and they can also tinker with the structure of the landing page.[10] Another prominent example is NewsWhip, which every two minutes tracks social media activity on Facebook, Twitter, Instagram, Reddit, LinkedIn, and Pinterest. It provides news organizations with a "predictive discovery dashboard" that allows journalists to identify in real time viral content by locations, topic, keyword, etc. (Cherubini and Nielsen 2016; NewsWhip 2017). In other words, these data services constitute the instruments through which platform data are operationalized in the news process, potentially shaping editorial decision-making in terms of topics to focus on and reconfiguring the presentation of content. It is through user data that the larger platforms, intentionally or not, begin to govern the news.

This development is reinforced by recent efforts of social media corporations, most prominently Facebook, to provide audience measurement services specifically tailored to news organizations. In late 2016, Facebook acquired CrowdTangle, making it freely available to news organizations and other users. CrowdTangle allows publishers to track how their content, as well as content from competitors, is spreading on major online platforms, including Facebook, Instagram, Twitter, Reddit, and YouTube. Before its acquisition by Facebook, CrowdTangle was already used by BuzzFeed, Vox, the Huffington Post, CNN, NBC, and USA Today (Kessler 2015). Making the tool freely available, Facebook aims to further expand the take-up among news organizations and a wide variety of other companies. To this end, it provides these organizations with online tutorials on how to integrate CrowdTangle's dashboard in their operations. As part of its journalism project, Facebook combines these tutorials with detailed support on how to use CrowdTangle in relation to other Facebook data tools, including Insights and Signal, which help journalists to "surface relevant trends, photos, videos and posts from Facebook and Instagram" (Facebook 2017a).

The many audience measurement services support news organizations to tailor their content to the platform ecosystem. This system favors news production and distribution informed by the algorithmic processing of datafied user activity on platforms and thus potentially clashes with journalistic independence. Instead of relying on editorial decisions based on journalistic judgments, the "automated" news process would be determined by quantified user demand. Such a model of news production could be interpreted as a democratization of the news process, but, as argued in earlier chapters, user empowerment is only half the story. Platform datafication also means that the technological standards and economic models of platforms

shape professional values and sectoral activity. Thus, a fully data-driven news production and distribution process would be one in which neither news organizations nor users but rather platform dynamics would be leading the way. Whether this indeed becomes a reality will be determined not only by platforms, data services, and available metrics but especially also by how news organizations integrate them in their operations.

Data-Driven News Production and Distribution

Exploring this integration process, we will first focus on two leading digital publishers, the Huffington Post (HuffPost) and BuzzFeed, based in the United States, which have been particularly assertive in datafying news production and distribution. These publishers both started as news aggregators in the early 2000s but over time began to produce more original content, developing into large media companies in the process.[11] As major online-only news organizations, BuzzFeed and HuffPost are particularly apt at datafying the production, circulation, and monetization of individual content items. Interviews with HuffPost directors show that data are central to every aspect of their news operations. However, data are not just about numbers of page views. For one, HuffPost uses an array of different tools, including a customized version of Chartbeat, a personalized Omniture dashboard, and its own recommendation service called Gravity, which it bought from AOL. Through these tools HuffPost journalists respond to real-time trends and test out various headlines and formats; they also develop long-term strategies on how to cover particular subjects and grow a loyal audience rather than drawing a new audience every day (Bowman 2014; Cherubini and Nielsen 2016). In this regard, HuffPost can be characterized as a data-driven news organization, in which the independence of individual journalists and editors is limited by datafication. At the same time, datafication does allow this news organization to set editorial priorities by privileging particular user signals, albeit within the scope set by platform infrastructures.

Looking at how other data-driven news organizations work with platform data, we gain further insight into how this works. From the very beginning, HuffPost was conceived and positioned as a mainstream news site; therefore, it uses a wide range of metrics to determine what users might be interested in, and it produces content on the basis of these signals. BuzzFeed, by contrast, began as a viral experiment. The site does not just focus on producing content informed by trending topic lists but tries to determine what *is* viral content. BuzzFeed has turned virality into data science by systematically collecting its own user metrics and combining these with available platform metrics as well as with descriptive variables regarding the articles' and videos'

content.[12] In this way, BuzzFeed can A/B-test its content to predict when and why stories go viral and tweak their visibility when deemed necessary.

Even though HuffPost and BuzzFeed have both organized their operations around the mechanism of datafication, they each developed a different approach to decide what is *relevant* content. Building on a wide variety of Web metrics, HuffPost has become a general interest news site. BuzzFeed, which primarily focuses on social media data, offers shareable content. By concentrating on particular types of platform metrics, publishers can make choices regarding the sort of content they want to promote. In other words, editorial choices have been partly automated, rendered into quantified procedures.

While data-driven news publishers do set editorial priorities, this type of news production and distribution entails a shift from a model that primarily revolves around editorial autonomy to one based on datafied user interests and activities. In this regard, there certainly is tension between datafication and journalistic autonomy. User data are never a neutral reflection of user interests but always shaped by the techno-commercial strategies of platforms. Consequently, whatever data signal news organizations prioritize, the very use of these metrics inevitably injects the "platform perspective" into the news operation. To understand the consequences for the overall news process and the role of journalism in society at large, we also need to examine how legacy news organizations are working with data.

Datafying Legacy News Organizations

Historically, the so-called quality press has, more than any other medium, embodied the core values of journalistic independence and fair and comprehensive news coverage. Throughout the twentieth century, these values have been anchored in institutional processes, routines, and journalistic formats. The *New York Times* and the *Guardian* are prime examples of such legacy companies' transformation. Over the past two decades, the process of unbundling has forced them to rethink how they produce, distribute, and monetize news. This is not to say that these legacy news outlets are adopting the same data-driven production and distribution models as HuffPost and BuzzFeed. Stuck between print and online, newspapers have continued to hold on to many of their traditional routines, norms, and values, while gradually adjusting to the platform ecosystem.

Even though platform metrics have been available for quite a while, they have been only slowly integrated in the newsroom operations of legacy news outlets.[13] A clear signal that fundamental changes were underway was the infamous internal *New York Times Innovation Report* that was leaked in May 2014. The report showed how deeply worried the *New York Times*' leadership is about not adequately responding to the

rise of digital publishers and social platforms.[14] The report stressed that born-digital news sites "are not succeeding simply because of lists, quizzes, celebrity photos and sports coverage. They are succeeding because of their sophisticated social, search and community-building tools and strategies" (Wills, 2014, 24) The overall message of the report was that the *New York Times* needed to do a better job responding to the interests and practices of Internet users. To accomplish this, the newspaper created, in the fall of 2014, a new audience development team. The team systematically tracks social media and search engine traffic, invites *Times* editors to join the conversation on social media when a story is trending, and proposes keywords to optimize stories for search engines. Furthermore, it creates social media accounts for particular sections and desks, such as a Pinterest account for the cooking section and Facebook accounts for individuals' news desks. In other words, the team is trying to organize the news operations around user traffic and activity.

Even so, the *Times* is clearly on the conservative side of the data-driven approach to journalism. Many other newspapers have not only taken the step to form dedicated audience engagement teams that continuously monitor platform metrics but also more thoroughly integrated analytics into the newsroom. In 2014, the *American Journalism Review* interviewed editors from eighteen US print news organizations, revealing that most of them "encourage or recommend staff to be on social media." Some newspapers, such as the *Los Angeles Times*, even "require all bylined staff to be on social media" (Fischer 2014). Although platform data are not directly dictating editorial decision-making per se, user metrics are increasingly becoming an integral part of day-to-day journalistic routines (Cherubini 2014; Edge 2014).[15]

What these observations show is that newspapers are developing a hybrid model, holding the middle between an editorially driven and a data-driven mode of news production. Progressively integrating online audience metrics into their day-to-day operations, newspapers are gradually developing a more demand-driven news production and distribution process. Hence, while the mechanism of datafication clearly puts pressure on journalistic independence at legacy news organizations, the value of journalistic independence is deeply ingrained in the newsroom culture of these organizations—partly because an important part of their audiences is still offline—so the data-driven model of news production and distribution cannot be fully implemented. The question is what datafication means for the type of content produced and circulated by newspapers and for their role in democratic politics. To address this larger question, we need to explore how news content is commodified and selected in the platform ecosystem. The dynamic of the datafied news process is determined less by the reporting of individual news organizations and more by the interaction between the assemblage of news organizations, platforms, data services, and advertising networks that populate the contemporary news landscape.

ECONOMIC REORGANIZATION

The unbundling of news transforms what constitutes the tradable commodity: from the newspaper and its audience to an isolated piece of content (e.g., article, advertisement) and its distributed (personalized) users. This shift entails a fundamental reorganization of economic power relations. The question is whether this reorganization undermines, as various observers have argued, the economic viability of the news industry and therefore of professional journalism as a key democratic practice (Bell 2016; Lewis 2017). As Couldry and Turow (2014) make clear, advertising has historically subsidized media content production, a monetizing model that is now under strong pressure.

Considering the implication of this development, we first need to understand what the economic reorganization of the media landscape entails. In the past, newspapers and other media organizations functioned as *two-sided markets* connecting readers, viewers, or listeners to advertisers. Media organizations had effectively monopolized access to audiences, allowing them to command the advertising market. Today online platforms have largely taken over this position, functioning as *multisided markets* that connect audiences, advertisers, and third-party content producers, such as newspapers and other media organizations (Nieborg 2015; Rieder and Sire 2014). Because the major infrastructural platforms, most prominently the ones operated by Google and Facebook, draw billions of users, they become attractive or rather unavoidable for advertisers and content producers, due to their strong *network effects*.

While news content has been circulating through the platform ecosystem from its very beginning, in recent years platforms have, as discussed above, drawn news organizations more deeply into their multisided markets through native hosting programs. In these programs, news organizations "hand over" their content to the core infrastructural platforms, where it can be consumed, bought, and connected with advertisements. Facebook's Instant Articles is the best-known example of this, but Apple News, Google AMP pages, Twitter Moments, and Snapchat Discover offer similar functionality. Launched in May 2015, Instant Articles allows news publishers to "distribute fast, interactive articles to their readers within the Facebook mobile app and Messenger" (Bell et al. 2017, 25). The platform promises publishers "ten times faster" loading times than standard mobile web articles. As users are increasingly consuming media content through mobile devices with relatively slower Internet connections, native hosting on platforms, optimized for mobile use, becomes an attractive proposition. In terms of monetization, Instant Articles, like most other native hosting programs, allows publishers to extend their own direct-sold ad campaigns, as well as sell unfilled ad slots through Facebook's own ad network for 30% of the revenue (Facebook 2017b). For Facebook and other

infrastructural services operators, native hosting is evidently attractive because it keeps users on the platform, allowing these corporations to collect and control user data, as well as pushing their own advertising networks. For news publishers, it presents a much more ambiguous proposition as it further undermines their control over the audience–content–advertising relationship. To understand how these mechanisms of commodification reshape the news process in practice, it is vital to interrogate how publishers try to monetize their content in relation to these infrastructural platforms.

Networked Versus Native Strategies

At least two types of commodification strategies are available to publishers in the platform ecosystem: networked and native strategies. A *networked strategy* refers to the circulation of content links, headlines, and snippets through online platforms to drive audiences to the news publishers' website, where they are served with ads or enticed to sign up for a subscription or give a donation. Alternatively, publishers can pursue a *native strategy*, which entails that the publisher hosts its content on platforms, where it is connected to advertising. What combination of strategies the news industry settles on has far-reaching consequences for the distribution of economic power between news organizations and platforms, as well as for the realization of journalistic independence and fair and comprehensive news coverage.

Up to recently, news organizations have mostly pursued networked strategies, trying to draw users to their websites. HuffPost, BuzzFeed, and other digital publishers developed a systematic network approach from the beginning; building on search engine and social media data, they primarily aimed at drawing user traffic on their sites (eBiz 2017). Over the past years, legacy news media caught on as well, setting up audience engagement teams who systematically datafy their operations. This strategy has, however, not proven particularly lucrative to news organizations. Since ads can potentially be delivered through every website that draws users, the cost of reaching users through advertising has steadily fallen. Examining the cost for reaching a thousand members of a target audience (cost per mille [CPM]) in 2010, Turow (2012) observed that *online* the content–audience–advertising relationship generates much less revenue than it once did *offline*.[16] Recent research suggests that this situation has only gotten worse over the past years (Bell et al. 2017; Nielsen and Ganter 2017).

Hence, it is not surprising that many news organizations have been trying out the native hosting programs offered by Facebook and other major platforms.[17] Yet, pursuing an exclusive native strategy would reduce news organizations to mere complementors—content producers that outsource distribution and monetization

to platforms. Most publishers have, consequently, adopted a mixed approach, natively hosting part of their content on platforms, while simultaneously networking their content by posting links on platforms. There are large differences between organizations in how much they emphasize each strategy. For example, HuffPost, BuzzFeed, and the *Washington Post*, purchased by Amazon's Jeff Bezos in 2013, post a larger part of their content through native programs, whereas the *New York Times* and the *Wall Street Journal* choose to do so for only a tiny portion (Bell et al. 2017, 30). In fact, the *New York Times* along with the *Guardian*, after some experiments, completely pulled out of Facebook's Instant Articles after reporting disappointing revenue from platform hosting (Davis 2017).

Of course, native hosting not only has implications in terms of revenue but also raises questions about the relationship between news organizations and audiences. Who owns the relationship with and the data about the online news user? And who gets to organize how content becomes visible to this user? Reflecting on these questions, it should be noted that platforms like Facebook, Apple, and Google have direct access to data from networked and native audiences, while news organizations only have indirect and often partial access. Consequently, they have to get these data from third-party data services or from the Big Five platforms themselves. Moreover, networked and native audiences should primarily be considered as *platform users* rather than *news audiences*. Digital Content Next, a trade association for premium publishers, found that 43% of users are not even aware of the publishers behind the news stories they encounter on platforms (Moses 2016). Particularly striking is also that many users, especially on Facebook, are not actively looking for news but simply find it by accident (Gottfried and Shearer 2016). Finally, it should be observed that if users primarily access content linked or hosted on platforms, news organizations have little control over the specific context in which these users encounter this news. Ultimately, this means that these organizations cannot guarantee that users are getting a fair and comprehensive news offering, which is considered essential for democratic politics. What type of news Internet users get to see is increasingly determined through the interaction between platforms, users, and news organizations.

The search for more revenue has prompted news organizations not only to develop new distribution strategies but also to invent new advertising tactics. Or, rather, the news industry has revived an old advertising format, the advertorial, and labeled it "native advertising" or "branded content." Native advertising is a type of "paid media where the ad experience follows the natural form and function of the user experience in which it is placed" (Sharethrough 2015). It allows publishers to directly insert advertising into the social media feed, transforming advertising into something that is shared and consumed *as content*.[18] Digital publishers like HuffPost, BuzzFeed, and

Upworthy have been especially important in popularizing this advertising format, with legacy newspapers following suite.

While good for revenue, native advertising does raise questions regarding the commodification of journalism. By hosting branded content that looks and feels like editorial content, news publishers are challenging the church–state distinction. The proliferation of branded content sits in tension with journalism's core values as it means that commercial interests *directly* shape content production and distribution. While most digital publishers keep the production of editorial and branded content separate, users tend to experience and share the latter as regular content. A 2016 survey by Contently in collaboration with the Tow-Knight Center indicates that the majority of Internet users do not even recognize native ads as "advertising" (Lazauskas 2016). This is problematic for the news ecosystem as a whole because media content overall becomes more commercialized, leaving less space for critical independent journalism and comprehensive news reporting.

Publishers are clearly aware of the threat posed by platformization to their independence and long-term economic sustainability and have recently started to focus on platform-independent and advertising-independent commodification strategies (Bell et al. 2017; Nielsen and Ganter 2017). This has led to a renewed effort to increase online subscriptions. Essential components of this effort are "hard" and "metered" paywalls (Newman and Levy 2014). In the "hard" variant, readers can access some content for free, but they have to pay for premium content. The "metered" paywall, employed by the *New York Times*, the *Financial Times*, and the *Wall Street Journal*, lets readers view a specific number of articles before requiring a paid subscription. Especially the *New York Times*, the *Wall Street Journal*, and the *Washington Post* have been successful at growing their online subscriber base (Bond and Bond 2017). This is significant because it gives news organizations a more direct relationship with online audiences; it also returns control over data and the presentation of content to news organizations, which in turn helps them to sell advertising through direct sales rather than having to rely on advertising networks. In other words, the online subscription strategy potentially enables news organizations to "rebundle" content, audiences, and advertising, becoming more independent from platform mechanisms. It should be noted, however, that this strategy is only a viable option for news organizations with a strong and distinctive reputation, such as the *New York Times* and the *Wall Street Journal*, for which people are willing to pay.

In sum, under pressure to find new sources of revenue, news organizations have developed a range of platform-oriented commodification tactics, which conflict with the values of independent journalism and comprehensive news coverage. Although alternative, more independent tactics are possible, these are not necessarily a viable

option for the majority of news outlets. To conclude our inquiry into the transformation of journalism in the platform ecosystem, we now need to turn to the other side of the equation: the curation of editorial content.

CURATING CONTENT

As news production, distribution, and monetization become increasingly entangled with platforms, the selection principles of these platforms also become more central to how the news is curated. Selecting content has always been the very essence of professional journalism, reflecting a news organization's judgment with regard to social, political, and cultural public values. The human power to select is now shifting to the algorithmic power deployed by platforms, which can be observed on various levels.

First, the Big Five platform corporations, which operate internationally, tend to set global standards regarding content that can be shared by professional news organizations. Given that most infrastructural platform corporations are US-based, this effectively entails a globalization of American cultural standards concerning what is and is not permitted. In general, Facebook's, YouTube's and Twitter's terms of service tend to prohibit content that contains nudity, graphic violence, spam, and viruses, as well as content that is hateful or threatening (Gillespie 2017). Evidently, these rules leave a lot of room for interpretation. It is often a mystery why a platform removes particular content but leaves other content in place. In May 2017, the public was given some insight into how Facebook decides what its two billion users can post on the site. Over one hundred secret internal training manuals, spreadsheets, and flowcharts used by Facebook to moderate content were leaked. From the files, it becomes clear that Facebook tries to find a middle ground between removing content that potentially shocks and affronts, while at the same time leaving content of public importance in place. For example, the files instruct moderators that "videos of violent deaths, while marked as disturbing, do not always have to be deleted because they can help create awareness of issues such as mental illness" (Hopkins 2017). The files also show, however, that Facebook moderators, given the sheer volume of shared content, often have just ten seconds to make a decision. Moreover, as the *Guardian* reports, many moderators are confused by the complex and sometimes inconsistent policies, especially concerning sexual content. Responding to the leak, Facebook representatives indeed admit that the corporation is wrestling with editorial responsibilities (Hopkins 2017).

The gravity of such responsibility becomes even more evident when considering how Facebook's content moderation efforts affect the news process. The social media

network clearly struggles to take into account the historically and culturally specific importance of particular news content. This was again painfully demonstrated during the 2016 controversy over Facebook's unremitting removal of the iconic *The Terror of War* picture of a young Vietnamese girl, Kim Phúc, running naked down a road after a napalm bombing (Levin, Wong, and Harding 2016; Scott and Isaac 2016). The controversy was ignited by Facebook's decision to delete a post by the Norwegian writer Tom Egeland, which featured the picture among other photos that "changed the history of warfare." To make matters worse, Egeland was subsequently suspended from the platform. When the Norwegian newspaper *Aftenposten* reported on his suspension using the same picture, their post was also deleted. In response, *Aftenposten*'s editor-in-chief, Espen Egil Hansen, wrote an open letter to Mark Zuckerberg, stating: "You create rules that don't distinguish between child pornography and famous war photographs. Then you practice these rules without allowing space for good judgment" (Hansen 2016). The letter triggered an immediate online response with thousands of people around the globe posting the *Terror of War* image on their Facebook pages. Confronted with such a global backlash, Facebook decided to reinstate the picture across its domain. It maintained, "an image of a naked child would normally be presumed to violate our community standards." However, "in this case, we recognize the history and global importance of this image in documenting a particular moment in time" (Levin, Wong, and Harding 2016). Of course, this also means, ironically, that if such picture were taken today, it could no longer become iconic through a system of news selection dominated by Facebook and platforms with similar community standards.

While usually not generating as much controversy, platform content moderation overall displays little sensitivity to the cultural, local, political, and historical importance of specific content (Gillespie 2017; Youmans and York 2012). As platforms rely on a combination of user flagging, automated image and word detection, and time-pressed human moderators, platform moderation predictably lacks the kind of editorial consideration we have come to expect from news organizations (Buni and Chemaly 2016; Crawford and Gillespie 2016). Facebook explicitly tries to steer away from such expectations and the complexities of the news process, arguing that it is a *technology company* rather than a media company or publisher (Manjoo 2017a). This strategic maneuvering shows the core tensions generated by platformization. Facebook and the other major platforms infiltrate different economic sectors, fundamentally reshaping how these sectors are organized, but refuse to take the responsibilities that come with power. Nevertheless, as social media platforms like Facebook will always need to moderate content and as people will also continue to share and access news through these platforms, they inevitably play a central role in news selection. Caught between accusations of filtering too much and too little, they become precisely what they claim not to be: "arbiters of truth."

Second, platforms also deeply intervene in the type of news and type of media outlets that draw a lot of traffic and therefore dominate the news sphere. Especially changes in Facebook's News Feed algorithms tend to have a dramatic impact on the traffic volume of particular news outlets. For example, at the end of 2013, when Facebook decided to encourage the sharing of more quality news content, a lot of digital publishers, among others HuffPost and Upworthy, saw a large drop in their traffic. At the same time, BuzzFeed's traffic remained constant, leaving observers wondering about the intricacies of Facebook's algorithmic curation practices (Carlson 2014; Kafka 2014). Even more dramatic was Facebook's decision, in 2017, to run an experiment in which it removed professional news media altogether from users' News Feeds in six countries: Sri Lanka, Guatemala, Bolivia, Cambodia, Serbia, and Slovakia. Public posts by media organizations were moved to a separate feed on the platform, which greatly diminished the user traffic of these news outlets (Hern 2017b). And in early 2018, Mark Zuckerberg announced that the company would be "making a major change to how we build Facebook," which would lead users to see more from their "friends, family and groups" in their New Feed and less from "businesses, brands, and media" (Mosseri 2018). Each new round of major algorithmic News Feed revisions draws similar scrutiny by the news industry, which has come to depend for an important part of its traffic on Facebook.[19]

These kinds of changes also affect the type of news that becomes prominently visible. We already observed in chapter 2 that most platforms tend to include signals of both personal and global interest in their algorithmic selection of "most relevant," "top," or "trending" content. In doing so, they privilege content that rapidly generates more user engagement. Automated news selection very much revolves around the principles of "personalization" and "virality"—principles that are fundamentally baked into platform architectures—prompting users to share content with their friends and followers and, hence, soliciting an "emotional" response.[20] These dynamics of personalization and virality again show that Facebook and other social platforms are primed on maximizing user engagement rather than arriving at an accurate and comprehensive news offering for all users.

Furthermore, user sharing practices and algorithmic personalization potentially generate filter bubbles, encapsulating users in their own information cocoons (Sunstein 2009; Pariser 2011). After years of research and debate, the existence of filter bubbles is, however, still contested. Especially Facebook has tried to demonstrate through internal research that a substantial part of the hard news people get to see in their News Feed cuts across ideological lines. Moreover, the corporation has argued that if users are not seeing ideologically diverse content, it is not because of the platform's algorithms but because users tend to click less on content they disagree with and because of the friend networks they create (Bakshy, Messing,

and Adamic 2015). This again clearly illustrates the key ideological differences between Facebook and news organizations. From a platform perspective, it is the responsibility of the individual, and not of professional editors, to make sure that users receive diverse news. As such, platformization tends to transform the accuracy and comprehensiveness of news from a *public value* to a *personal value*. This indicates that content personalization cannot be solely attributed to either platform algorithms or user preferences and practices but results from the interplay between platforms, users, and news organizations. Thus, it is vital to also study what content strategies news organizations develop in response to the selection principles of infrastructural platforms.

News Content Strategies

Given the diversity of news outlets, there are substantial differences in how they respond to selection through platforms. Starting with digitally born publishers, it is not surprising that they most directly shape their production and distribution process in correspondence with platform selection mechanisms. Looking at the most popular BuzzFeed and HuffPost items, we learn that the interaction between datafied publishing strategies and the emotion-driven dynamic of platform sharing tends to promote *infotainment* and *breaking news*—a strategy that strongly resembles commercial mass media's propensity to offer entertainment to attract as many readers and viewers as possible.[21] Digital publishers' tendency to reinforce this is not just prompted by commercial tactics but should be understood within the context of the platform ecosystem. Platform's technological infrastructures and business models are fully geared toward stimulating, capturing, and monetizing user sentiments. By optimizing their operations for platforms, digital publishers effectively translate these sentiments to professional content production.

Strikingly, the mechanism of algorithmic selection also affects the *quantity* of content generated by digital publishers. As only a small percentage of articles and videos go viral, these publishers have developed into full-blown content factories to ensure that at least some of their content catches fire. In 2016, BuzzFeed, for example, generated an average of 6,365 posts and 319 videos per day. By comparison, in the same year, the *New York Times* was publishing about 230 pieces of content—stories, graphics, interactives, and blog posts—daily (Meyer 2016). Note that the digital publishers are effectively putting forward a different publishing model: by producing content at a frenetic rate, they leave it up to platform users rather than to the editorial staff to decide what content is valuable. This signifies the native Internet "publish, then filter" model rather than the traditional "filter, then publish" model (Shirky 2008). Of course, such preference also corresponds with the

observed platform-driven shift in editorial responsibility from professional editors to individual users.

Whereas digital publishers from the get-go optimized content production and distribution for the platform ecosystem, legacy news organizations have only gradually introduced changes in the form and style of journalism in response to platform selection mechanisms. Most of these organizations are trying to find a balance between adjusting to the platform ecosystem and maintaining their journalistic autonomy. Many of them have invested in supplying platform users with a steady stream of infotainment and breaking news in the form of videos, slideshows, (live) blogs, listicles, quizzes, as well as constant Twitter and Facebook updates. They have also specifically focused on creating more video content for their lifestyle, technology, and sports sections because such content is seen to boost social media traffic and is a crucial source of native advertising revenue. In practice, such a strategy has not always been successful, especially when it forced publishers to reduce their editorial staff (Benes 2017).

At the same time, it should be noted that many legacy news outlets continue to do the kind of investigative reporting they have always done. Especially in response to the Trump presidency and the "fake news" controversy, legacy news organizations have re-emphasized the importance of critical independent journalism. The rise of platforms, while stimulating the production of lightweight user-friendly content, has not eliminated what is generally considered quality journalism. Some news organizations, such as the *Guardian*, have managed to attract new subscribers and solicit donations, stressing the importance of independent journalism.

Perhaps more surprising is that leading digitally born publishers have also started to invest in the development of investigative journalism and original content. HuffPost has created teams of reporters dedicated to producing original content across fifteen different countries (Folkenflik 2015). Most remarkable is BuzzFeed, which has become known for its investigative reporting while continuing to churn out a growing stream of viral content. In a few years, the digital publisher has built a newsroom, which by 2015 consisted of about 250 reporters and editors. Both in the United States and internationally, Buzzfeed's journalists are concentrating on original reporting. Its editor-in-chief, Ben Smith, stresses that he mainly hires reporters "who get scoops the same way they always have" with "phone calls, trips to Iowa, drinks with political operatives" (Lichterman 2015).[22]

Taken together, responding to the rise of platforms, news organizations have doubled down on the production of infotainment and breaking news, which generates a lot of user traffic. The production and distribution of such content is very much guided by platform data. In this sense, platformization appears to put pressure on journalistic independence and comprehensive news coverage. Simultaneously we

have observed that news organizations of all stripes continue to develop investigative reporting, informed by journalistic values. Given that the platformization of the news process is still unfolding, it is too early to tell how it ultimately affects journalism's role in democratic politics. Addressing this question, it is important to note that the type of news platform users get to see is only partly determined by the kind of content that is available. To understand how news is ultimately selected in the platform ecosystem, we now need to turn to the interaction between news organizations, platforms, and users. How does the mechanism of selection affect the realization of key public values and the role of journalism in democratic politics?

Democratic Content Curation

The development of the platform ecosystem, with the Big Five's infrastructural platforms at its core, has fundamentally changed the dynamic of news and content selection, putting the onus on user preferences. Platform selection mechanisms shape the visibility of deep-digging investigative stories, as they do with infotainment, and disinformation specifically produced to trigger viral processes. Consequently, even though a lot of high-quality journalistic work is available, chances are that it does not reach the mass of platform users. Not surprisingly, entertaining and emotionally charged content tends to travel much faster and further than hard news; put simply, cute-cat videos do much better than stories about politics in the Ukraine (Seitz 2014). More remarkable and more worrying is that disinformation also tends to circulate much further and wider than hard news. Studying the "differential diffusion of all of the verified true and false news stories distributed on Twitter from 2006 to 2017," Vosoughi, Roy, and Aral (2018, 1146) discovered that "falsehood diffused significantly farther, faster, deeper, and more broadly than the truth in all categories of information." Strikingly, these dynamics appear to be very much driven by users' emotional response triggered by different types of news. The researchers found that false news was experienced as "novel" and "inspired fear, disgust, and surprise in replies," whereas "true stories inspired anticipation, sadness, joy, and trust."

At the same time, it should be observed that these dynamics are fundamentally enabled by the platform ecosystem. Whereas professional news organizations offer verified hard news in combination with entertainment, stimulating readers and viewers to consume the whole bundle, platform selection mechanisms prompt users to consume and circulate hard news, entertainment, and unverified news disjointedly. Consequently, particular items, including false news stories, can become prominently visible and "travel faster," while other items remain largely invisible. This suggest is that policymakers and media theorists concerned with the role of journalism in democratic polities need to shift their focus from individual news outlets

and legacy news media more generally to the platform ecosystem and its selection mechanisms. While legacy news media, especially newspapers, have for a long time been the (flawed) carriers of public debate and democratic accountability, they are now only one of many actors to determine what information people get to see and how to interpret this information.

The 2016 US "fake news" controversy made this abundantly clear. It showed how strategically spread misinformation could rapidly circulate through platforms, despite the availability of mainstream news accounts and reports by fact-checking organizations that disproved this information. Studying the sharing of news through Facebook and Twitter during this period, Benkler and colleagues (2017) found that Breitbart, the far-right news and commentary website, became the center of a "distinct right-wing media ecosystem, surrounded by Fox News, the Daily Caller, the Gateway Pundit, the Washington Examiner, Infowars, Conservative Treehouse, and Truthfeed." Users encapsulated in this ecosystem were much less likely to encounter stories from mainstream news organizations at the center of the political spectrum. Although misinformation was produced and circulated by Breitbart and other predominantly right-wing news organizations and entrepreneurs, it could never have had such a large reach and become an economically viable enterprise without the platform ecosystem. Moreover, it is precisely because platforms promote and allow for content personalization that an insulated media system could be built that transmitted a hyper-partisan right-wing perspective on US politics (Benkler et al. 2017).[23]

In light of these considerations, we need to rethink what is required for a democratic news process in a platform society. Of course, such a process still requires generally available, independent, fair, and comprehensive reporting by professional news organizations. It also requires that the other actors involved in this process take responsibility for the circulation of information. A major part of this responsibility rests with the infrastructural platforms, whose sharing features, algorithms, and ad networks have greatly contributed to the circulation of misinformation by turning it into a powerful political weapon and profitable business. In other words, we need to discuss to what extent infrastructural platforms should take responsibility for the sectoral power they wield.

Facebook and Google have responded to the 2016 US "fake news" controversy by proposing fact-checking as one of the remedies to combat the spread of misinformation. For one thing, they have begun to collaborate with independent fact-checking organizations to identify and label misinformation. The social media network and search engine alert users that content has been labeled as false, while also asking users to contribute to this effort by flagging misinformation. In addition, Google and Facebook have banned hundreds of malicious publishers from their advertising

networks (Wakabayashi and Isaac 2017). Strikingly, these measures have been very much stimulated by advertisers worried about their reputation. In the case of YouTube, a public boycott prompted large advertisers, such as the *Guardian*, the BBC, AT&T, and Verizon, to force the platform to guarantee that their ads would not appear alongside problematic content (Hern 2017c). Such proactive advertiser action also affected Breitbart, which has seen a dramatic decline in the number of advertisers (Moses 2017). Finally, both Facebook and Google have launched projects to strengthen journalism. Facebook Journalism Project, as discussed, was announced in January 2017, while the Google News Initiative was made public in March 2018. Besides allowing Google users to more easily subscribe to news publications and giving publishers new analytic and content distribution tools, Google's initiative also specifically focuses on improving "digital information literacy" and on combatting disinformation "during elections and breaking news moments" (Schindler 2018).

For some critics such measures are insufficient. They maintain that social media corporations need to be considered as news organizations and bear the same editorial responsibility for the content that is published through their platforms (Bell 2017). While we agree that infrastructural platforms like Facebook indeed need to take more editorial responsibility for automatically shared content, they cannot and should not be equated with news media, if only because such equation would not do justice to the complex interdependence between platform mechanisms, user activity, and content producers. Moreover, it would be a mistake to give corporations with very little editorial expertise and experience full responsibility for what billions of users get to see. The blocking of the *Terror of War* picture by Facebook as well as the many other highly arbitrary editorial decisions by platforms have made clear that this is by no means a desirable solution.

To enhance the democratic character of the news process in a platform society, it is crucial that different key actors collaborate in news curation through platforms (Helberger, Pierson, and Poell 2018). To enable this, more transparency is required: the guidelines on the kinds of content allowed on platforms, the rules for fact-checking trending news items, as well as the overall development of platform algorithms should be opened up to democratic assessment rather than being secretive decisions. Such proposition corresponds with the advice of the High Level Expert Group on Fake News and Online Disinformation of the European Commission, which also stresses the importance of transparency, along with the promotion of media and information literacy, continued research on the circulation of disinformation, tools for empowering users and journalists, and safeguarding the diversity and sustainability of the European news media ecosystem (European Commission 2018). A vital first step toward a healthy online news ecosystem is that platforms provide more insight into how they operationalize user policies and by what principles

they construct their algorithms. These forms of content curation should, subsequently, be subjected to democratic control and governance mechanisms to enable the realization of key public values. One could, for example, think about a council of representatives from the news industry, advertising, and citizens collaboratively determining the standards on which news content filtering and monetization should take place. We will return to issues of oversight and governance in the last chapter.

CONCLUSION

This chapter has demonstrated that the production, circulation, and monetization of news through the platform ecosystem involve a wide variety of actors. This is not either a platform-driven or a user-driven process but one that results from the interaction between platforms, ad networks, news and fact-checking organizations, advertisers, and billions of users. It is through the interaction between these actors that mechanisms of datafication, commodification, and selection take shape. User metrics become vital in the news process not only because they are prominently circulated and acted upon by platforms but also because news organizations actively organize their production and distribution around platform data. Similarly, news business models change because the rise of platforms leads to a fundamental reorganization of economic relations around platforms as multisided markets. Platform mechanisms transform news organizations as they are forced to develop new native and networked monetization strategies. Finally, while platform policies and algorithms become vital actors in the curation of news, selection mechanisms are also driven by how news organizations target platforms, how users share particular content, and how fact-checking organizations assist in the filtering of problematic content.

In sum, policymakers, nongovernmental organizations, and media and communication scholars concerned with the realization of key journalistic values need to squarely focus on the interplay between the different actors in the contemporary news process.[24] Above all this means shifting the attention from individual news organizations and single platforms to the ecosystem as a complex dynamic between infrastructural platforms and sectoral players. This is where the key public values of journalistic independence and accurate and comprehensive news coverage need to be realized. How this should be done in practice is by no means straightforward, given that no single actor can ultimately be held responsible for the diversity of news, for potential increases of branded content, for the circulation of misinformation, or for professional standards. The struggle to define the conditions and principles of a platform society requires an acute awareness of the constantly evolving nature of the

news ecosystem, in which key actors keep changing their datafication, commodification, and selection strategies. Hence, the democratic governance of the news process is predicated on a continuous monitoring of these strategies by the large infrastructural platforms, as well as the leading news organizations. And on the basis of such monitoring, standards in terms of content diversity and accuracy and of journalistic independence from commercial and political pressure will need to be collaboratively articulated and maintained.

4

URBAN TRANSPORT

INTRODUCTION

The next sector that we will systematically analyze is urban transport. As fierce legal battles and public debates worldwide have shown, most attention in the urban transport sector has been focused on the rise of ride-hailing platforms such as Uber and their competition with legacy taxi firms.[1] In November 2016 the European Court of Justice took up a case from the Spanish national court that was to set the status of Uber in the European transport sector. Is Uber a *transportation* company that should operate according to locally set laws with regard to licensing, customer safety, and pricing in the private transport sector? Or should it rather be seen as a connective platform—that is, an innovative platform connecting demand and supply that should be given free reign across the single digital market that the European Union government wants to establish across Europe? In December 2017 the court ruled that in the European Union Uber should be considered part of the transportation sector.

This court case will most likely not be the last legal struggle concerning the organization of transport in the platform society. As we will argue in this chapter, the conflict at the heart of the European court case (is Uber a connective platform or a transport service?) is not simply the regulation of the taxi sector. Urban transport is largely a market sector, but it has a considerable public interest. It has always

been organized through a myriad of providers and consists of a mix of market-based operators such as taxis and bus companies as well as public providers such as mass transit operators. To ensure the quality of these services, on the one hand, local governments have set up regulatory frameworks, for instance, to control taxi markets; on the other hand, they provide subsidies for infrastructures (e.g., roads and traffic systems) and organizational structures for public transport. Regulatory frameworks and subsidies are to guarantee a number of public values pertaining to the *quality* of public transport: consumer protection, passenger safety, inclusiveness (services should be accessible for everyone, including physically challenged people), universal service provision (all areas of the city should be serviced), and affordability.

Platformization affects the *entire* sector, effectively blurring the division between private and public transport modalities; existing public–private arrangements have started to shift as a result. In this chapter we will analyze and discuss the emergence of a platform ecology for urban transport, focusing on two central public values: the *quality* of urban transport and the *organization of labor and workers' rights*. The importance of each public value carries well beyond the urban transport sector and addresses problems of governing a platform society at large. Using the prism of platform mechanisms, we will analyze how the sector of urban transport is changing societal organization in various urban areas across the world. Datafication has allowed numerous new actors to offer their bike-, car-, or ride-sharing services online; selection mechanisms help match old and new complementors with passengers. Similarly, new connective platforms are emerging that offer public and private transport options in integrated transport services, often referred to as "mobility as a service" (MaaS).

A central issue in the European court case as well as in this chapter is the extent to which platforms should be understood as part of the transport sector, just as in the previous chapter we discussed to what extent social media platforms like Facebook should be considered part of the media sector. Facebook and Uber claim they are mere connectors, carrying no responsibility for the sector as such. A similar position can be discerned with regard to the organization of labor; connective platform operators claim they empower micro-entrepreneurs to offer their services and allow users to self-regulate their offerings through its reputation systems. Both stands imply that connective platforms withdraw from collective responsibilities with regard to the organization of public values as part of a sectoral arrangement.

The dilemma laid out in this chapter revolves around the negotiation of responsible governance. Connective platforms could offer certain individuals more personalized and efficient modes of urban transport. At the same time platformization may undermine collectively held public values with regard to urban transport, such as inclusiveness and universal service provision, as the platform mechanisms of datafication,

commodification, and selection tend to import specific economic and public values to the sector. So what can local governments and nongovernmental organizations or collectives do to remedy the market-driven articulation of platform mechanisms? We will discuss various alternative models and opportunities for governments and civil society actors to recalibrate the transport ecosystem from a public values perspective.

THE EMERGENCE OF A PLATFORM ECOLOGY FOR URBAN TRANSPORTATION

The new sectoral platforms for urban transport that have arisen in the mid-2010s have tremendously enlarged consumers' mobility options. The introduction of bike-, car-, and ride-sharing schemes and new apps to hail cabs or plan public transport rides has widened the availability of options and eased navigation in the maze of different and unconnected urban transport systems. We will start our analysis by giving an overview of the various types of transport platforms and describing how they are becoming increasingly integrated into a platform ecosystem.[2]

Most debates concerning the emergence of connective platforms that offer ride-hailing and car-sharing services has concentrated on transport network companies (TNCs) such as Uber and Lyft. They initially started to compete directly with legacy organizations such as taxi companies but gradually—as we will see in this chapter—take on the organization of public transport. Uber and Lyft connect (professional) drivers with passengers through an app-based service. Neither company owns any infrastructure in the sector itself, nor do they employ drivers. Private drivers act as complementors, offering the actual transport services in their capacity as micro-entrepreneurs. These can be professional taxi drivers who fulfill particular criteria, as required by legislators in many jurisdictions. In a number of countries Uber has also introduced its controversial UberPoP service, allowing private individuals to offer rides to other individuals, blurring the difference between professional taxi services and ride-sharing arrangements that so far have mostly taken place in the private sphere.

Part of the attractiveness of these TNCs for consumers is their ease of use in combination with their competitive pricing in comparison to legacy companies. Their structural undercutting of various regulations concerning the sector as well as other sectoral provisions is partly enabling these lower prices. Because these connective companies do not see themselves as part of the transport sector, they claim these regulations and provisions do not apply to them; we will return to this in the section Three Ways to Commodify Urban Transport.

Next to TNCs, other connective platforms have arisen that allow for the easy organization of private carpooling or provide access to vehicles rented out by private consumers or companies.[3] Examples are BlablaCar and Waze Carpool (worldwide), SnappCar (Europe), Turo (formerly RelayRides, active in the United States), and Getaround (United States). These connective platforms rely mostly on private individuals to offer their services.[4] Legacy companies have also set up their own platforms. Traditional public transit companies have made their services accessible through travel-planning apps that increasingly also allow for ticketing. Traditional taxi companies have built their own ride-hailing apps. We have also seen new rental companies appearing, including Car2Go and Zipcar. These companies manage their own fleets of cars that can be rented by the minute or hour through an app. The development of autonomous vehicles could eventually erase the differences between the various categories described here. And although it is far from assured that autonomous vehicles will take over the roads of our cities anytime soon, many of the connective transport platforms seem to be betting on that future.[5]

On an ecosystem level, new connective platforms have emerged that integrate various transport offerings in a MaaS system (Ambrosino et al. 2015; Shaheen, Stocker, and Bhattacharyya 2016). Some platforms aim to provide travelers integrated advice for planning their trips—trips that may combine public transport, bike-sharing, and ride services like Uber. Examples are Citymapper, Moovel, and Transloc that provide transport planning across multiple modalities, based on real-time data, comparing various options in terms of travel time and costs (Tsay, Accuardi, and Schaller, 2016).[6] What these MaaS platforms have in common is that they have the ambition to integrate various transport services, offer a single payment system, and continuously provide users with real-time information about their trips, including personalized recommendations.

What emerges is a complex and layered model. MaaS platforms act as connectors that match passengers with complementors such as traditional public transport companies and car rental services. At the same time, some of these complementors to MaaS platforms may act as connectors in their own right, connecting, for instance, passengers with drivers for a part of their journey. In turn, both these connectors and their complementors rely on numerous underlying services and technologies provided by infrastructural platforms, with the Big Five playing central roles. Mapping services are of great importance as they provide a central information layer indispensable in the organization of personalized transport services. Many sectoral platforms are dependent on Google Maps for positioning, navigation, and traffic data. In the past, Uber has made use of TomTom traffic data and maps as well as Google Maps and has now started to collect its own map data. Lyft advises drivers to use Waze (owned by Google) or Google Maps for navigation

purposes. App stores also play an important role as they function as gatekeepers through which TNCs offer their apps to the public.[7] The entanglement is further visible in the vertical integration of sectoral platforms with regard to (infrastructural) login services and identity management. For instance, most peer-to-peer car-sharing services use Facebook or LinkedIn login procedures.[8] And cloud computing also plays an important role, especially in the further development of the information processing heavy management of driverless cars. Microsoft has teamed up with Chinese Baidu in the project Apollo, making available its Azure cloud platform for the development of a self-driving car (Choudhury 2017).

Mapping applications are set to take up a central role as transport portals, opening up access to various complementors. For instance, people looking for travel directions on Google Maps are automatically offered various options, from walking, biking, and public transport to directly ordering an Uber; not unimportantly, Google Ventures has a minor investment in Uber. In addition, Google Maps can display public transport schedules of 18,000 cities around the world, through the standardized General Transit Feed Specification data format. Google developed the data format, which has now become the de facto standard for transit data, illustrating standard setting powers that infrastructural companies may hold in the platform ecosystem.[9]

The rise of MaaS platforms and other integrated transport services creates new relations between connective platforms and the complementors that provide the actual transport services. It should therefore come as no surprise that actors in various domains of the transport sector have become increasingly entangled trying to secure a prime position in this ecosystem. Many players aspire to become central connectors rather than mere complementors or hardware manufacturers. Car production companies such as Daimler, General Motors, and Tesla; car rental companies; and digital mapping companies are interested in partnerships with big sectoral and infrastructural players and vice versa.[10] Meanwhile, in the domain of self-driving vehicles, both Apple and Waymo (a subsidiary company of Alphabet) have turned away from the ambition to become car producers; they rather aspire to produce the software platforms for self-driving cars produced by (or in partnership with) third parties (Hern 2017a). In sum, we see an increasingly integrated ecosystem for urban transport emerging, with central roles for infrastructural platforms and their mapping systems, identity management, and cloud services. The growing interdependency between infrastructural companies and connective platforms shows, for instance, in the relations between Alphabet-Google and Uber, Waze, and Waymo. To understand the consequences of such interdependency, we will now turn to an analysis of the ways the underlying platform mechanisms are articulated in this emerging ecosystem.

DATAFICATION AND THE INTEGRATION OF PUBLIC AND PRIVATE MODES OF URBAN TRANSPORT

The mechanism of datafication plays an important role in the platformization of transport. With digital technologies, available cars, drivers, their positions, and current traffic conditions and transportation needs can be turned into data points (datafied information). In turn, these datafied indications of demand and supply can be matched through (algorithmic) selection by transport platforms. The same technologies enable each transport activity to be recorded by the minute or kilometer. Datafication allows for the relatively easy commodification of these goods and services—making them available as rental products or on-demand services on the market, where they can be accounted for in micro-units (Demary 2015; Edelman and Geradin 2016; Rauch and Schleicher 2015). Urban transport platforms can therefore be understood as the datafied marketplaces through which demand and supply are matched. Platform-based activities lower transaction costs, such as finding passengers or renters for one's private car and figuring out whether they are trustworthy. This enables transactions that hitherto were just too cumbersome or too costly to organize.

The data driving these platforms are supplied by various sources. As we mentioned, infrastructural platforms provide essential mapping data often combined with real-time data provided by various parties: cities have installed sensors in the road infrastructure, public transportation companies have equipped their fleet with sensors, TNCs track their drivers and clients through their apps, and users are often invited to crowdsource data. For instance, a service like Waze currently rewards its users by contributing information about road conditions and hazards, e.g., about construction sites or the presence of traffic cops (Shaheen et al. 2015). Consumers further contribute to these systems by providing data in the form of evaluations or automatically gathering information about traffic conditions through their GPS navigation devices or smartphones. In addition, platform companies themselves mine a broad variety of data, some of which seem not directly related to the provision of their service. For instance, Uber uses the accelerometer in passengers' phones to detect changes in speed, indicating both traffic flow and road conditions, such as the presence of potholes (Tsay, Accuardi, and Schaller 2016). Calo and Rosenblat (2017) suggest that Uber collects data from its drivers to feed the algorithms for its driverless cars program: "This may mean that Uber drivers are unwittingly training their own replacements."

Datafication concerns all modes of transport, both public and private. The result is that public and private transport offerings are increasingly organized and accessed through the same platforms, rendering them part of a single ecosystem and contributing to a process of commensuration, as mentioned in chapter 2. A major

consequence is that the difference between private and public forms of transport becomes increasingly hard to discern, in terms of both ownership status as well as the types of services offered. For instance, Uber and Lyft have started to offer collective services that increasingly look like public transport offerings.[11] UberPool and Lyftline match up passengers traveling in the same direction to share a car and portion the fare (Jaffe 2015a). In new iterations of this service, both Uber and Lyft provide passengers with "pickup suggestions," nudging them to walk to a nearby road where a collective service can pick them up more efficiently. In San Francisco, Lyft is also experimenting with a shuttle that runs along a set route, like a regular bus service (Constine 2015; Griswold 2017b).

Meanwhile, public transit companies are integrated into MaaS applications that merge them into a single experience with private offerings from companies such as Uber and Car2Go or even private citizens offering their resources or services. Some public transport companies have already started to cooperate with Uber and Lyft, offering access to the service from their apps. In those examples, transit passengers can take an Uber for the so-called first and last mile to and from transit stations.[12] Some local governments have begun to outsource part of their public transport provisions to Uber. Rather than maintaining bus lines themselves, they subsidize rides made through the platform.[13]

Data play a key role in the operation of all these platforms and in the connection between platforms. It is obvious that these data are considered extremely valuable by all players in the ecosystem; it is the collection and analysis of these data that allows them to operate their services. Yet the aggregated data sets do not only hold economic value, but also have public value. To operate an efficient, integrated (public) transport system, it is imperative that companies share their various data streams. Aggregated data could be useful to optimize MaaS systems as a whole or to provide governments essential information that could be of use for the further planning of infrastructure investments.

Here, a potential conflict of interest may rise between individual commercial operators and the common good of a well-functioning, integrated transit system. So far, private TNCs have not been very willing to make much of the data they are collecting available, even though general use of these data could contribute to public value creation. Individual companies see ownership of their data as the key to their competitive advantage. The privacy of their customers is another argument they have used in this discussion. Uber reluctantly shares data with local governments and transport agencies in big metro agglomerations such as Chicago, Houston, and New York. However, in 79% of cases in which regulators tried to organize access to the company's data sets, Uber wanted to make fewer data available than originally requested (Tsay, Accuardi, and Schaller 2016).[14]

The contestation of public values derived from transport data has gradually intensified, as illustrated by the rising criticism of the deals that local governments have struck with transportation companies (Badger 2014; Dungca 2015). For instance, when the US District of Columbia legalized services such as Lyft and Uber, it did so under the condition that they would register as taxi companies. But why did the local government not require these companies to make at least some of their data available, in order to allow external parties to check if their actions were in compliance with public values (Badger 2014)? Similarly, a report by the TransitCenter claimed that public transit authorities are often unaware of the richness of data that TNCs may have gathered and they are too shy in demanding access to these data (Tsay, Accuardi, and Schaller 2016).

THREE WAYS TO COMMODIFY URBAN TRANSPORT

When we take a look at the ownership structure of the emerging transport ecosystem, it has mostly been corporate owners taking up the role of platform organizers, with infrastructural platforms playing an important role in determining standards and protocols. We will now take an in-depth look at the various ways in which these companies have commodified transport services through their platforms: how and according to which logic do platforms turn transport services into economic goods, and how are public values taken into account in that process? First, we will look at Uber as an example of a platform that is based on the principles of the free market. Second, corporate platform owners are not the only players in that process; civil society actors have been setting up platforms based on alternative economic models such as nonmarket peer production and platform cooperativism. Third, we will look at the role of governments and their attempts to recalibrate the mechanism of commodification operative in the platform ecosystem from a public value–based perspective.

Markets

Uber is by far the most discussed TNC that is organized according to free market principles. Although the platform is not unique in that respect, it will serve here as our entry point in the discussion. The basic mode of operation of Uber as a connective network platform—and for that matter its competitors like Lyft—is fairly simple. These platforms can be understood as multisided markets, connecting drivers and passengers through an app. Passengers use the app to request a ride; drivers who have logged into the drivers' app see these requests appearing and can accept or deny them; according to Uber, the driver who is closest to the set pickup

location will receive the request first. The GPS system shows drivers how to get to the passenger's location and proposes the most efficient route to the requested destination. Payment is also arranged through the app. The platform charges the passenger and pays the driver, withholding a transaction fee for using the platform that varies according to a number of variables, as well as over time. Uber generally charges between 25% and 30%.[15]

Much discussion has revolved around the dynamic pricing of transport services on the platform. Pricing on the platform is set by Uber and can vary according to a number of parameters. The phenomenon called "surge pricing" is meant to secure the supply of drivers when demand goes up. Uber's algorithms monitor demand and supply in a given market, and when demand surpasses supply by a threshold factor, tariffs will rise (Bria et al. 2015). Pricing may also be adjusted to other variables. In the spring of 2017, Uber started to experiment with "route-based pricing" in a number of markets. Customers pay a flat rate that is set up at the start of each trip. This price is calculated by machine learning algorithms that try to figure out how much a given person in a given situation would be willing to pay for a ride.[16] This means that a trip over the same distance taking the same amount of time could be more expensive when it starts in a high-income neighborhood or a central business district.[17]

Uber representatives claim that surge pricing will guarantee the supply and reliability of the system as a whole, even when the weather is bad or when, for instance, bars close on a weekend night (Gurley 2014). Similar arguments have been made for route-based pricing. It could theoretically lead to more affordable rates for lower-income areas (Griswold 2017a). However, both instruments have also led to discussions about the fairness and affordability of this system. For instance, in the past, Uber rates have spiked during a hostage situation in the center of Sydney as well as during a snowstorm in New York, when, according to the *New York Times*, fares went as high as eight times the normal rate (Lowrey 2014). Similar discussions have been held around the introduction of route-based pricing. Algorithms pairing drivers to passengers paying various rates may lead to longer waiting times for passengers who have less purchasing power (Brustein 2016).

In both cases, pricing plays a central role in the matching of demand and supply, yet it remains unclear whose interests are served. For instance, the pricing mechanism can be modified to increase net gain for the platform owner, to maximize gains for individual drivers, to optimize travel and waiting times for all passengers, or to optimize travel for premium customers at the cost of other groups. Due to a lack of transparency, neither drivers nor passengers nor regulators have the means to understand the exact workings of the system. Hence, it remains obscure whether or not users are being treated fairly and whether or not public values such as universal service and inclusiveness are actually realized.

A similar discussion revolves around the relation between connective platforms and the sector they operate in, in particular with regards to platform operators' (professional) responsibilities. Platforms like Uber argue that they provide a new type of service that sets them apart from the sector in which they operate, including the collective responsibilities that are traditionally assigned to professionals, companies, and institutions operating in the sector. Uber's business is specifically aimed at circumventing, undermining, or just plainly ignoring existing regulation in the urban transport sector in order to cut costs (Heimans and Timms 2014). Depending on the jurisdiction, Uber tries to prevent its drivers from having to abide by regular taxi laws in order to evade regulations such as geographical knowledge tests, commercial plates, specific vehicle qualifications, or others that have been set by lawmakers and/or professional organizations to serve the public interest (Edelman 2017).[18] For instance, in New York, regular taxi drivers contribute 30 cents from each ride to the Taxi Improvement Fund created by the city's Taxi and Limousine Commission. These funds are used to subsidize the provision of accessible taxis. So far Uber has shunned imposing such a levy on its rides (Jones 2016).[19]

With these developments in mind, it is currently debated whether it is wise or not to outsource the organization of urban transport as a public good to platforms. This direction that some US cities have started to take has drawn a lot of criticism—criticism that pertains to a broad set of public values. Although Uber and Lyft indeed offer convenient services, they have so far proven to be less inclusive than traditional public transport. Passengers need smartphones and credit cards to ride the service, and there are no standard provisions for disabled passengers. While Uber and Lyft can offer discounted fares due to local subsidies, in most cases their services are still more expensive than traditional bus lines. Transferring the organization of urban transport to connective network companies also means that local governments are replacing living wage–earning civil servants with flexible labor organized through these platforms (Grabar 2016). And it is still up for discussion whether a shift toward TNC-operated urban transport will make the system more efficient. Some research points in the adverse direction. In New York City, subway ridership fell in 2016, and since the introduction of ride-sharing services, the average speed "in the heart of Manhattan dropped to about 8.1 miles per hour last year, down about 12% from 2010, according to city data" (Fitzsimmons and Hu 2017).[20] In a similar line of reasoning, the Active Transport Alliance forecasts that "shifting people from high-capacity transit to ride-hailing services is a recipe for unimaginable gridlock" (Hertz 2017).

More principally, outsourcing public transport to corporate platform companies may erode the financial base and democratic support for traditional public transport provisions, meaning that connectivity may come at the cost of collectivity. In

Detroit, a $4.6 billion investment into a public transit system was outvoted in a local referendum. One of the main arguments in the debate was that buses and trains are forms of "dinosaur mass transit" that are outdated in the era of Uber and Lyft (Grabar 2016). It shows how investment in private services can come at the cost of investments in more inclusive and high-quality mass transit. And as connective platform companies do not see themselves as part of the urban transport sector, they can hardly be expected to invest in basic infrastructures. In the long run, such disregard may even lead to the demise of public transport systems, leaving cities with no alternatives other than to rely on privately organized platforms (Brustein 2016). In that sense it may not be taxi firms that Uber will put out of business but public transport as we know it (Lindsay 2017). And that may come at a cost. Uber and Lyft currently make a loss on every ride, basically subsidizing their position in the market with venture capital. One day, however, these companies will also need to start to make a profit (Grabar 2016).

Indeed, platformization through market forces may lead to a more personalized transport system. However, this may come at the risk of a decrease in inclusivity, universal service, and affordability of the system as a whole. Moreover, there is a chance that global connective companies will reap the benefits of locally funded collective infrastructures, while passing on the costs and collective responsibilities to local or national governments (de Hollander et al. 2017), hence undermining collective funding for public transport infrastructures.

Connective Platforms and the Organization of Labor

Another public values–related discussion around Uber that deserves more detailed attention here is the organization of labor through connective network platforms. The multisided market model that Uber proposes—and that is commonplace in many other sectors organized through platforms—departs from a specific libertarian view on the organization of labor. Drivers are seen as entrepreneurs running their own businesses. Uber offers a number of data-related services that help individuals to become proficient drivers.[21] For instance, Uber enables drivers to find their passengers and offers services such as a payment module, a rating system, and "intelligence" that informs drivers at what times of the week demand is predicted to be highest. The company has also set up a partner network that can help drivers to become entrepreneurs. Drivers can lease a car through one of Uber's lease partners or temporarily drive the car of a fleet partner. Through another partner, it offers administration services that help with officially required business administration.[22]

Sundararajan (2016) has argued that platforms like Uber should be understood as a new type of institution, enabling decentralized market relations between

individuals, replacing traditional hierarchies such as large companies. According to that view, platforms promote entrepreneurialism, turning individual citizens into "micro-entrepreneurs." This choice is justified by arguing that platforms lower transaction costs and external coordination costs by providing a number of services and basic infrastructures such as monetary transactions and reputation systems or, in some cases, even financing for the micro-ventures. In this vision, sectoral connectors can be understood as a new type of hybrid institution for the organization of economic activities. They are not legacy companies because they only serve as connectors between drivers and riders; and unlike traditional companies their drivers have some freedoms to determine their own working hours (Gorbis 2016; Sundararajan 2016). As we explained in chapter 2, they can be understood as multisided markets that bring various players together, with platform organizers providing additional services such as training, financing, and navigation intelligence that help individual entrepreneurs with their businesses.

Adherents to a free market ideology see this as a positive trend, a "natural culmination toward the digital organization" of society, in which new technologies have provided the market with ever more efficient ways to organize economic activity (Sundararajan 2016). According to this view, firms, customers, and workers all profit: companies do not have to keep people on their payrolls anymore but can just tap into an on-demand workforce without worrying about minimum wages or benefits; customers can tap into a "customer surplus," with more and better-quality services available to them by pressing a single button on their phones; and workers are now freed from the constraints of organized work. They can set their own schedule and further develop their entrepreneurial skills. This organization of labor allegedly makes the economy more resilient while diffusing boundaries between being employed and unemployed.

However, such a model for the organization of labor may come at the cost of the rights and well-being of citizens. While Uber claims it is just an enabler for entrepreneurs, in reality platforms like Uber are in control of the marketplaces they organize as they own the data, program the algorithms, and shape the interface.[23] In addition, as we have seen, Uber sets the prices. And whereas drivers are free to set their own schedule, the company is notorious for its data-driven techniques that make use of predictive analytics to send out scheduling prompts to drivers as well as other incentives to keep them on the job (Van Doorn 2017a). For instance, when drivers try to log off, the system will intervene with prompts such as "You're $10 away from making $330 in net earnings. Are you sure you want to go offline?" (Scheiber 2017). Prompts like these are based on behavioral economics, and Uber continuously experiments with these techniques to keep drivers on the job and make sure the company can offer enough supply for its services.[24] As drivers are not employees,

they are not protected against such tactics (Scheiber 2017). Whereas connective platforms hold a promise of more flexibility—drivers can choose for themselves whether they respond to a call or not—their practices seem to lead to an intensification of work as providers don't want to miss out on any opportunity (Glöss, McGregor, and Brown 2016). Whereas Uber calls these prompts "suggestions," for drivers they carry more weight than a mere encouragement as they come from the platform owner that controls the marketplace (Rosenblat and Stark 2016).

In addition, because drivers are categorized as entrepreneurs, they have no rights commonly assigned to employees, nor do they have much of a collective bargaining power (Van Doorn 2017a). Platform owners also do not have to contribute to employer-based taxes and levies used for the management of Social Security services such as disability provisions and pensions, shifting the responsibility for paying into social benefits to society at large. Critics see this as a next step in a longer development toward liberalization of the economy and flexibilization of labor (Van Doorn 2017a; Hill 2016). Researcher and current chief technology officer of the city of Barcelona Francesca Bria speaks about "a precarization of labor and erosion of job security, social protection and safety nets for workers such as benefits related to health care, pensions, parenting and so on" (Bria 2016, 219). The consequence is that these entrepreneurs lack a social safety net (Dillahunt, Arbor, and Malone 2015; Scholz 2016; Schor 2014). In dystopian visions, members of this "precariat" are now on-call 24 hours a day as indeed every moment of one's private life is an opportunity to earn an income. An additional problem is platforms' ability to evade taxes, further undercutting opportunities for governments to fund social services. Some even speak of a new kind of feudalism, where a new ruling class emerges, not of landowners but of those who control the flows of networked data (Bauwens and Kostakis 2016). Again, as many of these connective service platforms claim to operate *outside a specific sector*, they leave all responsibilities for that sector to its contractors or to local governments, to whom costs for the upkeep of basic logistic infrastructure as well as the organization of social benefits are transferred.

Civil Society

In response to the rise of commercial connective service platforms, a number of civil society actors have emerged, organizing alternative platforms for urban transport—platforms based on alternative models to commodify transport such as nonmarket peer production and platform cooperativism. Alternative platforms want to shift the power over the transportation ecosystem and its conditions back to passengers and drivers. Mechanisms such as datafication and commodification are still at the heart of these platforms, yet they are articulated in a different way as they are deployed

toward different business models and governance systems. Civil society initiatives come in various flavors. In nonmarket peer-to-peer systems, economic activity takes place outside the traditional market, often supported by alternative payment systems or crypto-currencies. Members of local communities collaborate toward a common goal, such as the provision of transport outside the traditional market. The hope is that blockchain technology will provide a decentralized architecture that can be used to publicly account for contributions to, and consumption of, communal resources (Bollier 2016).

La'Zooz is probably the most discussed example of a nonmarket peer production system in the area of transport. Although at the time of this writing it is still in an experimental stage, the La'Zooz initiative, which originated in Israel, has received quite a bit of media attention as a "decentralized, crypto-alternative to Uber" (Schneider 2015). La'Zooz presents itself as a real-time ride-sharing service that aims to make more efficient use of existing urban infrastructure in order to provide affordable transportation, while contributing to sustainable cities as well as enhancing social connections between citizens. Like Uber, the service aims to pair drivers with passengers through an app. Passengers pay for their rides in "Zooz," a crypto-currency that makes use of blockchain technology. These Zooz can be earned by both taking on other passengers as well as contributing to the development of the system. Zooz can also be earned by introducing new users to the system. The underlying blockchain architecture allows for a decentralized administration and management of rides. The system is developed and governed by its community of developers, whose members decide what values are incorporated in the algorithms of the platform. Currently, the goal of the platform is not "commercial profit, but rather, sharing the costs of the drive as well as experiencing the joy which comes from social matching between driver and rider" (La'Zooz 2015). What makes this setup different from Uber, according to some, is that "the ecosystem will not ultimately be controlled by the goals of a central profit-orientated group, but by the users themselves" (McCluskey 2016).

Despite the attention it gets in media and academic studies, it is not quite clear what the future for La'Zooz will be. After an initial enthusiastic reception in the peer-to-peer community, a campaign to crowdfund the development of an app has failed, and there is no visible active uptake of the platform by local communities yet (Rosenberg 2016). At the time of this writing, it is still possible to download the app. Yet, ride-sharing capacities will only be unlocked when a certain minimum number of drivers in a community is activated, and so far this point has not been realized.[25] The fact that the service is still not operational also shows how difficult it can be to actually realize decentralized alternatives. Commons-based peer production is promising, but in the end, contributors need to make a living. How can

contributions be rewarded fairly in a way that can be made productive outside the commons itself (Benkler 2016)?

Platform cooperativism can be understood as a second example of civic initiatives. The goal of platform cooperativism is not to organize activities outside of the market but to put the producers of the services, in this case the drivers, in command of the system. This vision is built upon the historical emergence of cooperatives in the industrial era, when economical production in certain areas or the organization of social goods such as housing was managed through democratically governed, member-based organizations. The goal of cooperatives was not to maximize profit for a select group of business owners but to secure collective and public values for their members, as well as to share the values produced among their members. In cooperative platforms, drivers themselves will be the owners of the platforms and collectively govern their mechanisms. So far a few initiatives in the transport world are based on these principles. People's Ride in Michigan is a small transit cooperative that in 2016 provided work for fifteen drivers. In Newark, the TransUnion Car service functions as a not-for-profit. All drivers are members of a union that stands up for their working conditions and wages (Scholz 2016). In Denver, around eight hundred drivers organized themselves into a worker-owned and democratically governed cooperation called The Green Taxi Cooperative with the help of the Communication Workers of America Local 7777 union (Stearn 2016). The firm now advertises itself with the slogan "our fares stay in Colorado and provide a living wage for working families" and offers its own app (Green Taxi Cooperative 2017).

Striking as these examples may be, so far platform cooperativism has only come out of local initiatives in which citizens and workers are able to govern their own platforms. Development of user-friendly platforms that are also scalable has proven relatively hard, as are attempts to find financing for their growth. In the United States, current regulation discourages development of cooperative platforms to some extent. For one thing, anticompetition laws—once designed to protect free markets—make it illegal for a cooperative to set standards for prices or conduct (Scholz 2016). This makes it difficult for members of local co-ops to collectively bargain for standards, as well as making it harder to scale up or organize themselves in federations through which standards could be shared across regional markets and communities. As Scholz and Schneider (2016) argue, advancing platform cooperativism is not just a matter of designing the right technology; it also needs specific forms of finance, law, and policy (Taylor 2016). In sum, these experiments show that in theory it is possible to ground the organization of urban transport in particular public values such as solidarity, democratic ownership, and fair labor conditions. In practice, though, current regulation and financing structures make this alternative articulation of commodification difficult to realize. In fact, cooperativism's inherent decentralized

logic runs counter to the dominant network effects–driven logic of the platform ecosystem whose governance is increasingly concentrated in the infrastructural and connective platforms found at its core.

(Local) Government

Local governments are a third important actor in shaping the commodification of urban transport through platforms. Local governments usually own and/or govern parts of the infrastructure—roads, parking places, and bus stops—and control access to special instances of infrastructure such as bus or carpool lanes. And while governments are usually not entrepreneurs, they can steer—discourage or promote—particular behaviors through various tax incentives or levies or by subsidizing or organizing activities themselves that are thought to be of public value and that the market itself would not provide (Rauch and Schleicher 2015).

The platform society offers governments new opportunities to intervene in markets to safeguard public values by interfering in the mechanisms at work in the platform ecosystem. An example of this can be found in a law proposal that is currently under review in São Paulo. The city management decided to take a comprehensive approach to the platformization of urban transport and recalibrate the mechanism of commodification to promote public values into the urban transport system. In the proposed law, all transport network service operators will have to buy "credits" from the local government to make use of the city's infrastructure. These credits will be auctioned off on a pay-as-you-drive model: for each mile a passenger is driven by a TNC provider, that provider has to buy a mobility credit. The more mileage a provider makes, the more credits it needs to buy.

What makes this proposal interesting from a public values perspective is that these credits themselves can be priced dynamically. For instance, credits could be cheaper for providers in areas underserved by traditional public transport. By the same token, credits used for the transport of disabled people may be available at a lower price to stimulate providers to serve this particular group of customers. The system could also be used to promote particular labor market policies. The draft proposal reserves 15% of the credits to be used by female drivers (Darido 2016). What we see here is not so much the commodification of transport itself but rather the incorporation of public values in the platform mechanism of commodification. Through its regular democratic processes, the local government can set public values (such as emancipation of the workforce or equal transport provision for all city areas) and translate those into a tax-credit system that TNCs have to incorporate into their platforms. The goal, then, is to maximize the efficiency of the transport system from a public values point of view, rather than profit alone.[26]

Local governments can also bring their infrastructure into the equation. In most cases, governments or public transport authorities own infrastructure such as roads, parking places, bus stops, and carpool lanes to which they can allow or deny access. City management can offer these publicly funded infrastructures through dynamically priced systems based on economic value or on the contribution to public values that their use is supposed to bring about. For instance, in many cities, governments have made parking spaces available to car-sharing platforms. Similarly, local governments could negotiate with TNCs over how the use of infrastructure or permits could be tied to conditions like securing living wages for contractors, democratic governance of platforms by their users, or promoting opportunities for workers from disadvantaged communities (Rauch and Schleicher 2015). Through such measures, governments can develop new instruments to incentivize positive externalities such as reducing traffic congestion while curbing negative externalities.

Finally, local governments can also offer or subsidize services that generate public values the market cannot or will not sustain. An example is the experiment undertaken in the city of Helsinki with Kutsuplus, a micro-transit service of flexibly scheduled vans. Customers could use an app to book a ride, with the platform combining the transport wishes of various customers into shared trajectories. The service was part of a larger vision to turn parts of Helsinki into car-free areas. Unfortunately, the experiment was canceled after two years as the government found out that each trip cost 17 euros in subsidies (van Wijk 2016).

The failure of Kutsuplus does not necessarily mean that such services are not viable (Morozov 2016). In fact, the number of rides had increased by 59% in 2015, and the subsidies necessary to cover for the costs were declining. A major problem for public sector providers is that they do not have the same access to financial means as venture capital–backed start-ups. According to reports from the business press, a company like Uber also racked losses of more than $1 billion in the first half of 2016 (Newcomer 2016); however, Uber still has ample funding to expand its market share, build up a customer base in a variety of countries, lobby regulators from local to supranational levels, and pay the legal fees and fines when their service provisions are disputed by local regulators. Public service innovation does not have these financial capacities (Morozov 2013). Similarly, where start-ups can be flexible, target niche markets, and challenge existing laws and regulations, public service start-ups have less leeway to do so as they have to comply with current arrangements, for instance, with regard to labor policy or universal access, making them less flexible for innovation in an unequally created playing field (Tsay, Accuardi, and Schaller 2016). However, what the Kutsuplus example does demonstrate is that it is conceivable to model transport platforms on public values such as decreasing emissions and increasing livability in cities.

As all examples show, local governments have more options than to allow or disallow a particular platform to operate; instead, they can recalibrate platform mechanisms to the advantage of public values and to serve community benefits. Local governments can provide services that contribute to public values, which can then be incorporated in MaaS platforms (e.g., Kutsuplus); they can offer access to public infrastructures to TNCs that fulfill particular conditions; or they can build "plug-ins" for the platform ecosystem that taxes or rewards particular contributions to public values, such as the São Paulo example.

REPUTATION SYSTEMS AND THE REGULATION OF URBAN TRANSPORT

The extent to which governments should step in to tune the mechanisms of commodification and safeguard public values in the marketplaces of urban transport is, of course, a hotly debated topic. One argument countering government intervention is that governments can leave regulation to the marketplace because new selection mechanisms have emerged in the form of reputation systems that will empower citizens to make better-informed decisions. We will now scrutinize the mechanisms of selection at work in these reputation systems.

One of the central aspects in the emergence of platforms for urban transport, as well as in the platform society at large, is a shift in the organization of trust. Trust mechanisms have always been key to the organization of economic and social transactions. Throughout history, various arrangements have emerged, from personal reputation in close-knit cultural groups and guild systems to global brand reputations and legal arrangements such as government-set standards and market oversight. Reputation systems organized by platforms are a new tool that, according to its advocates, allows for arranging trust between individuals as well as safeguarding the quality and trustworthiness of the system as a whole. For instance, drivers who are reckless, who discriminate, or who don't provide a basic level of service will supposedly be weeded out of the system as a result of negative reviews from their clients.

A number of advocates have pointed out the positive affordances of these reputation systems as trust-building mechanisms in the platform ecosystem. From this perspective, reputation systems upend the asymmetric information positions between providers and clients, empowering the position of citizens (Koopman, Mitchell, and Thierer 2015). Proponents of these systems have claimed that they could be very useful not only in facilitating transactions but also as a new way to organize regulation and oversight in various economic domains (Strahilevitz 2012; Sundararajan 2014, 2016). O'Reilly (2013) even speaks of new opportunities for "algorithmic

regulation" in which systems driven by open data will oversee transactions in domains such as transport.

To further investigate these claims, we will now take a closer look at the way such a reputation system works at Uber. Uber allows passengers and drivers to rate each other after every finished ride on a 1- to 5-star scale. In the help sections on the website, Uber states that most passengers give out 5-star ratings, unless a problem arose during the trip, meaning that the company considers all ratings below 5 to be problematic. Passengers and drivers cannot see the individual ratings they have received; they only see their average. In many cities, drivers are shown the reputation score of a passenger with their ride requests. Passengers only see a driver's score once he or she has accepted their request. Theoretically, drivers and passengers could use this information in their selection process, but they cannot systematically compare drivers or passengers. Moreover, drivers only have a short time to accept or deny a ride request, limiting their capacity to take a passenger's reputation into consideration.

Overall, the Uber reputation system seems to work as a *normative apparatus*, nudging both drivers and passengers toward a specific behavior. For instance, on their website Uber provides passengers with tips on how to perform to optimize reputation scores. Drivers receive messages with desirable driving behavior as well as messages that inform them about their average rating in the last week and whether their scores are above or below average compared to other drivers. Drivers who fall below a certain rating are deactivated from using the system. A rating below 4.65 is generally used as a threshold, although this can vary from city to city and from time to time (Rosenblat and Stark 2016; Scholz 2016). Users who score a low rating can also be given a "cooling off period" or a permanent ban from using the system.[27]

To what extent are these reputation systems indeed capable of anchoring public values in the organization of urban transport? Whereas they could indeed help to bring about the mutual trust needed to rent out a private car to a stranger, critics have pointed out a number of problematic aspects that need to be addressed. The first issue concerns the veracity of data assembled in reputation systems. Reviewers are generally very kind in their evaluations. For instance, when analyzing almost 200,000 evaluations on Blablacar, Tom Slee (2015) found that 98% fell in the top category of 5 stars. The rise of reputation systems has led to a situation in which providers and clients are becoming dependent on each other's evaluation in order to participate successfully in the platform economy; a subpar evaluation could dramatically increase one's opportunity to attract new business or to be recognized as a worthy client in future transactions. The problem is that Uber's reputation system is utterly nontransparent, and its calibration is in the hands of its owners, giving drivers no recourse to an independent assessment of their scores.

Related to that point is a second issue. Reputation systems may up to a point provide an indication of the quality to expect in a transaction, they are not well fit to administer negative externalities, and they do not protect users from aspects that they cannot evaluate. For instance, normally a passenger won't be able to assess the quality of the brakes. If their functioning may not be problematic for normal circumstances, their malfunction in case of an emergency won't show up in a reputation system until it is too late (Edelman and Geradin 2016). Similarly, if Airbnb renters cause noise and lead to extra pressure on collective neighborhood resources, such distress most likely will not show up in the users' evaluation as they are not the ones who suffer from the platform-enabled transaction. Across the board, it seems that currently most reputation systems are set up to measure customer satisfaction with an individual service on the level of individual platforms but have no or limited means to take collective and civic considerations into account.[28]

Accountability for connective platforms, then, should be based not just on individual user ratings but also on other instruments that provide indicators on actual aggregated behavior of TNCs. Rather than relying on internal reputation systems, publication of various other data sets concerning the actual use of a system could be instrumental in holding TNCs accountable. For instance, aggregated data from actual trips organized through the platform could show whether or not various geographical areas remain structurally underserved by a TNC.[29]

Such forms of accountability could be organized through various procedures. Some data may already be publicly available and could be used by existing regulatory institutions. Regulation could be introduced that would make it mandatory for transport companies to open up some of their data, leaving scrutiny to traditional enforcement agencies within the government or to special interest groups and civic communities. Rather than publishing all their data, TNCs could also be forced to perform these analyses of their data sets themselves. Local governments could set standards based on public values and leave it to TNCs to provide audited records of compliance, similar to the ways that US companies that are traded on the stock exchange have to file yearly audited reports with the Securities and Exchange Commission (Sundararajan 2016).[30]

On the meso- and macro-levels of the platform society, the use of reputation systems as a means of anchoring public values also leads to questions of governance. Which party should organize these systems, how can they be made transparent, and who can be held accountable? Currently, most reputation systems are tied to individual platforms and are nontransferable. Over the last few years a number of companies have been trying to set up a cross-platform identity and reputation management scheme. Companies such as Traity and eRated21 offer online "passports"

that should allow users to carry their reputation from one platform to another (van de Glind and Sprang 2015; Sundararajan 2016). At the ecosystem level, players such as Facebook and Google also play a role. Many urban transport platforms make use of their identification systems to allow users to log in, and the display of social media profiles in platforms could play a role in building mutual trust. At the back end, and more invisible to users, companies such as Acxiom and Intellius have started to combine online profiles with data from government sources, selling these to all kinds of service providers, whether or not in cooperation with companies like Facebook. Worldwide both companies manage between 225 and 500 million user profiles (Bria et al. 2015). The problem is that users usually have little knowledge about either the profiles constructed based on the data they produce or the criteria applied to their interpretation. So far, these reputation systems are highly nontransparent and lack any form of accountability.

This may become even more problematic as in the future reputation systems are likely to become more closely intertwined with identification schemes and data profiles. Companies such as Google and Facebook are very well positioned to grow into standard identification systems for the platform society. Such a central position could also leverage these companies to carry out data analysis across platforms. For instance, an analysis of one's language use on Facebook could be used to estimate someone's propensity for risky behavior, which in turn may influence one's trustworthiness or eligibility for other platform services. In these scenarios reputation is based not only on ratings but also on analysis of actual behavior that may qualify or disqualify potential users as—in the case of urban transport—trustworthy drivers or passengers.[31]

Such nascent reputation systems bring out questions with regard to privacy and ownership of the data that are collected and aggregated. Who owns these data, and who can get access to them? So far users have to rely on windy and opaque terms of service agreements that regulate these aspects in a contract between platform owner and user. An important discussion is to what extent users should be able to access their own reputation data and port it across platforms. To avoid platform lock-in, it would be a good idea if drivers could take their reputation from one platform to another or if it could be handled by an independent platform. On the other hand, if a citizen has a conflict with a platform provider about his or her reputation, this could lead to his or her exclusion across platforms. If one's reputation indeed becomes a central asset in getting access to a platform-dominated labor market, then the institutions that manage reputation become powerful, if not central, actors in the platform society. From a public values perspective, transparency of such a scheme is the least we should expect.

CONCLUSION

Platformization is paving the way for new ways to organize urban transport, based on the gathering and processing of data. This could bring about an urban transport system that offers high-quality transport that is inclusive, affordable, comprehensive, and easy to use. It could give citizens a wide array of choices as to how to organize their transport in an integrated system that combines various transport modalities without much hassle. The main question is, of course: *who will govern urban transport in the platform society and based on what values?* The promise of market-based platforms is that they may be at least partially able to regulate themselves. For instance, they claim that reputation systems could weed out low-quality drivers. However, we have seen that although these systems may indeed expedite interactions between strangers, they are not very well suited to command public values with regard to the quality of public transport, such as accessibility, universal service provision, inclusiveness, and affordability. Moreover, a system in which a number of central players own the data and control the interfaces and algorithms requires more checks and balances. Most current sectoral platforms lack transparency in the way their algorithms set prices and connect demand and supply. Indeed, there are no procedures in place through which these platforms can be held accountable. Additional regulation will be required to tune the system to public values.

Local and national governments have a number of instruments at their disposal to step into that void. First, they could demand that providers open up their data on aggregate levels so that market supervisors and civic watchdogs can scrutinize their performances in relation to public values. In addition, local governments could adapt their own comprehensive platform approach. As we have seen in the example with flexibly priced tax credits in São Paulo, governments could develop modules or sets of criteria in the form of "plug-ins" that platform owners have to incorporate into their platforms. This would allow governments to steer platforms toward democratically set public goals.

A similar approach could be developed to address labor issues. We have seen that platformization could lead to the rise of a new class of laborers who have few rights and cannot lay claim to the provisions of the welfare state. Platforms like Uber maintain that their drivers are not employees, but in reality they are also not entrepreneurs in the traditional sense as platform owners assert considerable control over them and their working conditions. In exchange for access to local infrastructures, governments could enforce standards with regard to the remuneration of urban transport professionals, including those working for connective platforms. Alternatively, they could introduce new tax models and social service provisions into the ecosystem that caters to this new category of "independent contractors."

Governments should keep investing in public infrastructure as they always have and subsidize or stimulate the development of local alternatives that empower local drivers and passengers. The latter is all the more important as the financial organization of innovation through venture capital currently promotes the development of market-based platforms that are able to scale quickly. The global nature of both infrastructural platforms and a number of big sectoral platforms means that alternative platforms focusing on local value production have a hard time being funded. Similarly, legacy public transport companies do not have the resources to attract the skilled talent needed to develop data-based services. This makes public transport companies increasingly reliant on the data services offered by big platform operators, both for their strategic planning as well as for the management of personalized travel trajectories (Tsay, Accuardi, and Schaller 2016). Consequently, the management of transport data and their use for public value creation may be controlled by infrastructural and connective platform companies.

Last, it is important to regard complementors, connectors, and infrastructural platforms as *part of the sector in which they operate*. As we have seen, platforms like Uber place themselves outside the sector. While this allows them to operate more cost-efficiently, it also means the company does not contribute to the cost of maintaining public values such as quality, accessibility, comprehensiveness, and the organization of labor rights. In any society, regulation, market oversight, workers' collective bargaining agreements, and provisions made, for instance, to ensure accessibility for the disabled, to name just a few, are anchored in sectoral arrangements. As we have seen, platformization tends to disrupt these arrangements, shifting the management and governance of urban transport to connective and infrastructural platforms—a shift which further entangles public and private transport and resets the relations between private and public partners. This development is not exclusive to sectors that have always been strongly market-based. As we will see in the next two chapters on health and education, similar issues are at stake in sectors that until now have been predominantly in the public domain.

5

HEALTHCARE AND HEALTH RESEARCH

INTRODUCTION

In February 2016, Royal Free, one of the British National Health Service (NHS) hospitals, announced it was entering a partnership with Google's DeepMind to develop the so-called Stream app—a "clinical alert app" that would aid hospital personnel in monitoring their patients with kidney diseases (Hodson 2016). Analyzing real-time patient information, Google can help support doctors in making clinical diagnoses and predicting if the patient has an illness in its early stages. The app depends on large data streams to make predictions as accurate as possible. Since there is no separate data set for patients with kidney conditions, part of the agreement with Google was to give DeepMind access to *all* NHS data of 1.6 million patients; these data encompass current as well as historical patient information from the past five years, including sensitive details on abortion, drug overdose, HIV status, and pathology records (Cabral-Isabedra 2016). According to both sides, the agreement between NHS hospitals and Google would benefit not just individual patients but health research and healthcare in general.

Not surprisingly, the deal between Google's DeepMind and the NHS hospital stirred controversy over a number of issues, primarily privacy, confidentiality, and transparency. In July 2017, the National Data Guardian—a UK privacy watchdog—concluded that the data-sharing agreement between Google and the NHS had

an inappropriate legal basis under the Data Protection Act.[1] The partnership also triggered questions about transparency in terms of data use: could Google-DeepMind guarantee patient data would not be used for other purposes (Stevens 2017)? Besides these important values, though, the deal raised more profound concerns about safeguarding access to data and knowledge in what has historically been a public sector contributing to the common good. For the first five years of the agreement, Alphabet-Google gets access to data belonging to a public health trust for free, while in return it delivers data analytics software for a nominal fee—a fee that is expected to rise after the initial period. Building the Streams app would be a first step toward a wide range of DeepMind's artificial intelligence products, and this exclusive contract might give Google an unfair advantage over other developers. Not just data are privatized but knowledge is as well. As some wondered, who will "own" precious analytical knowledge in the future: will it be a private commodity or a common good (Hodson 2016)?

The sector of health, like the sectors of urban transport, news, and hospitality, is currently undergoing its own platformization. A burgeoning field of online health platforms has emerged, ranging from personal fitness apps to health-and-sickness platforms that are used by patients, doctors, and researchers (Lupton 2014a; West et al. 2012). A global industry of health-related platforms is being stacked onto, and interwoven with, the infrastructural core of the ecosystem; developing sectoral health platforms is a potentially lucrative and data-rich area that major operators are keen to invest in.[2] Besides the Big Five, there are also health platforms operated by specialized start-ups, for-profit companies, nonprofits, nongovernmental organizations, and public actors. Perhaps most notably, there is an increasing number of public–private alliances in this sector—a sector that is chronically underfunded and in need of resources for expensive technological and pharmaceutical innovations.

Examining health platforms, we can detect a peculiar double-edged logic in how their benefit is argued. On the one hand, they offer personalized data-driven services to their customers; on the other hand, they allegedly serve an overarching public interest in medical research, the outcomes of which benefit everyone. As in previous chapters, we will use the mechanisms of datafication, commodification, and selection as an analytical prism, this time to scrutinize three single platforms which are fairly illustrative of the health sector: 23andMe, PatientsLikeMe, and Parkinson mPower. Each of these platforms employs the logic of personal gain serving the public good, although they operate from different organizational premises. The insights into specific health platforms help us reflect on the conflicting public values at stake in this debate: the concern for privacy versus the benefit of personalized medicine and the privatization of data by corporate owners versus the accessibility of health data and knowledge to *public* research.

As illustrated by the Google–NHS agreement, the lines between corporate, private, and public interests are fiercely embattled in this sector. Therefore, it is very important to articulate questions such as who owns user-generated health data, who gets to benefit, who is in control of data flows, how is the health sector governed by platforms, and how are health platforms regulated by governments? Online health services currently thrive in a gray area of nationally varying regulatory regimes. Oversight is often tied to national governments, and regulators commonly focus on accuracy and security of personalized healthcare apps but pay scarce attention to broader public values such as privatization of health services and access to health data for all researchers (Hamel et al. 2014; Yetisen et al. 2014). In the final section, we will argue why it is important to reflect on the ethical and societal implications of health data markets for the future of research.

HEALTH APPS AS PART OF THE PLATFORM ECOSYSTEM

We have seen a spectacular growth in online services promising to advance the health, fitness, and physical or mental well-being of users and to serve a wide-ranging number of purposes (Lupton and Jutel 2015; Coiera 2013). On one end of the spectrum, there are *fitness apps* that are mostly used for tracking a person's physical performance and condition. Examples include Fitbit, Strava, and Runkeeper. On the other end, we identify *medical apps* that are meant for (self-)diagnosis, to monitor symptoms in order to prevent or treat diseases, and to help patients cope with their ailments (e.g., 23andMe, Doctor Diagnose, WebMD, Virtual Doctor). The boundaries are not always clear-cut. So-called experience exchange platforms serve simultaneously as patients' social networks and as data exchanges for research and development; examples include PatientsLikeMe, CureTogether, Health Unlocked, and Alliance Health (Lupton 2014b). Health monitoring platforms help individuals to track vital signs, health-related behavior, or symptoms of diseases; examples include apps for weight loss (Lose It), sleep cycles (Sleep Diary), pregnancy (What to Expect), glucose levels for diabetics (Glucosio, Glucose Buddy), or symptoms of Parkinson disease (Parkinson mPower). This typology is neither exclusive nor exhaustive, but it serves to illustrate the broad range of platforms that are currently available online and the many shades of gray that typify them.

The purpose of most health platforms is to solicit and collect all kinds of health information from users (Adibi 2015).[3] But what motivates users to contribute their data, and on what grounds do platforms solicit users' personal information? In order for individuals to give away their data, they need to be convinced of the personal and/or the collective gain involved in this transaction; citizens are generally

distrustful of both government and corporate stewardship of their health data.[4] In many platforms, we see a double logic at work that appeals to personal gain and public benefit. Health apps intent on gathering personal data often promise to offer *personalized* solutions to medical challenges—a healthier lifestyle, a quick diagnosis, a proper monitoring device, a speedy update, helpful peer support, etc. At the same time, though, they often claim that patient data contribute to the greater *common good*, such as improving public health, educating a general audience, or helping medical research. Particularly when medical research is concerned, it often remains unclear who is the real beneficiary: is it individual patients, tech companies and their shareholders, "big pharma," researchers, or society as such? The double promise of private gain and public benefits often takes shape as part of the wider struggle over how a data-driven platform society should be organized. The premise that all actors equally contribute to the common good from which everyone equally benefits is underpinned by a powerful set of arguments that informs a common-sense understanding of how society works (Kitchin 2014).

Platform operators wield this double logic to involve users in generating health data. Health data donated by individuals—the healthy and the sick, the fit and the frail—may be automatically aggregated, analyzed, and processed in order to inform a variety of services. These data are extremely valuable to tech companies, particularly the Big Five which operate infrastructural platforms at the center of the ecosystem.[5] Hardware devices, operating systems, and built-in software have been increasingly outfitted for automated data collection. Apple's iPhones now come equipped with sensors that allow for personalized health monitoring, such as heartbeat, steps, and distance measuring. Android systems are equally furnished to enable monitoring functions. The large majority of apps get distributed through their respective app stores: Apple's App Store and Google Play Store (Research2Guidance 2017). Each of the Big Five high-tech companies has also developed sector-specific platforms to help gather, store, and analyze large quantities of health data. In 2014, Apple launched ResearchKit, the first of several "nonprofit subsidiaries" enabling researchers to automatically gather data via iPhones in order to conduct large-scale empirical studies.[6] Google operates the Google Genomics Cloud service, allowing the aggregation and analysis of large quantities of genomic data. Its immediate competitor in this business is Amazon Web Services, which offers storage and analytics to public and private clients. Google and Apple also target the consumer market via their respective apps Google Fit and CareKit, which allow for aggregation of personal data via wristbands, phones, and other smart devices (Roof 2016). Microsoft, for its part, offers competing services through MS Azure—a genomic data storage facility—and Health Vault, a hub promoting the storage of private health data preferably collected through its own hardware (Microsoft Band) and devices.

In other words, each of the five major players in the ecosystem has developed its own set of health data management tools on top of its infrastructural core platforms; they build repositories and offer integrated services that collect and manage more health data than public and private hospitals can ever handle. Therefore, collaborations between high-tech companies and health researchers, like the one between Google DeepMind and the NHS, are increasingly inescapable, transforming the latter into platform complementors. As explained in the first chapter, infrastructural and sectoral platforms, connectors, and complementors are not fixed categories but roles that can change over time. In the United States, Alphabet's subsidiary Verily (formerly Google Life Sciences) has partnered with the Stanford and Duke university medical centers to execute its large-scale baseline study, a medical and genomics study to map the healthy human body (Sharon 2016). Vice versa, academic researchers increasingly deploy major platforms' devices, software, and analytics to process patients' health data, as we will see in the examples below. Health institutions, in other words, are drawn into the ecosystem through connective platforms owned and operated by the Big Five.

In the sections below, we will focus on three specific health apps and show how they function as part of the larger ecosystem's dynamic. 23andMe was launched as a medical app and marketed *for profit*; PatientsLikeMe is a patient experience exchange platform that is "*not-just-for-profit*"; and Parkinson mPower, a health monitoring app, is a *nonprofit* service intent on providing data to researchers. As in previous chapters, the mechanisms of datafication, commodification, and selection serve as primers to explore how information is translated into value. Analyzing this dynamic, it is important to identify how the promise of health research as a common good gets articulated. What key values do specific health platforms promote, and how do they justify the use of personal data for research? How do they align private gain and public benefit, corporate and collective interests, with regard to health data sharing?[7]

GENOMIC INFORMATION SERVICES: 23ANDME

The platform 23andMe started as a personal genome service in 2006, offering customers worldwide a record of their DNA profile; ten years later, the platform was one of the world's largest data hubs for genomic data, having collected over "320 million phenotypic data points" (23andMe 2016a).[8] Data are collected both offline and online. The offline method is to order a "genetic profile service kit" from 23andMe and send in a bit of saliva; after paying a fee between $99 and $199, customers receive a complete overview of their genetic makeup, including a risk

report stating their personal chances for genetic disease and conditions. Besides the commercial offline transaction of genetic data, the company approaches customers online to submit phenotype data through pop-up questionnaires. The additional data purportedly help to compile an even more accurate profile of one's personal state of health. From the very beginning, 23andMe has wanted to promote its product as a medical diagnostic test, while its data are allegedly a by-product deployed toward medical research.

In 2013, the US Food and Drug Administration (FDA) banned the 23andMe test kits because they were giving customers inaccurate information based on misleading predictive algorithms. As a result of this setback, the platform dropped the medical component and shifted its focus from diagnosis to ancestry identification. After the FDA's interference, 23andMe featured a "genome compass app" in the Google Play Store, allowing its customers to find out "what your DNA says about you and your family." Notwithstanding its new category, the platform's website still hinted at its underlying aim to deliver personalized predictive medicine. In 2014, after slightly changing its rhetoric, the company sought and received approval from the British health authority, arguing that the kit was marketed not as a diagnostic test but as an "information product." From the United Kingdom, 23andMe could ship the test kit to customers residing in the United Kingdom and fifty other countries all over the world (23andMe 2015b). Since there is no global guidance for standards to help review a product's claims, each company can look for a regional or national market whose regulatory policies allow it to be distributed as a medical app (Yetisen et al. 2014, 838). In 2015, the FDA approved 23andMe's testing kit for a few specific diseases and conditions, so the company relaunched a modified version of its product in the United States, now with FDA approval.[9]

It is interesting to see how 23andMe solicits data from customers on two different grounds that are intricately intertwined: the promise of receiving a personalized genetic profile as well as the promise of donating your genotype and phenotype data to help genetic research for the common good. On the website we can read how by sending in a DNA sample "you're not only *learning about yourself*, you're *joining a community of motivated individuals* who can *collectively impact research* and *basic human understanding*" (23andMe 2015a, emphasis added). Hence, 23andMe appeals to users' need for solidarity and collectivity by invoking "a community of motivated individuals"—a term that implies that active patients or user groups are involved in this effort. Notwithstanding the company's attempts to buy up active online patient platforms, 23andMe has shown less interest in patient communities as *collectives* and more in patient *categories* as deliverers of valuable data.[10] As Harris, Wyatt, and Kelly (2013) point out, 23andMe's rhetoric "slips smoothly from notions of personalized health care to a celebration of consumers' research participation as a form of 'gift exchange'" (250).

However, what appears as a gift exchange is in fact a *data exchange* where individual phenotypic data are turned into economic value. Upon purchasing a DNA kit, every customer is urged to give permission to make his or her genetic data available for research purposes, which is phrased in terms of altruism and the common good:

> In order for scientists and researchers to accelerate healthcare, they need large sets of data . . . from all of us. Your *research participation* could contribute to findings in disease prevention, better drug therapies, disease treatments and ultimately, genetic paths to cures. Once you purchase your kit, you will *have the choice* to *join this research revolution*. (23andMe Research 2016b, emphasis added)

Users are addressed as "participants" in a "research revolution," the prospect of which is to find cures and preventive remedies for many diseases. As we learn from the fact sheet, more than 80% of all customers opt to participate in research (23andMe 2016a). The terms "research" and "researchers" remain unqualified; they seem to refer to both public and private research, as if the data were made available indiscriminately to all researchers. 23andMe has users sign the terms of service, which states that it is up to the company to decide which third parties customers' genetic data are shared with (23andMe 2016c).

Already in May 2012, it had become clear that 23andMe would privatize the yields of its datafied resources, when the platform owner was granted a patent for "polymorphisms associated with Parkinson's disease," sparking a controversy among its clients (Sterckx 2013, 382). Patients said they felt "tricked" into donating their data to a company that subsequently monetized their data gifts. In January 2015, pharmaceutical company Genentech paid $60 million to 23andMe for accessing its 3,000 DNA profiles of patients with Parkinson disease (Regalado 2015). It did not take long for major pharmaceutical firms and medical product developers to start financing 23andMe. The company's investors envision a future where combinations of health databases are the prime resources for patentable drugs and treatments. When 23andMe announced it would go into drug discovery and development, its owners pointed at its extensive databases of "research participants" as its greatest asset in facing fierce competition from "big pharma" companies.[11]

The success of 23andMe in building a user-generated genomics database cannot be seen apart from the larger ecosystem of connective platforms, where the vertical and horizontal integration of platforms enables global expansion. The strategy to find the most profitable revenue model for a single health app very much depends on its successful integration in the ecosystem (Ragaglia and Roma 2015). Worldwide distribution of 23andMe's genetic test kit and ancestry app, despite the regulatory

hurdles, was made possible through Google's Play Store. The choice for Google is not coincidental: Alphabet-Google is 23andMe's first and biggest financial investor, mostly through its subsidiary Google Ventures.[12] But the platform is not solely locked into the Google-paved path through the ecosystem. In 2016, 23andMe also launched an Apple ResearchKit module to help researchers seamlessly integrate genetic information into app-based studies. Based on these studies, developers will build platforms for asthma patients and sufferers from heart disease. Presented as a "collaborative framework" with Mount Sinai Asthma Health and Stanford Medicine's MyHeartCounts apps, 23andMe customers can upload their genetic information directly through these platforms, following an informed consent process. With over one million customers worldwide, of which 80% consented to participate in research, 23andMe markets its database as a gold mine for researchers. Data are not for free, but researchers "will have a simple, *low cost way* to incorporate genetic data into their studies" (23andMe 2016a, emphasis added). It is not specified what the "low costs" refer to, but it is obvious that researchers not included in this private scheme will have to pay for the data donated by users.

As a sectoral platform, 23andMe has gradually evolved into a global genetic data company that is tightly interwoven with the infrastructural core of the platform ecosystem. Through hardware devices, cloud services, and interlocking software systems, crucial databases are gradually privatized, despite their promises to deploy the "gift" of patient information toward collective goals. The ideals of collectivity where patients are asked to donate their data for the greater good of research turns out to be an investment in connectivity that helps companies like 23andMe accrue value because they turn patient data into tradeable goods. As Ajana (2017, 9) argues, shared data are "increasingly regarded as a 'public good', an asset of sorts that could potentially be beneficial not only to the individual but to society at large. In such a context, solidarity becomes almost synonymous with data sharing and information giving." There is an ironic twist to this "data philanthropy" identified by Ajana: whereas patients want to contribute their data for the greater good, tech companies may eventually end up largely privatizing common resources. We will return to this ambiguity later in the chapter, after looking at several other platform examples.

PATIENTS EXPERIENCE EXCHANGE APP: PATIENTSLIKEME

The dual ambition to offer personalized health solutions while enhancing the common good also echoes on the pages of PatientsLikeMe (PLM). PLM is a patient experience exchange site that encourages patients to keep track of their personal

conditions by uploading data about their symptoms, vital signs, and medicine intake and to report more subjective information, such as experienced pain levels, mood fluctuation, emotional impact, or side effects. Through the website, users can keep detailed reports, replete with graphs and charts, and take them to doctors' visits. Datafication of patients' personal illness takes shape as structured information as well as through narrative accounts. Individual users are solicited to donate their information via various interface prompts. The site deploys so-called patient-reported outcome measures to quantify and standardize the patient experience. Such self-reported data on symptoms, vitals, treatment, and effects serve to find personalized remedies, for instance, to systematically screen for signs of depression, to help patients "capture pain trends between doctor visits," or to help them "choose between surgical options" (PatientsLikeMe 2018b). PLM rewards members who frequently update their information with "stars"; obtaining three stars means you receive a free T-shirt with the PLM logo.

PLM is used not just for compiling personalized health reports but also for exchanging information and advice and for soliciting support from fellow patients. The site focuses on creating communities: individuals suffering from the same disease can make sense of their data by comparing symptoms, the course of their conditions, and the effectiveness of treatment relative to other patients. They can call on each other for help and support disease-centered patient assemblages. PLM invokes a sense of solidarity between patients to entice them into mutual data-sharing; the interface organizes its users around disease categories, ranging from diabetes to cancer and from amyotrophic lateral sclerosis (ALS) to depression. When PLM talks about "communities" it is referring to its patient-support function where patients can exchange information about their disease to get peer support in return (Lupton 2014b). While PLM may provide individual empowerment to patients suffering from the same disease, the platform does not in principle provide collective empowerment the way that activist patient groups do (Wentzera and Bygholm 2013; Vicari and Cappai 2016). As Deborah Lupton (2014a) found in her research, many health platforms claim to serve communities, but "very few are directed at broader social change or activist politics in the spirit of the new public health" (615).

The site's contribution to health optimization as a public value accruing toward the common good comes in the form of the claim that PLM data inform a new research paradigm. All personal data generated through the platform, combined with known medical data on specific conditions, form the input for aggregate data sets that researchers may use to find cures and effective treatments for any ailment. According to its home page, PatientsLikeMe (2018b) aggregates patient-reported data from over 600,000 members on 2,800 diseases, carrying 43 million data points about disease; analyzes them; and shares the results with researchers and companies

to accelerate the development of more effective treatments. PLM's philosophy of "openness" leverages the idea that sharing patient-recorded measurements leads to potential treatments and cures: "We're not doing science for science's sake. Our goal is to make as much data as possible openly accessible to researchers, and to you" (PatientsLikeMe 2018b). Self-reported data provide the foundation for "evidence-based medicine," resulting in personalized healthcare and treatment.

The idea of patient-driven health research, using patients' self-reported data for clinical testing, has gained traction. According to the site, data gathered by PLM were used in over one hundred "published research studies." For the first time in 2010, PLM asked its user-patients to test a scientific hypothesis from Italian researchers who suggested that lithium carbonate might slow down the symptoms of ALS. About 160 user-patients obtained the drug and started to self-track their progress through PLM-validated rating scales. In less than nine months, this patient-initiated effort led to a refutation of the claim originally made by the Italian scientists—a refutation that was confirmed much later by three conventional clinical trials. The results were published in an open-access academic paper, complete with data sets and statistical analysis (Wicks et al. 2011). Patient-led efforts to generate experiential data, according to PLM executive Paul Wicks, prove that this new type of "citizen science" can complement large-scale, longitudinal clinical research by conducting observational research "on the fly."

Not unexpectedly, some medical researchers responded critically to PLM's accuracy claim: how valid are the results propelled by a health platform soliciting user data? Detractors argue that sites like PLM fundamentally breach the protocols of medical research by allowing a group of *self-selected* patients *self-administering* drugs or treatment to *self-report* results without proper protocols that guarantee double-blind testing or control groups (Gorski 2012). Whereas proponents like Wicks laud the qualities of speed and direct involvement of patients, critics like Gorski warn that such patient-driven trials, relying on massive quantities of subjective data, are unscientific experiments that benefit neither science nor patients. The belief in the objectification of self-reported data should not distract from solid scientific paradigms such as double-blind testing, he argues; a side effect of this type of health research might be that it puts the onus of scientific evidence in the hands of patients or, as explained below, in the hands of companies that use these data. Underlying this dispute are two competing paradigms: one that emphasizes the power of patients to act as co-shapers of medical research vis-à-vis one that accentuates the power of platforms' architecture to manipulate data collections and skew research protocols (Wicks, Vaughan, and Heywood 2014; Tempini 2015).

So how does this research paradigm tally with PLM's business model and governance strategy? According to its home page, PLM is a "for-profit company with a

not-just-for-profit attitude" (PatientsLikeMe 2018c), a description that leaves a gray area of interpretation. The platform presents itself in its promo video as a patient-centered site; obviously, it has no products to sell like 23andMe's personal genome service kit. PLM does not allow advertising on its site. What the platform does sell, though, is "research services," which means they sell aggregated, anonymized data to third parties. PLM is very explicit about its intention to make users' health data available to more than eighty partners that support the platform, which are all listed on their website and include the world's leading pharmaceutical companies, medical device makers, and research institutions (PatientsLikeMe 2018a). *How* PLM goes about selling data and contracting partners is not described in detail. To their credit, the website explicitly warns users about privacy infringement. Personal data may potentially be commodified, for example, by "medical and life insurance companies who have clauses that exclude pre-existing conditions" or by employers who may refuse to hire "someone with a high-cost or high-risk disease." Most PLM users will not read these details; but unlike many other sites, including 23andMe, PLM does not stuff away this information in small print terms of service—agreements that no one ever reads and which can be changed without a user's consent.[13]

In line with its "not-for-profit attitude," PLM has to walk a fine line between patients' trust and monetizing intentions (Sillence, Hardy, and Briggs 2013). The site's invitation to "donate your data for you, for others, for good" (DataforGood 2018) underwrites the "data philanthropy" claim identified by Ajana (2017): platform users are urged to donate personal health data to benefit the common good. On the one hand, PLM presents itself as a proponent of open data; the platform developed an online tool called the Open Research Exchange—a tool that allows for the prototyping, testing, and validation of patient-reported outcome measures, questionnaires that measure symptoms and impact. On the other hand, though, "open data" in the context of PLM, does not mean that *anyone* can use them for free; you have to become a "partner" in order to access data donated by patients.

Underscoring its "not-just-for-profit" claim, PLM explains its commercial goal to turn data into economic value; the qualifier "not-just" before "for-profit" refers to its function as a patient experience forum and its support for health research. Unlike 23andMe, PLM defines communities as patient groups exchanging information about diseases, even if they do not rally around collective interests. Indeed, PLM promotes users' active participation in research in a slightly different manner from the for-profit platform 23andMe. Users are addressed simultaneously as consumers, patients, citizens, and partners; and the fusion of the platform as an experience exchange, a data exchange, and a research exchange is packaged in a nonprofit-yet-commercial business model. Before we turn to the implications of this ambiguity, let us first look at a nonprofit platform that makes similar promises.

MONITORING APP PARKINSON MPOWER

The third platform in our sample analysis solicits patient data through a health-monitoring app called Parkinson mPower (PmP). Part of a broader research program executed by several legacy institutions—universities and researcher institutes—PmP is a "patient-centered iPhone app-based study of symptom variation in Parkinson's disease" that helps monitor actual patients' signs in real time (Parkinson mPower 2015). Such signs include measuring tremor, balance, memory, and gait before and after taking medication. Using Apple's ResearchKit, researchers gather data from participants through easy-to-complete surveys via their iPhones. The study collects additional data reported by patients themselves, including automated physical measurements from wearable devices and assessments through online surveys or designated tasks. Unlike PLM, PmP uses no reward motivators for individual patients, such as gamification elements or T-shirts. PmP requests full names and email addresses to make sure they are dealing with real persons; and it uses the digital equivalent of a consent form. The site subsequently anonymizes a user's identity from its data; even though they warn for potential data breaches, they guarantee users' privacy.

Clearly, the platform's prime focus is on gathering research data that will ultimately help all patients suffering from this disease. As PmP's website states, "Whether you have PD [Parkinson disease], are touched by someone who has or has had PD or you want to help, we invite you to participate in this study. Become a research partner!" (Parkinson mPower 2015). Like in PLM, patient-users are primarily addressed as "research partners" in this online clinical study. According to its principal investigator, the reason to run these studies is "to see whether we can turn anecdotes into signals, and by generating signals find windows for intervention" (Business Wire 2015). Scientists are in great need of precise real-time information about the various Parkinson signals to enhance their understanding of disease phenotypes. Research data in PmP are gathered in a structured fashion as part of a medical research framework, even if the researchers do not know exactly beforehand what data to collect on the basis of a prespecified thesis "but instead work with patients to learn about the disease, with the app serving as an intermediary" (Business Wire 2015). Data collection on PmP differs from that on PLM because its researchers predefine the parameters of standardized tests. The platform neither promises to help individual patients nor provides patients support nor facilitates interaction. What is learned from user-generated data is later reported back in the form of a "dashboard" that allows patients to track their personal disease progress.

The claim that PmP gathers data indiscriminately from all Parkinson patients implies that there is no selection; however, the mechanism of selection creeps

into this study surreptitiously in several different ways. As one of PmP's leading researchers points out, having 20,000 participants in an app-based study can generate more specific information than most clinical trials that have at most 500 participants (Business Wire 2015). And instead of collecting data from patients every couple of months, iPhones can continuously and automatically register data in real time. This might partially preclude the selection bias involved in self-reporting data. However, another selection bias may slip in through the use of iPhones. Dutch health researcher Tamar Sharon (2016) warns that "iPhone users tend to be younger, better educated and wealthier than both the general population and the population of smartphone users, the vast majority of whom have Android devices" so that "the ResearchKit population will skew toward a specific demographic that may be quite different than the populations affected by the diseases it seeks to study" (567). Sharon points out that platforms are generally aware of their services' flawed representativeness because their customers are overwhelmingly white, affluent, and educated. Legacy institutions such as hospitals and research institutes are bound by all kinds of (ethical) rules that validate the quality of research protocols. Platforms like PLM and PmP ostentatiously "disrupt" the academic research paradigm of patient-based testing by relying on large quantities of app-generated patient data. The point is not so much a paradigm change per se but control over the provenance and gathering of data. Selection biases in data input due to self-selection, informed consent, and data skewness due to digital filters and devices are just some of the many issues raised in the context of data validity and quality.

Another mechanism in need of closer inspection is commodification, more particularly the question of how PmP's nonprofit business model tallies with its data governance and collaboration model. PmP is part of a consortium, including medical researchers from Rochester University and the University of California San Francisco—both legacy institutions rooted in the private and public health sectors. The consortium is headed by Sage Bionetworks, a "nonprofit biomedical research organization, founded in 2009, with a vision to promote innovations in personalized medicine by enabling a community-based approach to scientific inquiries and discoveries"; Sage Bionetworks' grander claim is to "activate patients and to incentivize scientists, funders and researchers to work in fundamentally new ways in order to shape research, accelerate access to knowledge and transform human health" (Business Wire 2015). As a nonprofit organization, Sage is very keen on prioritizing public values of privacy, safety, and accuracy. Therefore, the PmP app works with informed consent forms. All data provided by patients in this study will be encrypted and stored on a secure cloud server, and neither Sage nor anyone else will be eligible to sell, rent, or lease patients' contact information (Parkinson's

mPower 2015). For regulatory purposes, the effectiveness and conduct of research may be reviewed by the US Office for Human Research Protections, as required by law.

While PmP obviously prioritizes the public values of privacy, safety, and accuracy, what gets eclipsed is how its outcomes may benefit the common good in the longer run. The PmP website says nothing about what happens with the results of these studies, who has access to its accumulated data, and who benefits from its acquired knowledge. PmP and Sage Bionetworks are both nonprofit, yet their partners and funders include commercial parties with a substantial monetary interest in patient data.[14] So while users are referred to as "research collaborators" or "participants" in a trial, PmP's "partnership" thus indistinctly refers to pharmaceutical companies and public research organizations. The use of such fuzzy terms obscures the fact that corporations, individuals, and public institutions have distinctly different interests in (the yields of) personalized health data flows.[15] As some have argued, the push and pull of precious personal data flows in the PmP app remains utterly opaque to consumers (Nosowitz 2015). By the same token, the deliberate collusion of individual, corporate, and research interests legitimizes data collection and sharing practices for the common good, while glossing over the contentious issue of corporate benefits. We agree with Ajana (2017, 10) who concludes that this triangulation between data gifts, data ownership, and the commercial use of data poses a severe challenge for researchers and policymakers.

GOVERNANCE BY PLATFORMS: TRANSPARENCY VERSUS AVAILABILITY

The double-edged logic inscribed in the three health platforms discussed above—to offer personal solutions to medical problems while also contributing to the common good of health research—epitomizes a wider struggle over how a data-driven platform society should be organized. For one thing, the dual promise of private gain and public benefit is nothing new: the pharmaceutical and healthcare industries have made such claims for decades. Neither is the merger between for-profit, nonprofit, and public organizations a novelty: over the past three decades we have witnessed the increasing privatization of public health partly as a result of mounting collaborations between hospitals, universities, and industry. What is new in this era is the *automated* collection of *individual data* by platforms, often bypassing conventional *institutional filters*, and their absorption in a *complex ecosystem*, where *corporate owners* hold sway over data sets that they can endlessly repurpose and combine with other data collections. Evidently, nonprofit platforms such as PmP cannot operate independently from the general ecosystem's mechanisms of datafication, commodification, and selection;

they are entangled in this larger "assemblage of technological innovations" (Banning 2015, 499).

In this ecosystem, the Big Five operators are undoubtedly the most powerful because they control its infrastructural core as well as a growing number of sector-specific apps, despite competition from other connective platforms.[16] As we have seen in the last example, Apple provides the necessary hardware (iPhones that come with built-in measurement features), storage (HealthKit), and software distribution (App Store) on top of which health apps can be built and operated. HealthKit works seamlessly with ResearchKit—the "open" nonprofit platform that offers free storage space for health data to be used by researchers. Notwithstanding the openness of the latter, Apple's data stream is proprietary—a "closed" integrated circuit that creates path dependency and horizontal integration. Each of the Big Five brokers can make its health data streams interoperable with other relevant data flows—think of behavioral information, data about purchased goods, or search data. For example, individuals with a diabetes condition can be monitored for the food they purchase, the number of steps they take every day, their search activity, their mobility patterns, and so on. In the big data economy, the potential to combine data flows is the privilege of big-tech corporations that can steer data streams and consequently decide their level of "openness." Evidently, Apple and Google are not *health* companies interested in finding cures for diseases but *tech* companies interested in building better devices and analytics that can also be used in other sectors (e.g., consumer retail markets or insurance industries).

The mounting power of tech companies and data brokers has substantial consequences for the future of health research and healthcare, raising various moral and ethical issues. Will these companies protect the *privacy* of patients and be *transparent* about data streams? Will they allow public institutions such as hospitals and universities *access* to their online health data repositories as well as the analytics they use, to let them do *independent* research? And how does platformization benefit health as a *common* good? Such competing moral repertoires have to be weighed for both the short term and the long term.

With regard to privacy and transparency, we have seen platform owners in the health sector respond similarly to those in the transportation and news sectors. Connective platform operators initially argued that they serve as neutral brokers between individual patient-subjects and complementors—much like Uber positioned itself as a mediator between customers and micro-entrepreneurs. And just as Facebook's News Feed did not hold itself responsible for filtering fake news, Apple was reluctant to enforce professional standards involved in medical research—not just accuracy and privacy standards but also transparency of patient data. For

instance, ResearchKit's terms of use require that studies conducted via the platform must obtain prior approval from an independent ethics review board; in doing so, the company basically outsources its responsibility for compliance with ethical guidelines to users (i.e., researchers and institutions) (Sharon 2016). Once again, it is highly commendable that professionals and independent research communities control professional standards rather than companies becoming arbiters of ethical decisions involving health data use. However, the bigger question is whether transparency is possible at all since a platform's proprietary algorithms and built-in features are effectively barred from inspection by outsiders.

Even with the best privacy regulations in place and even with Google, Apple, and others being completely transparent about what they do with data, there is a growing divide between those who have access to, and control of, data flows and those who do not have the means to mine, analyze, and recombine data themselves (Andrejevic 2014). Such information asymmetry becomes more relevant when companies declare they only want "to help" researchers develop remedies against disease and find proper therapies. Researchers from universities and hospitals have much less power than major platform owners and data firms when it comes to developing sophisticated analytic tools; and they have no leverage at all to combine health data with other personalized information. Hospitals and universities are becoming increasingly dependent on partnerships with corporate actors not just because the latter have the expertise needed to perform data-based and algorithmically driven research but also because they have the money to fund such large-scale studies. In an economic climate where public funding for research and health is steadily declining, partnerships with tech companies are a necessity rather than a choice.

Indeed, privacy, transparency, and accuracy may have become so central in this discussion that they tend to eclipse other important issues, such as who will be able to access health data and who will be setting the agenda for future research. Do we want tech companies to become powerful actors in health research the way pharmaceutical firms control which remedies will be researched? And, not unimportantly, who sets the price and reaps the financial profits from the future results of these studies? It is important to articulate the competing moral repertoires at stake in the digital disruption of health research and health care (Boltanski and Thenevenot 2006). What do we gain, and what do we lose? Suggesting that we might gain more efficient healthcare or better treatments should be weighed against the potential loss of independent research and the ability to publicly access crucial knowledge and control platformized measurement techniques. Each suggestion offers a different conception of the common good; therefore, we need to look into the governance of platforms to see how actors from government and civil society can help counterbalance power asymmetry and create truly "open data" and "open science" practices.

GOVERNANCE OF HEALTH PLATFORMS: HOW TO KEEP DATA OPEN?

Citizens commonly look at governments to balance conflicting public values; governments' regulatory power gets invoked to protect citizens' rights as well as the common good. In recent years, governing bodies have understandably focused on the medical safety and security of health apps, the testing of which takes an enormous effort and is ultimately inefficient (Hamel et al. 2014; Yetisen et al. 2014; Treacy, McCaffery, and Finnegan 2015; Powell, Landsman, and Bates 2014). Evidently, local and national legislators can barely keep up with the proliferation of health platforms that are often operated at a global scale; with hundreds of thousands of apps in the app store that are continuously updated, regulatory instruments appear increasingly outdated (West et al. 2012). Therefore, regulators try to concentrate more on defining the conditions under which developers are allowed to operate in the market. This insight has led various national regulators to shift their focus on informing developers about the rules and laws relevant to the sector of mobile health. In April 2016, the US Department of Health and Human Services, in collaboration with other agencies, developed a "new guidance for developers of mobile health apps"—a guide that protects consumer values such as safety, security, and accuracy "while encouraging innovation."[17] The guidance is essentially a self-regulatory instrument; it helps app developers sort out which laws may apply to what kind of apps. However, it does nothing to enforce developers' compliance with legal requirements.[18] And while the guidance does address some wider civic concerns, such as antidiscrimination laws, its main focus is on individual consumer rights.

In Europe, recent attempts to implement transnational legislation have focused predictably more heavily on issues such as privacy and data protection. Since mid-2014, various drafts of the European Union's regulatory framework for mobile health apps have been under review.[19] Although this legislation addresses individual consumers' concerns with regard to privacy and access to data, it does not touch upon the wider implications of data control as outlined in the previous section. Indeed, this is a convoluted issue because it pertains to a bundle of rights: the rights of individuals to control their own data; the rights of companies to collect, aggregate, and mine them; the right to trace data back to the data subject—to name just a few. Such profound reflections on the "ownership" of health data are important when weighing societal against economic values in a quickly emerging global market of big data flows. With regard to health *research*, current regulatory frameworks are still unequipped to handle fundamental issues concerning the commodification of health data collections (Seife 2013). As illustrated by the Google–DeepMind case in the introduction of this chapter and by the three health platforms in the previous sections, universities and hospitals are becoming increasingly dependent on

partnerships with corporate data brokers. The new data infrastructure inherently restricts the accessibility of automatically acquired and aggregated data; for future researchers, this will become a pressing issue, one that requires governments to become active protectors of open health data flows (Ruppert et al. 2015).

Keeping health data accessible, open for control, interoperable, and reusable is key to performing independent public research. Therefore, governments are increasingly calling for "open data" and "open science" in the health sector. American and European governments have started their own "open data" initiatives in the health sector, and it is interesting to note the two continents' ideological differences in handling the issue. According to the US government, "open data" basically means the freedom to create economic value out of public data collections. Through its Health Data Initiative, the US government aims to make large numbers of public data sets available to scientific institutions, health communities, and industry innovators (HealthData.gov 2017). It encourages private companies to monetize open health data, developing new patentable products. The Health Data Initiative's goal is to make more and more data from a large number of government departments easily available and accessible to the public and to innovators across the country.[20] This information includes clinical care provider quality information, nationwide health service provider directories, databases of the latest medical and scientific knowledge, consumer product data, community health performance information, government spending data, and much more.

The European equivalent carries the same mission for openness, but the project is framed by its own ideological principles: open data are considered instrumental in procuring citizens' access to affordable services, such as healthcare or education. In the fall of 2016, the European Commission pushed a concerted effort to set up the European Open Science Cloud to support the development of an ecosystem of infrastructures based on FAIR principles—FAIR meaning that data should be *f*indable, *a*ccessible, *i*nteroperable, and *r*eusable (European Open Science Cloud 2017). Setting up and curating such program should enable researchers working for public institutions to store, curate, control, and reuse public data sets. FAIR principles are just the technical basics of value-driven design; beyond these principles, the open science cloud should also balance personalized healthcare with privacy protection demands (Auffray et al. 2016).

However, truly public research requires a shared and *reciprocal* definition of openness, one that advances personalized healthcare while preserving independent research as a common good—a system of checks and balances that is carefully monitored and kept open to democratic control (Martin and Begany 2017). It will take years of negotiation before health platforms will have reached such equilibrium (Cheng-Kai and Liebovitz 2017). As much as the European research community

displays a common urgency toward the goal of open data procurement, there is also a sharp realization that the information and communication technology infrastructure is controlled by American companies who drive the convergence of artificial intelligence and deep learning. The initial controversy over the NHS and Google's DeepMind partnership testifies to that uncomfortable alliance. To remedy public concerns, the consortium installed an independent review panel to critically assess all possible compromising effects of this collaboration, including the monopolization of data (DeepMind Health Independent Review Panel 2017). The NHS-Deepmind case is a good example of how European public-private partnerships are pioneering careful triangulation between governments, corporations, and civil society actors in order to accommodate societal concerns about public values.

With regard to the latter category, there are several civil society actors active in protecting health data as a common good. Groups such as the Open Knowledge Foundation have called for "open data," defined as data that "can be freely used, modified, and shared by anyone for any purpose" (Open Knowledge Foundation 2018). There are also a few examples of collective initiatives specializing in health data; one is called MiData, a Swiss cooperative launched in 2015 that offers a platform on which user-members can upload their medical and fitness data, which they have gathered through mobile devices (MiData 2018).[21] MiData hopes to provide an alternative to commercial data brokers by creating its own ecosystem of data handling and storage, based on public values such as transparency, openness, and privacy; it also plans to include a vetting system executed by a data ethics committee. The cooperative is in an early stage of development; even if the platform manages to scale beyond Swiss borders, it is still dependent on the proprietary technical environment that supports the gathering and distribution of mobile health data.

Just as platforms are governed *by* a global corporate ecosystem, the future governance *of* health platforms will have to be envisioned in the context of a supranational environment, where the complex weighing of public values and the common good informs national and local policy principles. "Ultimately, healthcare policymakers at the international level need to develop a shared policy and regulatory framework supporting a balanced agenda that safeguards personal information, limits business exploitations, and gives out a clear message to the public while enabling the use of data for research and commercial use" (Kostkova et al. 2016, 5). The future of health research will depend on how the battle in this sector evolves and how it shapes up more generally as part of a global constellation of platform societies. Particularly in Europe, the regulation of privacy, ownership, accessibility, availability, and democratic control over (the yields of) health data will certainly define to what extent citizens can trust their data to platforms (Hunter 2016). Legislators need to understand how healthcare and health research are increasingly governed

by platform mechanisms that unsettle many current legal premises and undermine established paradigms. The question what regulators can contribute to the governance *of* platforms will be picked up in the last chapter. Before that, we will turn to the public sector of education, where we will again encounter the issue of open data—an issue that requires careful reflection on policy initiatives that help build public trust and protect public welfare.

6

EDUCATION

INTRODUCTION

After dealing with platformization of news, urban transport, and health in the previous chapters, we now turn to a sector that has traditionally been part of the public domain. Public education has long been one of the most precious common goods and the backbone of Western democracies—a backbone that was scaffolded by independent institutions like schools and colleges, which employed teachers who autonomously decided upon a curriculum for their students. Those curriculums were rooted in public values, such as *Bildung*—the ideal to teach children to become not just skilled workers but knowledgeable citizens—and equality—each child getting access to affordable education. Although there are considerable differences between the United States and western Europe in terms of how and how much public school systems get funded by their respective states, their underlying ideals tend to be similar.

In this chapter, we investigate how platformization is profoundly affecting the very idea of education as a common good on both sides of the Atlantic. Over the past few years, the growth of online educational platforms has been equally explosive as the growth of platforms in the health and fitness field. Most of these educational platforms are corporately owned, and propelled by algorithmic architectures and business models. They have quickly gained millions of users and are altering

learning processes as well as teaching practices; they boost the distribution of online course material, hence impacting curriculums; they influence the administration of schools and universities; and, as some argue, they change the governance of (public) education as a whole (Williamson 2016a, 123). Powered by the Big Five tech companies, platforms are pushing a new concept of learning that uproots or bypasses the values that are fundamental to publicly funded education: *Bildung*, a knowledge-based curriculum, autonomy for teachers, collective affordability, and education as a vehicle for socioeconomic equality.

In the next section, we will explain how sectoral educational platforms are developing as part of the larger connective infrastructure, dominated by the Big Five platform operators and carrying the ideological imprint of the ecosystem's architecture. More recently, global tech firms have also started to seriously invest in the education sector, either through distributing hardware and software to schools or by means of their charity foundations targeting educational systems. Therefore, we analyze *how* the platform mechanisms—datafication, selection, and commodification—influence traditional principles of learning and teaching. To see how these mechanisms work in the practice of school systems, we will look at to two different examples concerning two types: primary schools and higher education.

AltSchool is an educational startup targeting K–12 schooling in the United States; the initiative is backed by Silicon Valley investors and has been touted the "Uber for primary education" because of its potential to scale. The technological architecture of the platform directly informs its pedagogical philosophy of personalized data tracking; learning processes are translated into data processes and turned into tracking systems that continuously relate individual progress to standardized performance. Next, we will turn to higher education and explore how massive open online courses (MOOCs) have affected global online markets and the organization of (public) universities. American educational platform Coursera deploys the principles of datafication and personalization, while its business model explicitly fosters global expansion. MOOCs are promoted as an efficient and effective form of higher education—allegedly cheaper than courses and curriculums offered by brick-and-mortar universities. Zooming in on the principles of commodification, we will particularly pay attention to how this model affects public values.

When talking about public values in the sector of education, we are tempted to concentrate exclusively on parents' and students' concerns about privacy, security, and accuracy of the data processed by apps. Educational data, along with health data and financial data, are among the most valuable currencies in the ecosystem, so safeguarding these values is extremely important. However, as stated in the opening paragraph, public values in this sector have a much wider reach. Platformization is likely to redefine education as a common good as it gets caught between two

ideological sets of values: *Bildung* vis-à-vis skills, education versus learnification, teachers' autonomy versus automated data analytics, and public institutions versus corporate platforms. In the last section, we will discuss how datafication and personalization can be leveraged toward *enhancing* the common good, if organized as "open" initiatives and supported by public institutions, governments, and civil society actors.

EDUCATIONAL PLATFORMS AS PART OF A CONNECTIVE ECOSYSTEM

Educational platforms cannot be seen apart from the larger ecosystem of connective media on which they are built and through which they thrive. As we explained in chapter 1, Facebook, Alphabet-Google, Apple, Amazon, and Microsoft are pivotal gatekeepers in the data flows that fuel the online educational sector which is turning into a booming global market. So it should come as no surprise that three of the Big Five tech companies have invested in the educational sector from the very start of their business. Microsoft has been active in educational software since the 1980s, most notably through its office software and classroom software (i.e., Blackboard). Apple has built its imperium partly on the popularity of its hardware devices, such as laptops, desktops, and tablets in classrooms, drawing children and young adults into its iOS-based universe. The introduction of specially designed software for its popular handheld devices is Apple's latest example to enter the market for preschoolers. Google, from the very beginning of the company in 1999, has held a significant presence in students' lives through offering free services to universities, such as Scholar, LibraryLink, Gmail-and-Docs packages for students, and many more. In terms of hardware, the use of cheap Google Chromebook laptops has become widespread in in K–12 schools across the globe.[1]

More recently, high-tech companies have moved on from hardware and software to the next generation of data-driven, platform-based tool sets—tools that further penetrate the core business of teaching: content production and distribution, student performance tracking, class communication and administrative organization. For the past five years, the market for online educational services has flourished as schools have been rushing to implement sophisticated portals that allow students to see course assignments, let teachers communicate with students, offer digital courseware, and permit parents to assess their children's progress.[2] Intricate data-driven products are designed to adapt to the abilities and pace of each individual child, holding out the promise of improved academic achievement. Apple introduced the comprehensive Classroom App, a toolset for managing and monitoring its iPad products in the classroom. Microsoft presented MS Education, an online toolkit

for schools that "empowers students to develop modern skills, including communication, collaboration, problem solving and global awareness" (Microsoft Education 2017). Google created its own market niche of combined hardware and software when it preinstalled Google Apps for Education on its Chromebooks. In 2016, Amazon—a relative newcomer to the online education market—launched Inspire, a portal where teachers can upload, share, and review free digital learning material, not only books from the Shakespeare Library but also interactive tools from museums and open source materials, such as College Scorecard.[3] By launching Inspire, Amazon joined its high-tech rivals in their push to expand the use of digital technology in public and private schools, both in the United States and beyond. A number of tech entrepreneurs, most notably Facebook's Marc Zuckerberg, have recently invested their fortune in charity or nonprofit funds that promote the platformization of education and expressly the teaching of computer skills, math, and coding.[4]

In the online educational market, the Big Five companies are competing not just with each other but also with established education companies such as Pearson and Knewton, which have vested interests in holding on to their market base (Williamson 2016a). Like legacy news organizations, these companies are confronted with a new type of rival that has a huge lead in cross-sectoral data processing and platform distribution; as said before, they control the ecosystem not only through their infrastructural services (browsers, cloud services, search engines, etc.) that already have a strong presence in educational contexts but also via their partnerships with, or acquisitions of, promising ed-tech start-ups. There are still a fair number of successful independent developers and start-ups in the higher education segment.[5] However, few initiatives are able to scale their products without the support of at least one of the five big players. Google and Facebook have particularly capitalized on online educational services that aim to transform both the content and context of learning.

Sketching a rough outline of how the educational sector is embedded in the larger ecosystem of infrastructural platforms is helpful to understand how their integration with sectoral connective platforms helps sustain the dominant position of the Big Five platforms through path dependency. But we need to dig deeper into this dynamic to understand how they influence the fabric of social structures and institutions. Governing the ecosystem of platforms are the three mechanisms—datafication, selection, and commodification—that drive the reorganization of societal sectors.

Datafication stands out as the single most important factor in the transformation of online education, changing school curriculums from kindergarten to university. Large quantities of data are generated and collected automatically through the devices and services that students, teachers, parents, and school administrators

use. Data sets range "from the often ad hoc 'in-house' monitoring of students and teachers to the systematic 'public' collection of data at local, state and federal levels" (Selwyn 2015, 66). As educational assessment is increasingly quantified, student performance gets governed by numbers (Robert-Holmes 2015). Quantitative learning analytics, grounded in large numbers of students' online behavioral data, involve *real-time data tracking* as well as *predictive analytics* (Tempelaar, Rienties, and Giesbers 2015). Data tracking can be used to register fine-grained information about the time a student needs to solve a problem, to record the cognitive stages in problem-solving, to measure the amount of instruction needed, or to trace student interaction (Koedinger, McLaughlin, and Stamper 2014). Such computations can help predict an individual's chances for academic success based on average scores and a number of variables. These emerging digital policy instruments outsource the assessment of didactic and pedagogical variables from teachers and classrooms to data scientists and algorithms. The general idea of data-driven platform services is to allow for modification and corrective action of learning activities; they provide the as yet unrealized potential to radically transform learning processes and pedagogies (Maull, Godsiff, and Mulligan 2014).

Datafication is a precondition for personalization—a subcategory of what we identified in chapter 2 as the mechanism of selection. Personalized learning means that the online system adapts to each student's learning needs and abilities, to optimize individual performance and boost motivation. Although personalized learning is nothing new, in the context of user-data collection and predictive analytics it means that continuous individual monitoring and tailored didactics become integral to the pedagogical model. The ability to automatically track individuals obviously includes competence scores and performance levels but may also pertain to stress levels, speed variations, and heart rates. Personalized data allegedly provide unprecedented insights into how individual students learn and what kind of tutoring they need. If the data show that one student is better at solving verbal math problems than abstract equations, software developers can adapt the assignments and implement personalized variations. Aggregated data about learning behavior provide the input for individual "adaptive learning" schemes. Personalizing the learning experience is often embraced as the quintessential motivation booster; it lends its focus from intelligent business analytics and customer satisfaction measurements.

Datafication and personalization can hardly be analyzed separately from the mechanism of *commodification*: the monetization of content and data flows via their platforms' business models and governance structures. Commodification in the context of educational platforms often involves the processing of learning data by large data hubs that render big data streams monetizable and potentially profitable.[6] Massive information transfer to "calculation centers" and data hubs tallies

with the concentration of power in a few large data companies which serve commercial rather than pedagogical interests (Lawson, Sanders, and Smith 2015). As illustrated by some of the Big Five sectoral connectors, for instance, Google Apps for Education and Amazon Inspire, their interface feature design is strikingly similar to those inscribed in their (commercial) infrastructural services, affording a smooth exchange of data flows (Friesen and Lowe 2012; Lindh and Nolin 2016). Data flows generated by students and teachers have high economic value because they provide precious insights into individual vis-à-vis group preferences. Children and young adults are extremely valuable user populations, not least because they form a coveted but vulnerable target audience for advertisers and service providers—an extra reason for policymakers to be vigilant with regard to student privacy and security.

In principle, commodified online services based on the mechanisms of datafication and personalization have great potential to advance education, making it more efficient, accessible, and affordable; but there is no evidence yet that they will significantly improve learning and academic outcomes for the majority of students over the long term (Beetham and Sharpe 2013). The effects of data-driven, personalized education are as of yet scarcely researched. Proponents of quantitative learning analytics claim they are a significant quality booster for student learning (Ebner and Schön 2013; Reamer et al. 2015). Real-time data about individual learning processes help instructors monitor students' progress and allow for corrective feedback. As some advocates argue, continuous measuring of performance levels may enhance the quality of instruction (Maull, Godsiff, and Mulligan 2014). Others hail the datafication of educational processes, emphasizing how personalized data analytics inform learning design and facilitate specific pedagogical action (Lockyer, Heathcote, and Dawson 2013).

Detractors from across the world have pointed out how a growing emphasis on datafication through online services can be ineffective in terms of boosting student performance or academic levels; a gloomier prediction is that they intensify managerialism and the surveillance of students and teachers (Selwyn 2016; Thompson 2016). In a 2016 British government report, *From Bricks to Clicks*, a number of critics draw attention to the ethical and legal challenges involved in data collection and interpretation, including privacy, security, and control over one's own data (Higher Education Commission 2016). These important public values have also been at the forefront of researchers' scrutiny of data-intensive learning analytics (Siemens 2013; Slade and Prinsloo 2013). However, the criticism carries beyond privacy and security. Some educators critical of the UK-government report have questioned the very assumptions of data-driven, personalized education as pillars of trust and public confidence (Butcher 2016). They argue that the government's uncritical endorsement of platformization ignores basic principles such as academic autonomy and

independence—principles on which institutions for public education are founded. If dashboards for monitoring students' individual progress become the prime instruments for teachers, instead of classroom activities, this could cause a paradigm shift in education (Thompson and Cook 2016).

In short, while acknowledging the positive uses of datafication and personalization in teaching, critics draw attention to the fact that none of the presumed benefits cited by platforms have been proven empirically. The changing role of teachers from classroom directors to dashboard controllers, mediated by numbers and analytical instruments, is a major issue; professionals may feel that the core of educational activities—assessment and personalized attention—gets outsourced to algorithms and engineers. Let us now look more closely at two examples to help clarify what public values are at stake in the platformization of education.

ALTSCHOOL AND THE TRANSFORMATION OF K–12 EDUCATION

AltSchool is a Californian initiative founded in 2013 by Google's former head of personalization Max Ventilla; the venture has drawn much attention, if not for its educational philosophy then certainly for the names of its financial backers, including Mark Zuckerberg's education-focused nonprofit foundation and the Founder's Fund of venture capitalist Peter Thiel. AltSchool is a hybrid physical–virtual initiative. In 2017, it operated six physical micro-schools—one-classroom settings that house teachers and pupils but no administrators or secretaries; administrative and managerial tasks are handled by the platform's headquarters in San Francisco.[7] Its "virtual" products allegedly have great scaling potential, promising to benefit public school systems in the future. The investors' objective is to help reinvent American education, "first, by innovating in its micro-schools; next, by providing software to educators who want to start up their own schools; and, finally, by offering its software for use in public schools across the nation, a goal that the company hopes to achieve in three to five years" (Mead 2016, 6).

More than just a classroom, AltSchool is an experimental lab where teachers and students are minutely observed; each pupil has an iPad or Chromebook, and every activity is automatically recorded and analyzed. A large staff of over one hundred technicians and data scientists develops customized educational software and tweaks learning analytics to optimize each part of the learning process. The tools developed by this team are remarkably similar to those deployed by general networking platforms: a recommendation algorithm not unlike Netflix or Amazon that takes into account everything a child has already learned, data analytics that eliminate the need for regular testing, and reputation mechanisms that rate the personal input

of children while measuring their relative scores.[8] Teachers supervise the learning process; group instruction is replaced by independent projects. Instructed through a weekly "playlist," each pupil engages in individual or group activities that are tailored toward his or her unique capabilities.

In this high-tech educational setting, student performance is monitored through tracking systems that minutely evaluate each individual child's skills. This means for some pupils that math gets prioritized over reading skills and for other children the other way around (Lapowsky 2015). Informed by data, teachers keep scoring "cards" of each child's progress—academically, emotionally, and socially—and use them to make weekly personalized learning plans. The process of datafication supposedly renders education more efficient by cutting out ineffective tasks for each individual child. In terms of educational philosophy, AltSchool favors technology over teachers, online task-oriented learning takes over classroom instruction, and predictive analytics replace teachers' professional judgments.[9] In addition, individualized learning schemes take priority over a common curriculum or educational canon. To be sure, a personalized approach of students' learning behavior and a differential treatment of educational content are not exclusive to platform innovations like AltSchool. The very principles of datafication and personalization can be helpful aids to teachers if applied in a local setting; teachers can perform detailed assessments of student progress without having to rely on globally scaled connective tools developed by tech companies.

Besides the disputed effects of connective tools, some have pointed at the way in which platforms like AltSchool advance a pedagogical perspective also known as "learnification." Many data-driven, personalized education initiatives focus on *learning* rather than on education and on computable *processes* rather than on social interaction between teachers and students. The (social) activity of learning is broken into quantifiable cognitive and pedagogical units, such as instruction, short quizzes, assignments, deliberation with other students, and tests. The learnification model is predicated on the real-time, short-term process of learning, while education involves a simultaneous nourishing of intellectual, social, technical, and cognitive skills and involves a longer trajectory over a period of years. The "learnification" paradigm, according to some social scientists and philosophers, sprouts from the idea that learning can be managed, monitored, controlled, and ultimately modified in each student's personal mind (Attick 2013; Biesta 2012; Mead 2014).

Datafication coupled with personalization appears to be a double-edged sword. Customized assignments based on quantitative measurements may help improve each individual's learning process and outcomes. Still, personalization algorithms are based on *inferences* of users' needs or interests. So a by-product of personalized learning algorithms may be that they "filter out what is not designated as being of

interest to users and rather presents to them only what fits the system's belief of what their interests are" (Ashman et al. 2014, 824). In other words, personalized assignments may be the educational equivalent of filter bubbles in the news sector. One could argue that AltSchool delegates professional decision-making to data-driven algorithmic systems that have the capacity to circularly define, predict, and govern learners' progress (Williamson 2015). In her ethnographic observation of AltSchool's daily practice in the *New Yorker*, Mead (2016) concludes that data analytics change the role of an educator to "someone who is more of a data-enabled detective" (9).

Besides criticizing the learnification paradigm, researchers have raised various other concerns with regard to platformization, such as surveillance (Siemens 2013). Student and teacher performance are increasingly monitored through dashboards; constant assessments are based on behavioral tracking mechanisms and automated classroom surveying techniques introduced in many elementary schools throughout the United States that have triggered serious controversy (Singer 2015; Rich 2015). Students enrolled in AltSchool and similar platforms are prone to constant monitoring, to the extent that they become (unwitting) participants in continuous lab experiments. Over the past few years, online education has shown a conclusive shift toward continuous behavioral experiments (Ebben and Murphy 2014; Singer 2017a). Using students for research experiments is nothing new. However, the *continuous* tracking of young children triggers important ethical questions; issues of privacy and repurposing of data raised anxieties with parents and triggered inquiries from regulators (Selwyn 2015).

Other questions scarcely addressed by researchers are the ethical issues involved in the ownership of (meta)data and privacy protection, which can be quite thorny. In datafied school systems, students' performance is assessed not just in terms of grades or learning outcomes but also in terms of learning curves and social adaptability. Datafication of the learning process—minutely monitoring the interactive and cognitive behavior of pupils—yields an abundance of data beyond mere academic test results. How fast do students answer a quiz question? How solitary or collegial are they when it comes to problem-solving? Behavioral data are a sort of by-product of continuous monitoring, and students are barely aware of these data being accumulated, interpreted, and repurposed (Ashman et al. 2014). In fact, dashboards may produce behavioral information that is far more interesting than a straightforward grade point average. It is not at all difficult to imagine how future employers might request full performance records from kindergarten up to college to assess an employee's intellectual and social adaptability. The significance of privacy in an educational context cannot be overstated; as Helen Nissenbaum (2010) has pointed out, privacy is a contextual value. Students need a comfortable setting in which they

can make mistakes or take time to discover new ideas and acquire skills. If data about learning behavior get commercialized or traded in any way, students' comfort zone is seriously infringed upon.

AltSchool's use of platform dynamics is typical for many online initiatives currently being developed and implemented. And AltSchool is not the only pet project of Silicon Valley investors that promises to scale its technologies to empower all children in public schools. In 2015, Facebook initiated a partnership with California Summit Public Schools to engage with its K–12 educational program to pioneer a datafied personalized learning model similar to Altschool's.[10] Despite pledges to comply with privacy regulations and to protect student data, the interest of tech companies in the scalability of educational online systems promoting datafication and personalization can hardly be understood apart from the mechanism of commodification; as Ben Williamson (2016b) argues, these "start-up schools" epitomize "the next step in corporate education reform by venture philanthropy" (4). The platformization of primary education—including its potential benefits and possible drawbacks—should be assessed in light of the larger question concerning the privatization of public education. Particularly in Europe, where publicly funded schools are the norm, the effects of corporate platforms and their mechanisms should be subject to regulatory scrutiny and public debate. In the next section, we will try to understand the intricate dynamics of educational platforms as well as their impact on public institutions, shifting our focus to the field of higher education.

COURSERA AND THE IMPACT OF MOOCS ON HIGHER EDUCATION

The platformization of higher education has manifested itself in a variety of ways, but one of the earliest forms was the quick rise of MOOCs. These popular vehicles for online learning were initially promoted as future alternatives to, or even replacements of, college education. From their very onset in 2012, US-based platforms such as Coursera, edX, and Udacity positioned their platforms as global ventures, some of them based on for-profit models and others organized as nonprofit collaborations between universities and high-tech companies.[11] MOOCs did not come out of the blue; they fit a long tradition of distance learning and later e-learning in the United States and on the European continent. Between 2013 and 2015, the global interest for MOOCs surged as they managed to each occupy a specific market niche.[12] Even if the popularity of MOOCs may seem to have worn off a bit, their impact on higher education as a global online market still reverberates across the United States and Europe.

For this section, we will zoom in on Coursera, a for-profit platform that started in 2012 out of Stanford and has offered thousands of online courses to students worldwide.[13] Coursera deploys many of the same datafication and selection mechanisms as previously identified; the platform equally subscribes to the principles of learnification and vents out personalized learning strategies driven by predictive analytics. In an earlier article, we described extensively how the mechanisms of datafication and personalization are driving the development of online MOOCs (Van Dijck and Poell 2015). For the purpose of this chapter, we will concentrate on the mechanism of commodification, which is driving Coursera's business model. Similar to Facebook, Google, and other major platforms, Coursera offers content that is preferably free of charge to end users; students can enroll and watch videotaped lectures, engage in online exercises, and take tests. Coursera's goal is to connect educational content to a global mass audience. User acquisition is critical to achieve network effects, so MOOCs have a vested interest in drawing massive numbers of users in order to obtain big data sets and many student profiles. The more (meta)data they collect, the more they learn about their users (Koedinger, McLaughlin, and Stamper 2014; Clow 2013). But how does Coursera derive revenue from its activities?

MOOCs may be free to end users, but they do not come cheap.[14] Over the past years, Coursera has experimented with various business models and is still fine-tuning its monetizing schemes. First of all, the platform's revenue sources are predicated on the efforts of those universities and colleges it collaborates with. It is interesting to contrast Coursera's business model with that of legacy institutions—private and public universities—which offer a "bundled" educational experience; this experience comes complete with lecture halls, facilities, libraries, and labor-intensive courses that include certification, advising, tutoring, and testing (Boullier 2012; Decker 2014). For this all-inclusive package, students pay tuition and fees; in the case of public education, taxpayers fund the institutions to make higher education affordable and accessible to more citizens.[15] The conventional university business model reflects the ideology of higher education as a curriculum-based, comprehensive experience that focuses on *Bildung*; rather than churning out skilled workers, public education promotes the education of knowledgeable and critical citizens—a condition for healthy democracies. Most institutions of higher education are still grounded in the principle of curriculum-based diploma or degree programs, even if many universities are also offering single courses through extension programs or special programs tailored to specific groups.

For MOOC platforms, the core unit of education is not *Bildung* but *learning*; the core unit of trade is not a *curriculum* but a *course*—a single unit that can be "unbundled" and "rebundled" into an online "product" that is offered outside of a local college

context to an audience spread across the globe. Coursera's model parallels the way in which connectors like Facebook and Google promote the "unbundling" of news content, as described in Chapter 3: news articles and advertisements no longer come as a package (newspaper) but are redistributed via Facebook's Instant Articles, News Feed, and Google News. Like in news production, Coursera positions itself as a connector in a multisided market, connecting content, students, and third parties. But who pays for the online product? Content is produced and paid for by universities consorting with Coursera; universities commonly remunerate lecturers for the development of course content as well as instructors who process student feedback and questions. Universities and lecturers are thus complementors to these online connectors. In collaborating with platforms, universities can decide to offer some online courses for free while making students pay for other content. If universities ask user fees, they have to share revenue with the platform.[16] Universities, in other words, invest heavily in Coursera's business model, paying for content and teaching efforts, while the platform gets compensated for its "connective services."[17] Just as Uber has no cars and employs no drivers, Coursera employs no teachers and owns no school buildings.

Although the "free" model reigns in the world of MOOCs, a premium variant expands the free option by offering extra paid-for services such as so-called signature tracks, where students pay for certificates of completion, proctored exams, and identity verification. Proctored exams and verified certificates are gradually developed into—potentially profitable—units that can be marketed globally. These micro-degrees or nano-degrees are becoming very popular, particularly in markets where they target professionals who want to learn specific skills (Kalman 2014). What we are currently witnessing in the United States is education platforms teaming up with high-tech companies to train a skilled workforce: Coursera, in collaboration with Google, Instagram, and others, offer so-called capstone projects—online internships—where students take on assignments from companies to develop tech skills as well as marketing skills. Besides the labor that goes into these projects, the data gathered from the students' learning process are highly relevant to companies looking for future employees (Lardinois 2015).

Arguably the most profitable business model for online educational content is to collect and trade user data. Coursera's value proposition runs parallel to those of most social media platforms: money is made from leveraging data value to interested third parties. Every user signing up with the platform checks a box, allowing Coursera to collect all user data.[18] It is unclear how Coursera is currently monetizing this wealth of data. Inserting advertising in online content is an option that Coursera has not utilized yet, but it may well be a lucrative value proposition in the future; already, Coursera is fully absorbed in the platform ecosystem, where Facebook and Google

dominate online advertising (Kalman 2014). As we saw in the example of AltSchool, the accumulation of behavioral learning data culled from participants can be sold to businesses competing for global talent. The value of learning data is enormous; combined with other data, such as social media profiles or health and fitness data, personalized information is a gold mine not only to prospective employers but also to insurance companies or consumer firms. The repurposing of student data in the US context is largely a gray legal area; as Young (2015) points out, privacy law is outdated and insufficient when it comes to platforms like Coursera or other MOOCs.

If we look at the mechanisms underpinning the development of MOOCs, we can hardly deny their disruptive force in the global landscape of higher education. Many regard the tendency toward offering personalized, datafied, and customized online learning materials as a positive development. The idea of offering courses which can be taken on demand, apart from an institutional context, is a very attractive scheme in a world where lifelong learning skills are increasingly important and where a decent college education, especially in the United States, has become a privilege that many aspire to but few can afford. The higher the cost of the conventional college package deal, the more attractive MOOCs' "unbundling" proposition becomes. For individuals unable to enroll in traditional colleges the alternative of buying the "derivative" of a much coveted college degree may be very attractive.

As much as MOOCs may be complementary to current university programs and benefit *individual* students, they may undermine some of the core values of *collective* public systems in the long run. While few people believe MOOC platforms pose a threat to brick-and-mortar educational institutions, they are likely to have a strong impact on education as part of the public sector—particularly in Europe where public education is still considered an important contribution to the common good. Although it is impossible to predict how deeply the dynamics of platformization will penetrate the traditional structures of higher education, two potential implications follow from the analysis above. First, public schools and colleges have been great equalizers, proven engines of upward mobility due to their affordability and equal-access policies. Second, while schools and colleges were granted autonomy in defining their curriculum, guarding the standards of education was always a public responsibility, overseen and executed by independent agencies. Platformization tends to disrupt these public values of equal access, professional autonomy, and accountability.

To start with the former, MOOCs are often presented as high-tech fixes to a crumbling public institution—an institution that fails disadvantaged and poor students and has become less accessible to poor students due to rising costs.[19] Coursera deploys compelling rhetoric to promote the platform's scaling capacity to make higher education available to less advantaged students all over the world,

particularly those from developing countries. So far, there is little evidence to prove that MOOCs improve the accessibility or affordability of education.[20] Indeed, MOOCs cause "new relationships in the geometries between the learner, the developer of the content, the delivering and the assessment" of education (Jacovella 2013, 1300). But one way or another, that "new geometry" is deeply reliant on quality content provided by quality teachers that has to be paid for either by student fees or by collective taxes. The much broader argument that the money needed to fix public schools should be spent on private charters and high-tech fixes has become an increasingly popular tenet, especially in the United States, where it is leading to a dismantling of the public system.

Another embattled public value at stake here is the professional autonomy of teachers to design their own content in light of a globally operating, highly centralized and standardized distribution platform. Indeed, Coursera's scaling capacity is driven by a commercial business model, but even in the case of nonprofit MOOCs, the urge to operate on a global scale seriously affects the autonomy of teachers to design courses according to their own pedagogical principles. For instance, edX is the largest nonprofit MOOC venture.[21] Unlike Coursera, edX initially resisted the pressure of venture capitalists to scale and make money quickly, resulting in a focus on experimentation and collaboration with teachers toward building a sustainable online environment. However, as Kelkar (2017) has demonstrated in her ethnographic study of edX practices, over the course of several years there has been mounting pressure from "edX architects" to improve the platform's scalability and global standardization. Meanwhile, instructors and participating college administrations saw a gradual decline in their "ability to set the agenda and control the direction of the software" (Kelkar 2017, 14). EdX system architects admit they struggle with the tension between serving their paying customers and the demands of the wider community (e.g., open source community, researchers).

Finally, the third contested public value is accountability: the role of independent calibration and accreditation institutions in guarding the value of educational credits and diplomas. Regulation of quality standards in education is still largely handled through national agencies and, especially in Europe, through government institutions that are subject to democratic control. Platformization in a connective world may lead to the privatization of accreditation and certification systems. Coursera, for one thing, is keen on developing worldwide standards for credits and exams; much like Facebook wants to offer a standard for identity verification, Coursera has invested in acquiring a gatekeeping position in the field of accreditation and validation. Since Coursera operates on a global scale while many accreditation systems are still regulated by national or supranational (European) agencies,

there is a potentially lucrative market. Uber and Airbnb have proven they can disrupt entire sectors by fighting regulatory conflicts at the national or local level; in organizing its own global accreditation system, Coursera may simply bypass regulation and thus undermine the public sector's governance.

EDUCATION AS A COMMON GOOD: BLENDED LEARNING AND OPEN SOURCE

The transition toward a platform society disrupts traditional pedagogies of learning and teaching. Using AltSchool and Coursera as examples of how the mechanisms of datafication, personalization, and commodification work, it is important to realize how platformization affects the notion of education in the service of the common good. The two examples bring to the fore an intrinsic clash between two conflicting ideological views on the value of education: on one end of the spectrum, education is a private investment in youngsters, to teach them skills and enhance their employability; on the other end, education is a public investment meant to foster knowledgeable and critical citizens and enable them to participate in a democracy. In practice, the opposite views are obviously never this clear cut. Public values, as we argued in the first chapter, are the stakes in a negotiation over what the platform society should look like. So far, we have looked mainly at how the mechanisms of datafication and commodification imprint certain values in the architecture of the platform ecosystem. But what have other (nonmarket) actors in the platform society—governments, public institutions, and civil society actors—contributed to this negotiation? And what are their preferred tools and principles when it comes to procuring education as a common good, particularly in Europe where education is firmly entrenched as a public sector?

To start with the latter, nonprofits and governments primarily advocate two preferred principles: blended learning and open source. Digital and online learning tools can be extremely valuable additions to the arsenals of teachers and researchers, if carefully mixed with proven pedagogical methods that are implemented locally. So-called blended learning environments may enhance the learning process, not only for already advantaged students but also for those who are less gifted and need more training (Gikas and Grant 2013; Rennie and Morrison 2013). The focus on blended learning has caused a shift from *massive* open online courses (MOOCs) to *small* private online classes, leaving more autonomy to teachers and emphasizing the importance of human interaction between teacher and students. To be sure, many of these experiments are still in full swing, and there is no empirical evidence yet that "flipping the classroom" enhances the broader goals of (public) education.

Most universities and several nonprofit educational platforms are advocates of open source software; edX, for instance, has opened up not just its courseware but also the source *codes* of its tools to everyone who wants to use them. As we saw in chapter 5 on health apps, nongovernmental organizations, governments, and public institutions have turned "open source," "open data," and "open knowledge" into the mantras of the platform society. Research organizations, hospitals, and universities want to create a sustainable online infrastructure, in terms both of content distribution and of data management systems that support the public values of findability, accessibility, interoperability, and reusability.[22] But beyond those immediate operational values, it is mainly up to governments to guard the societal values of education: to promote the fair use of data while protecting students' privacy, to enhance education rather than just learning, to maintain independent quality control, and to keep education affordable.

Governments have also taken up their responsibility to defend education for the common good in the platform society by assuming an active role as platform developers, trying to streamline organizational processes while stimulating innovation (Janssen and Estevez 2013). Over the past few years, there has been a growing number of public initiatives in the educational domain, both by public school systems and by governments that eagerly invest in so-called open platforms, some aiming at primary schooling but most targeting higher education.[23] At the national level, Spain, Italy, and Poland have launched platforms for online courses in direct response to American MOOCs. In 2013, a pan-European public alternative called OpenupEd was started in the United Kingdom, in an attempt to counterbalance US corporate dominance in this area.[24] Some of these platforms have had moderate success, befitting the modest investments from public institutions or citizens.

More recently, we have witnessed several nations' "go open" campaigns, aimed at developing platforms whose architecture and resources are open and free to users. The concepts of "open data," "open educational resources," and "open learning" have been promoted as promising means for educational institutions to democratize data access and to share online resources. Governments in the United States, Europe, and Australia have actively invested in such platforms. In 2016, The US Department of Education, in a joint effort with the Department of Defense, started The Learning Registry. According to the website, The Learning Registry "acts as an aggregator of metadata, including the publisher, location, content area, standards alignment, ratings, reviews, and more" (Learning Registry 2016). Teachers and educators across the country can participate in the registry by submitting learning materials and metadata, where they will be vetted and made available for educational purposes. In the same year, the European Union commissioned its Open Education Europe Project (2017), mirroring the American government's effort to support the development

of open educational resources and learning analytics systems. In contrast to the American project, the European Union wants to go beyond MOOCs to embrace openness along dimensions of technology and pedagogy but also to guarantee wider accessibility and collaboration between teachers (dos Santos, Punie, and Muñoz 2016).

Open access resources, in the form of data and content repositories and shared analytics and learning systems, are increasingly positioned as the "common good" rejoinder to proprietary data hubs and corporate learning platforms. Their potential to provide reservoirs and tools is supposed to save costs and stimulate teachers; furthermore, open resources are considered a boon to researchers and entrepreneurs who want to develop new learning materials and products. The many advantages of open source education are eagerly proclaimed; meanwhile, there have been relatively few concerns about potential hindrances or adverse effects in the long run, even if such reserve is probably warranted. Researchers favoring the use of open resources in education call for a fuller exploration of the effects of "open" education, addressing potential drawbacks and obstacles, such as limited sustainability, high costs, and debatable democratizing effects.

Just as in the corporate domain of educational platforms, the effects of online learning methods powered by open source tools have been scarcely researched. A few small-scale studies of open educational data projects in Australian schools were designed to empirically prove the effects of open source learning. Selwyn, Henderson, and Chao (2016) report the results of a collaborative project in two schools, where teachers and administrators deployed datafied systems and made teaching materials open and reusable. Testing the main claims of open resources and open data (i.e., enhanced engagement of teachers and students, more empowerment and accountability), the study could not confirm these outcomes. Instead, it showed that open data use is quite costly and that meaningful exploitation of data-based systems cannot be sustained in the long run without permanent extra funding. The democratic potential of open data projects in terms of enhanced accessibility and equality, as these researchers conclude, may be overstated. This conclusion appears to be corroborated by another Australian study of an open data–based public platform, MySchool, that resulted in a mixed bag of positive and negative effects (Marjanovic and Cecez-Kecmanovcic 2017).[25]

In other words, "opening up" data and rendering platforms open does not in and of itself expedite democratic goals. Open data can empower teachers, students, and parents; but by the same token, it can deepen power imbalances and become a tool of disciplinary power. Collecting open source educational material and making it available on an open site may benefit teachers and entrepreneurs alike, but it takes appropriate tools and contextual materials to make it ready for (re)use. Making

data, tools, and materials "open" is expensive; and appropriate funding is often what public school systems lack. As Rob Kitchin (2014) rightly points out, "no established model has been devised to sustainably fund open data initiatives beyond government subvention, and the benefits of open data in terms of producing additional consumer surplus value and new commercial ventures, innovative products and costs being offset by additional tax revenue are largely hypothetical or only beginning to materialise" (66). "Open" is not the equivalent of "public" in education; moreover, "open" does not mean "free." And finally, "open" is not a panacea for underfunded public education. If government support for open educational resources will siphon more public funding away from teaching in schools and doing research at universities, it may actually be counterproductive. In other words, "open" infrastructures require a substantial commitment to the goals of public education, which brings us back to the clashing definitions of education as a common good.

CONCLUSION

The platformization of education has led to a fierce contestation of public values, which are traditionally anchored in institutions and professional codes that are increasingly bypassed and uprooted. The mechanisms of datafication, personalization, and commodification have penetrated deeply into the edifice of education, not only transforming the content of learning materials and students' learning processes but also affecting pedagogical principles as well as the organization of schools and universities. Datafication and personalization indeed raise many social, ethical, and normative questions concerning the kind of education children may engage with in the future. As a result of commodification, learning data have become a valuable currency. In a connective world, technological interoperability is a vehicle for commercialization and educational platforms have become a battleground for conflicting private, corporate, and public interests. So the protection of education as a common good warrants extra vigilance in what is still considered a public sector, particularly in Europe. There are at least three concerns raised in this chapter that we will take to the final chapter's reflections.

First, the platform society is entangled in the ecosystem's techno-commercial mechanisms that push the marketization of public services and public sectors. Since there is no public space carved out in the infrastructural core of platform society, technocratic solutions to social problems increasingly define the agendas of governments and public institutions. At the heart of this ideological clash lies not only what Morozov (2013) has called "technological solutionism" but also a neoliberal political agenda where formerly defined public and government functions are

administered toward yielding private profits. Public funding is increasingly lured toward platform projects' capitalizing on data-based, technology-intensive forms of teaching and learning, at the expense of investments in human-based, labor-intensive pedagogical and didactic skills. Datafication and personalization are pushed as the mantras of a new educational paradigm where human judgment is increasingly replaced by a product of predictive analytics that has acquired an aura of objectivity and empirical groundedness. However, there is as yet very little research evidence to substantiate the broad claims implied in this paradigm.

Second, the expansive ambitions of educational platforms as illustrated by their investment in scalable technology raises the question of efficacy: does scalability make education more effective or efficient? The automation of resources and learning systems raises the prospect of globalized "one-size-fits-all" education, a prospect that takes little account of the local and unique contexts of learning and teaching. Although platforms like AltSchool and Coursera promote "personalized mass education" as a unique selling point, what is behind the drive to scale technology is indeed global standardization. If online courses become the standard container for global education, shipping can be facilitated worldwide, from Shanghai to San Francisco, by a few global "connector" companies that create path-dependent distribution chains. While Coursera and Uber have much in common in terms of their underlying platform mechanisms, education differs from transportation in that the former is mostly about the uniqueness of each person, each place, and each cultural context.

Finally, the most profound insight taken from this chapter is how education, as traditionally part of the public sector that is uniquely entrusted with democratic public values, is rapidly inflected by the techno-commercial architecture of corporate platforms. As we have touched on in this chapter, there are notable attempts by governments, nonprofits, and civic groups to design a constellation of "open" platforms, aimed at helping teachers, students, and researchers work with data and digital tools. However, making data and knowledge *open* as we have argued is not a warranty to keep education *public*. Many projects for open educational resources focus on the quantity and quality of data sets collected. What is needed besides affordable, manageable, and easily maintainable resources is a better and deeper understanding of how data flows reflect, construct, and enact *public values*. The same "open" data sets can be used toward different goals. For instance, student performance track records, depending on their use, may lead to better personalized attention by teachers but may also enhance discrimination or limit accessibility.

A proactive engagement with potential short-term and long-term effects of datafication and personalization should be accompanied by the drive to ask fundamental normative questions, not just about privacy, data security and

surveillance but also about pedagogical foundations, the intrusiveness of techno-managerial surveillance systems, and the nature of quality education. Only if these wider societal norms and values are made transparent can we weigh and judge their implementation into platforms to which we trust our students' education. We will take these three concerns and insights to the last chapter, where we will elaborate on the role of governments and civil society actors as actors in the platform society.

7

GOVERNING A RESPONSIBLE PLATFORM SOCIETY

INTRODUCTION

The year 2017 was arguably a turning point in the development of the platform society; there were notable signs of an emerging opposition against the mounting power of large platform operators—and not just of the Big Five. Alphabet-Google, owner of YouTube, faced a strike from major advertisers, including the *Guardian*, Starbucks, and Walmart, that refused to have their ads placed alongside videos celebrating terrorism and disseminating fake news. The German government started to prepare legal measures against social networking sites that fail to take down hate speech, fake news, and defamatory content within 24 hours of its being posted. Twitter was reprimanded for not being able to comply with this voluntary rule. In the meantime, German competition authorities took Facebook to court for issuing blanket, incomprehensible consumer agreements that force users to cede all rights over their personal data to the company. And in anticipation of the General Data Protection Regulation (GDPR) directive—a ruling that will protect every European Union citizen from data abuse starting in May 2018—the European Commission considered whether social media sites' harvesting of personal data breaches European Union antitrust rules. European antitrust officials fined Alphabet $2.7 billion USD for unfairly favoring some of its own services (i.e., Google Shopping) over those of rivals, creating a lock-in for its users. In December 2017, the European Court ruled

Uber to be a taxi service rather than a tech company, dealing the platform another severe setback after the denial of its license renewal in London and the public outcry over Uber's harassment practices tolerated by its management earlier that year. Meanwhile in the United States, Facebook, Google, and Twitter executives were made to testify in front of the US House and Senate Intelligence Committee to probe their role in Russia's meddling in the 2016 US elections. And finally, two Wall Street investors requested that Apple look into the health effects of its iPhone and iPad products and study whether their design may promote addiction, particularly among children.

A growing backlash against the big tech companies' profound impact on all levels of society has drawn public attention to the intrinsic flaws of the global platform ecosystem (Manjoo 2017b). Each incident exemplifies the skirmishes between governments, market forces, and civil society actors to define the platform society as part of an ideological fight over public values and competing interests (Hutton 2017). In the first two chapters, we assessed how online platforms—with the Big Five squarely in the middle—are quickly positioning themselves as central to all sectors, penetrating private and public domains, affecting markets, and reshaping societies. Platform operators have gained not just economic power but also civic power, including "the power to enable collective action, the power to communicate news, and the power to influence people's vote" (Moore 2016). Indeed, there are enormous economic benefits for the Big Five in maintaining an "in-between" status as "neutral connectors" while accumulating centralized informational power (Andrejevic 2013b). The next four chapters analyzed the disruption of urban transport and news as part of the market sector and health and education as predominantly part of the public sector. In shaping the online world, the micro-level of single platforms is inextricably intertwined with the meso-level of the platform ecosystem, which in turn feeds into the geopolitical level of global companies and (supra-)national government bodies.

In this last chapter, we want to shift our focus from the analytical and the descriptive to the normative and the reflective. We started out this book asking what role online platforms play in the organization of public values in American and western European societies. Public values and the common good often remain implicit or invisible, whereas they should be articulated, especially when they are contested or when they serve competing interests. A key issue is how public values can be forced upon the ecosystem's architecture—an architecture whose core is overwhelmingly controlled by (US) tech giants pushing economic values and corporate interests, often at the expense of a (European) focus on social values and collective interests. The mechanisms of datafication, commodification, and selection seem to afford tech companies unprecedented infrastructural, sectoral, and *inter*sectoral powers.

However, the ecosystem's architecture is adaptable to changing societal norms and awareness about potential harms. This book's search for underlying patterns and systemic mechanisms prompts a final reflection on the "what," "how," and "who" of governance: what kind of public values do we want to incorporate into the design of the platform society, how do we do that, and who is responsible for doing so?

As stated in the first chapter, creating public value for the common good should ideally be the shared responsibility of market, state, and civil society actors. The Big Five, as major shapers of the ecosystem, can rewrite the rules for democratic societies; but how can they act responsibly in a new global world order? The same question can be asked of civil society actors. What are the capabilities and constraints of individual citizens, nongovernmental organizations, and cooperatives in the platform ecosystem? Public institutions have a special function as guardians of social trust and a democratic commons. Finally, we will zoom in on the responsibilities of local, national, and supranational governments that are slowly waking up to the vast consequences of outsourcing governance to sociotechnical systems. Platformization requires an integral approach rather than just a sectoral one when it comes to defending consumers' and citizens' rights. Governments are, of course, regulators and law enforcers, but they can also be responsible users and developers of platforms. Governing the platform society is ultimately a geopolitical fight for influence and power; in the epilogue, we will return to the ideological clash between global powers in the digital age.

TOWARD A VALUE-CENTRIC DESIGN OF THE PLATFORM SOCIETY

Societal orders are no longer just cemented in offline institutions and organizations, but they are increasingly interwoven with digital constellations. If societies want to create a platform structure that reflects and constructs a democratic order, they need to strive to implement public values and collective interests in the ecosystem's design. The current platform ecosystem is predicated on an architecture that is primarily staked in, and driven by, economic values and corporate interests; the more societal sectors this system penetrates, the more political power its key players accrue. Although the rapidly evolving ecosystem often appears as a self-driving force, it is not immune to change: technology shapes society as well as the other way around. The ideal platform society, which governance builds on homogeneous generic public values, obviously does not exist. Public values need to be articulated in each sector and in each context because they are both stakes and outcomes in political and ideological contests. Openly articulating and weighing public values at every level is imperative to revamping the ecosystem's design (Tura, Kutvonen, and Ritala 2017).

In the first chapter, we introduced a range of public values, some pertaining to individual consumer rights, others to the process of keeping the Internet open and reliable. The *safety* of data traffic is, of course, a fundamental public issue that pops up in the news almost every day: data flows that can be tapped or online systems that can be hacked cause a fundamental mistrust in the usability of the infrastructure as a whole. *Privacy* is a value that has shown up throughout our discussions of data traffic via online channels. Without privacy, citizens can no longer be assured that they have control over their own lives; the right to autonomy and sovereignty of individuals, of course, should always be weighed against the interests of communities. *Transparency* is another pressing public value that applies not just to data flows and algorithms but also to business models and the ownership status of platforms. The import of *accuracy* often comes to the fore when discussing questions such as: is information correct? and how can we control its accuracy so we can assess the fairness of its interpretation? Such questions are important in any sector, but they can mean the difference between life and death in the health sector and between real and fake in the news sector.

More broadly, we have analyzed how societal values form the heart of debates over private gain versus public interests. In an ideal governance model, citizens would have the *power to control* their personal data and wield *democratic control* over what happens to collective data flows and repositories.[1] *Quality* and *accessibility* are important values when it comes to data-driven processess; as we have seen in the health and education sectors, these values are inherently subjective and therefore should be open to public debate. In the transportation sector, *comprehensiveness* and *affordability* came to the fore as contested public values. A society that holds on to principles of *equality, inclusiveness*, and *fair treatment* without favoritism or discrimination needs to be able to judge automated decisions made by algorithms that are now obscured from public scrutiny. Two more general public values are *responsibility* and *accountability*. Public accountability suggests that it pertains to "good bookkeeping"—to be answerable for fiscal and social responsibility—but the term has moved far beyond its semantic origins and has come to signify "good governance," both in the public and in the private sectors (Bovens 2009). Needless to say, the list of public values is not limited to the ones discussed in the preceding chapters.

While everyone agrees on the necessity of articulating public values, there are no universal guidelines or recipes for the ensuing negotiations; "fairness" in healthcare contexts means something different from "fairness" in self-driving cars or education. Articulating which values are contested by whom in which context may help reshape the current platform ecosystem in ways that make it more responsive to public concerns. Implementing public values in the ecosystem's design is not as simple as it seems, partly due to the sector-agnostic logic inscribed in the architecture of

infrastructural platforms as well as in the platform mechanisms. As we have shown in the preceding chapters, platforms' techno-commercial strategies and user practices constantly co-evolve; and because of their performative nature, we should look into how platform mechanisms can also be deployed to *promote* public values and the common good. Let us probe a few scenarios to show how datafication, commodification, and selection might be "reverse-engineered" to inject public values into the system.

Datafication

The problems with datafication currently often relate to poor accessibility, unknown quality, indistinct ownership, and lack of accountability in the governance of data flows (Kitchin 2014). For the ecosystem of platforms to work effectively, it heavily relies on large quantities of data generated by a vast army of users who face a loss of control over their data after they have accepted a platform's terms of service. Data ownership is a troubled concept, partly because it has not been defined legally or technically, partly because the disaggregation and reaggregation of data flows and the unbundling and rebundling of digital products takes place at the back end of platforms, out of users' sight, and partly because the vastness and complexity of data capturing by infrastructural platforms frustrate data portability.[2] Conditions for access often get defined by the owners of data storage and computing facilities, which are generally handled by the very same companies that offer the software services and hardware devices on which users have come to rely. For instance, health data collected through fitness apps are routed through the infrastructural platforms that also channel connections between advertisers, news content, and users. Since data flows are near impossible to trace and because access to data and control of data quality are overwhelmingly in the hands of a few large corporations, there is little public accountability. Data have become a valuable resource constantly supplied by users, but they are treated neither as individual/personal property nor as a communal/collective resource. As long as data flows are considered proprietary assets, platform operators have the power to capture, store, and resell them without any recourse or compensation to the public.

And yet, datafication is a potentially powerful means to improve learning, enhance the circulation of news, optimize city traffic, and solve health problems of epidemic proportions. The availability and accessibility of (real-time) data shared through open standards could contribute significantly to the common good. In a seminal paper, the Organisation for Economic Co-Operation and Development (OECD) has argued how data streams in the transportation sector could be leveraged to improve traffic management and safety; however, platform operators "have

concerns that sharing their data with the government would allow other competitors to access the same information and eliminate their competitive advantage, and hence the public ends up losing out" (Organisation for Economic Co-operation and Development 2016, 28). As we saw in chapter 4, cities could substantially benefit from the data gathered by Uber and other transport network services to optimize traffic flows. Public access to data could also help to make platforms more accountable; therefore, some classes of data should be shared for the common good, provided that privacy is protected. In chapters 5 and 6 we elaborated on the importance of making data flows open, traceable, and reusable. In the domains of health and education, we are seeing a tendency toward privatization of user-generated data—a tendency that sits in tension with the need for more transparancy and testing for accuracy. Values like privacy can be wielded both for and against the public interest in open data flows; that is why it is important to articulate them as clearly as possible so that citizens and authorities can balance competing interests and values at every level of negotiation.

There are probably as many advantages to datafication and algorithm-based decisions as there are concerns. Platform societies are quickly moving from rule-based algorithms to machine-learning algorithms, where human decision-making is increasingly outsourced to machines, deciding who gets loans, who gets insurance at what price, or who is granted parole. As we saw in chapter 5, there are great opportunities, for instance, in personalized healthcare that is more efficient; but the concerns are equally great—think of discrimination or preferential treatment in healthcare. Subtle biases or existing ideologies, prejudices, and inequalities can slip into the data sets but also in the processing or training of algorithms (Amoore and Piotukh 2015).[3] Computing risks is always a combination of humans and machines, making it more important to develop reiterative processes for *judging* data sets and processing principles. Questions of accountability and responsibility get more complicated when systems become self-learning.

Data should perhaps be treated like money—and not just to distinguish the data-rich from the data-poor. Data flows ought to be made transparent just as money flows are made "(ac)countable" in order for citizens to see who owns them, who can access them, and who may use them. Perhaps in the future it will become possible to install a public register, a cadastre of sorts, which keeps track of data flows and enables individuals to keep some data private while giving away some data under certain conditions (i.e., anonymity or reusability for nonprofit purposes only). Such an administrative ledger system should be open to all, and its registers should also be held accountable—perhaps operated by public agencies or at least controlled by registered data accountants.[4] Accountability is not merely a technical matter; it strongly correlates with how institutions scaffold our social world (Reijers and

Coeckelbergh 2016). Of course, states and supranational bodies like the European Union can regulate data flows to some extent, but there needs to be an agreed upon legislative framework that defines who can "own" which data flows—privately, corporately, or collectively. Several organizations are keen on developing new (regulatory or legal) frameworks for understanding data flows similar to flows of money and goods; needless to say, it requires a concerted effort to design an alternative framing for data ownership and access that resonates equally well with businesses, governments, and citizens.[5] For these initiatives to take root, it is crucial for societies to develop an integral approach to data as a valuable currency accounted for in a trusted governance system.

In recent years, blockchain technology has been pushed as the new trust system where transactions can be managed and authorized through a decentralized ledger and records can be administered in a distributed fashion so that users can validate and count every interaction without having to ask permission from a central authority or organization (Mancini 2015). Blockchain proponents have argued that if we would only design an ideal technical system, the ideal society will inevitably follow: a society that no longer needs central organizations after every online transaction is made transparent. There are also a number of critics who have voiced serious concerns about the underlying assumptions of blockchain, from its technological determinist vision to its cyberlibertarian ideology (O'Dwyer 2016).[6] It is beyond the scope of this book to discuss the pros and cons of blockchain; instead, the observation suffices that the very dispute about blockchain technology revolves around basic public values and competing interests: Who will benefit from blockchain? Is it accurate and safe? Who is accountable in case the system is hacked or proven insecure? Is it sustainable both in terms of energy efficiency and in terms of public trust? Can institutions, citizens, market actors, and state actors collaborate and be involved in shaping this technology in line with democratically agreed upon values? These are the kinds of questions that need to be raised in order to assess the significance of *any* technology for a responsible platform society.

Commodification

The mechanism of commodification that helps transform datafied activities into economic value could in principle also be deployed toward creating *public* value. If we look at the business, ownership, and governance models currently prevalent in the platform ecosystem, we have to conclude that a public value–based design is still a far-fetched ideal. Transparency is a condition for accountability, yet the online world is getting more opaque by the day. Platform economics, simply put, relies on connecting producers to consumers to advertisers to content; the currencies

involved in online transactions are money (or alternative crypto-currencies), data, attention, and user numbers. A myriad of monetization schemes render the ecosystem notoriously intransparent: sometimes a transaction fee is paid by both sides (e.g., Airbnb, Uber); other times it happens through the creation of free(mium) content generated and paid for by users (e.g., YouTube, Coursera); platforms may capitalize on consumer attention through advertising (e.g., Facebook) or by selling data to third parties (e.g., 23andMe). An increase in users, similar to data and algorithms, intensifies a platform's network effects, offering it a potential competitive advantage over other platforms (Prufer and Schottmuller 2017). Business models are often business secrets; how platforms compute the four currencies to create value is often hidden from the view of competitors and users. The distribution of ownership and governance models is equally nebulous. Competition from newcomers is effectively offset when the Big Five companies buy up platforms as soon as they start to scale or—not uncommon—when they copy successful features from competing platforms to enhance their own monetization strategy.[7]

Users have little or no insight into how platforms extract value from their online activities; the onus is always on the user to share more, feeding platforms' infinite appetite for data. Some might argue that tech firms have turned into "banks," exchanging data for money while packaging their products into complex services whose price dynamics have become incomprehensible to ordinary users. If Twitter or Facebook users have no clue how they get fake news items in their information streams, that is likely because they are ignorant about the business models' underlying clickbait. With so much information asymmetry, one may argue that high-tech firms owe consumers an explanation of how a platform's monetization scheme works. Their obscurity seriously hampers consumer's comprehension of online services—a situation reminiscent of the period leading up to the 2008 banking crisis when abstruse subprime mortgages were sold to aspiring, unwitting homeowners. Like the banking sector, the high-tech sector should be held responsible for the legibility and legitimacy of their products and services. They are not "too big to fail."

And yet, transparency alone cannot make platform ecosystems more accountable. As Ananny and Crawford (2016) have convincingly argued, transparency coupled with accountability should always be contextualized: who is accountable for what and to whom? With regard to commodification, this requirement should apply not only to business models but also to ownership models and the governance of markets. And that is precisely the problem: datafication and commodification as mechanisms render fluid the distinction between for-profit and nonprofit, private and public, free and paid for, infrastructural and sectoral, complementors and connectors—and between global, national, and local markets. As we have shown

in the case studies on health and education, corporate platforms often partner with nonprofits and public players, promising communal benefits yet obfuscating private interests. Transparency and accountability need to be embedded in formalized relationship structures in order to work properly, but what happens if online and offline realities no longer match?

The offline apparatuses for regulating physical spaces and fair markets appear to be premised on the very dichotomies that datafication and commodification mechanisms undermine. User activity, transferable data flows, and automated data profiles are new variables in the global platform economy—variables that are barely accounted for in any kind of legal-regulatory framework. These variables apply across sectors, thus allowing for an unprecedented accumulation of digital resources and concentration of *intersectoral* power, facilitating not just vertical integration across infrastructural and sectoral platforms but also horizontal integration between platforms operating in different sectors. Algorithmic power accumulates exponentially when, for instance, health data combined with educational scores and retail purchasing data can be utilized to decide who should be offered discounts on their insurance. Datafication and commodification mechanisms across sectors and across nations beg for new taxonomies of governance which may render the ecosystem more transparent and accountable; such principles of ecosystem governance are needed so that they can be applied to specific contexts and situations. We will return to this issue in the last section.

Selection

When discussing the mechanism of selection, we have shown how the automated filtering, ranking, and personalization of data may stymie public values such as the need for accuracy and democratic control, particularly if they are intertwined with specific commodification strategies. In the news sector, as discussed in chapter 3, the mechanism of personalization can diminish the diversity in news consumption. Platform aggregators like Facebook and Google's News product thrive on the model of unbundling and rebundling content, targeting specific individuals who are already prepared to receive slanted news and advertising. Although they considerably boost audiences, news aggregators have stripped away news *content* from journalistic *contexts* and hence from professional curatorial systems. Promoting disinformation and creating filter bubbles are not in the public interest; as Facebook and Google have come to acknowledge, the platform mechanism of selection, driven primarily by commercial rather than public values, may seriously hamper democratic processes and eventually run counter to these firms' corporate interests (Napoli 2015).

That does not mean, though, that selection mechanisms are intrinsically faulty; personalization and reputation rankings may also work to empower individuals. Personalizing one's medical profile may be very beneficial to an individual's health. And customized news filters may in principle lead to better-informed consumers. However, there is a precarious balance between individual, private benefits and collective, public interests: connective systems that are geared toward optimizing personal services tend to subjugate or preempt collective interests. If personalized health information leads to better diagnosis and treatment, everyone gains; if it leads to unacceptably high rates for disabled people's health insurance, the very same mechanism undermines a social contract based on solidarity and equality. By the same token, personalized news filters may suit a specific person's informational needs in terms of news and advertising; but if these automated filters lead to a sharply divided citizenship in which communities lack any kind of common ground, we seriously need to consider how they can be made responsive to the demands of a democratically organized society.

In sum, a value-centric design of the platform society requires a retooling of the current ecosystem by tilting its underpinning mechanisms toward *societal valorization*. Over the past three decades, states and communities have yielded influence and power to corporations; the classic division of responsibilities where governments look after public interests seems no longer viable. Public sectors, institutions, and governments are increasingly reliant upon the corporate platform ecosystem, so it is crucial to rethink the principles from which these systems are designed and how the mechanisms could be wielded to sustain democracy and guarantee an equal playing field. The question to ask first is: what kind of society do we want? What values need to inform the online systems that have become so insidious in organizing our societies? Once again, the outcome of this negotiation process is never stable for once and for all as it is part of a democratic process. However, ignoring the technological, economic, legal, and social complexity of the platform ecosystem and hoping the market will take care of itself because it is "naturally" tilted toward democratic balance would be a serious mistake (Jacobs and Mazzucato 2016). Therefore, we will now turn to respectively market, civil society, and state actors—recaptured in Figure 7.1—who share responsibility for the platform society and ask how each type of actor can contribute to a public value–centered design. Such design requires negotiation and co-creation between multiple stakeholders from the very beginning, forcing them to organize themselves toward a common goal: how can various interests be balanced to create a responsible—that is, democratic, accountable, sustainable, fair—platform society cemented in public trust?

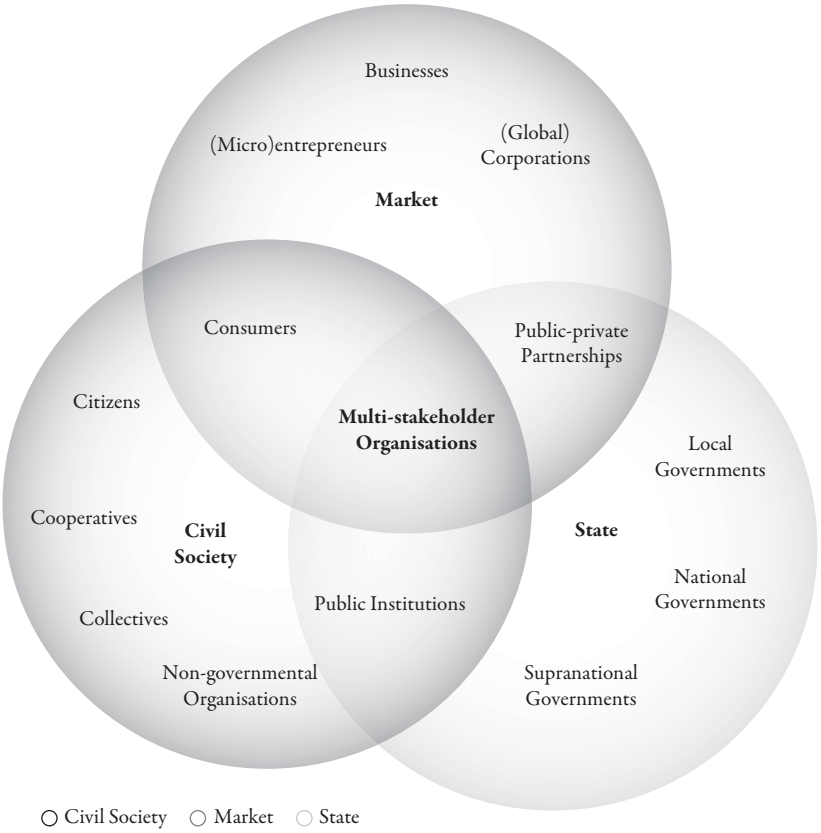

FIGURE 7.1. Schematic representation of actors from market, state, and civil society who shape the platform society; private and public actors cannot always be sharply distinguished and are partly overlapping. Collaborative efforts may be organized through multiple stakeholder organizations (figure designed by Fernando van der Vlist).

MARKET ACTORS

For the platform society to become democratic and sustainable, its various market actors—global tech companies, other (legacy) companies, micro-entrepreneurs, and consumers—need to put long-term public value creation over short-term economic gain. It is imperative to respect the position of all stakeholders, not just small and large businesses in the market sector but also civil society actors and governments. Responsible innovation starts with the inclusion of transparent values at the stage of design, acknowledging the various societal interests from the very onset (Taebi et al. 2014). This is not an easy task as values are contested and interests are fluid. What could various market actors do to add to a healthy democratic platform ecosystem?

Starting with the Big Five, we should reiterate the problem that they are wielding near-monopolistic power over essential infrastructural services while also deeply

penetrating every market and public sector of society (Dolata 2017). The argument that platform operators want to be classified as generic technology companies and "connectors"—rather than as "utilities" or "sectoral services"—has long served as an excuse to operate outside the regulatory parameters that traditionally organize Western societies (Napoli and Caplan 2017). The Big Five's powerful command over the platform ecosystem's infrastructural core is increasingly challenged by (legacy) companies in various sectors as well as by critical consumers, journalists, and public opinion.[8] After several incidents in 2016 and 2017, with disturbing live videos being streamed on Facebook, racist videos appearing on YouTube, and hate speech swamping Twitter, social network companies started to deal more proactively with filtering this type of content. Platform operators who were reluctant to police or moderate content began to act more responsibly as a result of mounting pressure not only from US Congress and consumers but also from advertisers who threatened to withdraw their ads.

At this point, an important dilemma arises. Users increasingly want sectoral platforms to assume responsibility and comply with professional codes and regulations in specific sectors, such as news. At the same time, neither users nor legacy companies trust Facebook and Google as editors-in-chief of globally circulating online content as long as they deploy opaque selection criteria and business models which primarily serve the interests of their infrastructural platforms. Facebook's Mark Zuckerberg has suggested that social network platforms can be both technologically agnostic and politically neutral. Indeed, social media have lowered the barrier for political participation, but that is precisely what makes them useful to extremists and manipulation. Deciding what content is repugnant or which groups should be barred from the platform requires a willingness to accept moral standards paired off with a sense of public accountability and professional responsibility. Facebook talks about "community standards" and asks users to help them with flagging fake news and hate speech, but as long as Facebook does not publish the criteria by which its own human editors are supposed to weed out banned content, collaboration with multiple stakeholders will be difficult (Gillespie 2018). In sum, global selection criteria and national or local accountability demands may be profoundly at odds—a dilemma we also have seen in the health sector.

Another problem that stems from power disparity is that users are simultaneously micro-entrepeneurs and consumers in the online marketplace, and yet they are not fully acknowledged as either one. Without users as co-producers of economic and cultural value, there would be no connective platforms. In spite of the fact that some platform owners close revenue-sharing deals with a few single productive users that draw huge crowds, for instance, a relatively small group of "influencers" on YouTube or Instagram, there is a growing resentment toward the tech giants'

unfair capitalization of human creativity and (micro-)entrepreneurship (Taplin 2017). That resentment also pertains to big platforms' extractive relationships with micro-entrepreneurs in the service industry. Drivers for Uber and food deliverers for Deliveroo have no clue as to how a platform's reputation mechanism defines price dynamics and gig offers. They also appear to have little collective bargaining power to negotiate better working conditions and lower commissioners' fees. Users are not appropriately respected as consumers either. They are effectively "products" whose behavorial data contribute to profitable services which they subsequently consume; "free" services somehow seem to disengage operators from procuring regular customer protection rights. We can hardly speak of a "shared responsibility" if platform owners refuse to open up their algorithmic procedures (e.g., their ad rating systems, revenue models, reputation systems, or selection criteria) to micro-entrepreneurs and consumers; both complementors and consumers should be able to access them so that they can control their practices.

Theoretically, users can decide at any moment—individually or collectively—to opt out of Google, Facebook, Apple, Microsoft, and Amazon services; in practice, opting out is hardly an option for users who want to participate in society or who simply need to make a living. The more the ecosystem turns into a global connective utilities-like infrastructure, the more citizens become dependent on that system for their private, public, and professional activities. We cannot simply assume that individual consumers are savvy enough to fend for themselves when it comes to protecting their digital rights. The intricacies of data flows and algorithmic processing are simply too complex for users to understand the conditions to which they "agree" by checking a box. As some legal scholars have argued, individuals can hardly be expected to comprehend the full consequences of a single terms of service agreement when even trained lawyers admit they are unable to grasp them (Moerel and Prins 2016). So for protecting their rights as consumers in a situation of profound information asymmetry, users are largely dependent on governments and legislation.

Although some of the Big Five platforms have taken steps toward building social trust, statements of shared public responsibility have been (intentionally) vague. Mantras like "making the world more open and connected," "accelerating science," and "promoting health" conceal actual contributions to public value. A first step toward a responsible innovative design could be to open up the deployed mechanisms of datafication, commodification, and selection to public scrutiny so that they become transparent to users in specific contexts and countries. Open markets require public accountability from its major platform operators: openness about its technological and commercial platform mechanisms; openness about who drives communication and circulation of messages, particularly political and issue-based messages; openness about what its users-consumers actually buy into if they ignorantly sign

terms of service. To understand private–public trade-offs, users need more clarification about sectoral vis-à-vis infrastructural power, about private versus public benefits. And, perhaps more urgently, users should be treated and respected as consumers as well as co-creators of economic and public value. The market can only regulate itself if the rules by which it is playing are transparent and open to all.

Secondly, platform owners and operators should start to realize that focusing on public values is a corollary to operating in Western democratic countries where checks and balances are anchored in institutional and legal frameworks. When Uber's management came under fire for a score of scandals including harassment of its drivers in June 2017, customers and shareholders demanded that the company clean up its act and meet societal demands. The Uber case may count as an example of good working market self-regulation, but cleanup acts tend to come rather slowly, if they happen at all. In December 2017, Facebook announced it would start booking advertising revenue in countries where it is earned, instead of rerouting it to Ireland where the tax burden is known to be much lower. Facebook's self-proclaimed insight that the company needs to provide more transparency to governments and greater visibility of locally generated sales and revenues to communities was more likely the result of a pending threat from European legislators to increase taxes on global digital companies. Abiding to rules for fair treatment of employees and reasonable taxation is part of a regulatory regime conventionally enforced by states and institutions. The question is whether the platform ecosystem is becoming less perceptive to governmental control now that the Big Five's power and capital are beginning to exceed those of states. We will return to this issue in the epilogue.

Thirdly, tech companies often complain that (European) governments put up expensive, regulatory obstacles to enforce public values onto market sectors, hence thwarting innovation and economic progress. Argued along those lines, implementing a value-centred design in the platform society would be bad for business as well as for users. This kind of "stymied innovation" argument has been deployed frequently with regard to the reduction of fossil resources, until it became crystal clear that changing the energy paradigm could also have substantial economic benefits. Designing a public value-centered platform society should be considered not a liability but rather an asset: a loss of public trust is ultimately a loss of business value. This was prominently illustrated in March 2018 when Facebook lost almost 10% of its market value after a whistle blower revealed that Cambridge Analytica had been illegally allowed to tap into the private profiles of 50 million Facebook users—information that was subsequently used to influence individual citizens with political advertising. Both American and European regulators have started to investigate this case, but the bottom line is that Facebook experienced a major breach of public trust that cannot easily be mended. Platform operators that welcome

and respect distinct contributions from government and civil society partners to revamp their design stand a better chance of succeeding in a sustainable platform society. This insight has increasingly dawned on some of the Big Five companies.[9] Technological fixes alone cannot remedy complex political and societal problems; it takes a decentralized and multistakeholder approach to tackle such problems. Let us now turn to those other actors to see how they may approach this concerted effort.

CIVIL SOCIETY ACTORS

Civil society actors are important partners in constructing a fair and democratic platform society; they first of all comprise engaged citizens but also nongovernment organizations (NGOs), cooperatives, and public institutions. The current ecosystem affords these actors a potent mix of empowerment and subjugation. But how can civil society actors help create and sustain a responsible platform society? What might be the role of engaged citizens, cooperatives, and public institutions in what Helbing et al. (2017, 12) have called a "new social contract, based on trust and cooperation, which sees citizens and customers not as obstacles or resources to be exploited, but as partners"?

Evidently, digital platforms can empower individual citizens to unite and to rally behind public advocacy efforts in order to influence democratic processes. Individual citizens are unlikely to influence big platforms' policies, unless they manage to take their case all the way up to the European court.[10] But individuals can muscle up collective power and become a force to be reckoned with because user metrics are one of the biggest currencies in the platform economy. For some time now, citizens have put their collective weight behind public concerns such as the right to privacy and access to one's own data as well as the right to fair and accurate information. Collective user protests have sometimes managed to marshal power against the big tech companies, forcing platform operators to change their ways, even if only temporarily (Van Dijck 2013). Putting pressure on advertisers appears a more effective strategy because platforms like Facebook and Google are remarkably vulnerable to negative publicity.

More generally, social media networks permit individuals to raise their voices for shared causes and connect at an unprecedented scale to pursue democratic goals (Bennett and Segerberg 2012; Castells 2012). A number of social movements that have evolved over time would have been unthinkable without the amenities of platform dynamics; as communication and organizing tools, social media platforms helped civil groups to act more as network nodes than as traditional social movement organizations.[11] Connective action has also been instrumental in

the organization of local communities, as we have seen in the case of community-led transportation services. Since 2003, a substantial number of nonprofit user collectives have built platforms; some have transmuted into market ventures (e.g., Couchsurfing, TeachersPayTeachers), while other collaborations operating at the local level were gradually marginalized or simply disappeared. The problem that nonprofit collectives face in the platform society is a strong dependence on commercial infrastructural platforms with built-in mechanisms that are tilted toward global scaling and cross-sectoral data-sharing. These mechanisms appear squarely at odds with any desire to operate at a local or national level and to keep data traffic decentralized. Democratic control indeed seems a heavily contested public value in the current global ecosystem where local sovereignity or personal ownership over data flows is rarely an option offered by the dominant platforms.

The positive force of connective action combined with the ideal of citizens as organizers of collectivity has led some to advocate a system of "platform cooperativism" to offer an alternative to the global corporate ecosystem. As Trebor Scholz (2016) wonders, can citizens design, organize, and maintain an ecosystem of like-minded cooperatives in spite of (or outside of) the influential ecosystem led by the big tech companies? Why would self-employed taxi drivers, public schools, and neighborhood groups not build, run, and own connective platforms themselves? Scholz's alternative does not just comprise a technological solution in the form of transparent data flows; his ideal of platform cooperativism also involves communal ownership and democratic governance, while different financing schemes and alternative legal rulings are indispensable to achieve his goal. In previous chapters, we have mentioned several interesting experiments with cooperative platforms, and there are many more.[12] While these efforts are viewed as viable alternatives by some, others have questioned their feasibility in the face of the current commercial ecosystem that capitalizes on a frictionless global user experience. Platform cooperativism may work well for small-scale communities, but it will not "spread" automatically to other cities and countries, so it remains dubious whether they can present a countervailing power to the Big Five's dominant position (van Doorn 2017a).

Indeed, there are very few examples of nonprofit and nongovernmental platforms that have been able to scale and establish a top-ranked position in the digital universe, while remaining true to their governance status. Arguably the most successful example to date of a nonprofit platform initiative on the Internet has been Wikipedia; ever since its creation in 2001, the "knowledge commons" has showed up consistently in the top ten of the most popular platforms, notwithstanding the fact that its laudable democratic ambitions are encapsulated within the corporate ecosystem.[13] Wikipedia's most important feature is its remarkable system of collective governance that combines procedural transparency with a respect for neutrality, and it is this

combination of pragmatism and idealism that has become the trademark of many "wikimedia commons" initiatives.[14] A growing concern about the lack of public space in an online world has led to a call for a "technology commons" supported and developed by nonprofit collectives and researchers. Commons-based peer production, a term coined by law professor Yochai Benkler (2006), embraces the principles of collaboration and co-development, sharing of data and source codes, and developing alternative reward and recognition systems (P2P Value 2017). While such initiatives are laudable attempts to provide an alternative to the platform ecosystem, so far they have managed to leverage little power if they are not supported by either Big Tech or governments.

The need for *global* civil society actors, whether NGOs or commons initiatives, to defend and secure a noncommercial, actionable public space on the Internet has been forcefully claimed over the past few years. Organizations such as Creative Commons, started in 2001 by Lawrence Lessig, and Tim Berners Lee's Open Society Foundation have unremittingly supported a democratic, fair, and secure Internet where citizens can exercise democratic control over information and data flows. They have been promoting open source and open data initiatives in an Internet environment that is increasingly determined by commodified mechanisms and proprietary algorithms, going against detractors who argue that these initiatives do not make a dent in the corporate system (Wittel 2016). In the spring of 2017, Tim Berners Lee, speaking for the sustained goals of the Open Society Foundation, revealed his three biggest worries regarding the future of the Web as a tool to serve humanity: the loss of control over our personal data, the ease at which misinformation can spread on the Web, and the obscure ways in which political advertising campaigns are now targeted directly at users. Pointing out the urgency of keeping the Web an open space for everyone, controlled by democratic forces and founded on principles of fairness and equal access, he stresses the need for NGOs and nonprofits to collaborate with companies *and* governments to negotiate the ground rules and common principles of a platform society.

Civil society initiatives are indeed direly needed, and there has been no lack of initiatives, particularly in Europe. Many plans for developing open source software or peer-to-peer platforms for civil society goals have been supported by state subsidies, but hardly any of them manage to scale from project to product.[15] Paradoxically, the foremost reason why these initiatives have a hard time succeeding may be *because* they have no centralistic, global business model and therefore do not fit the start-up logic of raising venture capital for scaling up. It is precisely this incongruency that may aggravate the power imbalance between market and civil society actors—an imbalance that may be remedied by collective action combined with collaboration with independent institutions and better regulation.

Finally, institutions such as schools, hospitals, universities, libraries, statistics agencies, and public broadcast organizations, which act independently from governments *and* corporations, have an important role to play as autonomous guardians of public values. Particularly in western Europe, public institutions still have a relatively strong position vis-à-vis the private sector, whereas in the United States public funding for education, health, and media has gradually dwindled. It is no coincidence that dominant corporate platform operators try to weaken the power of institutions by bypassing their *systems of trust* that were traditionally anchored in professional routines to ensure common knowledge. Think, for instance, of independent researchers and peer-reviewed methodologies; statisticians and agreed upon methods of analysis; doctors who ground their expertise in medical protocols, such as double-blind testing; and public media journalists whose editorial decisions and data policies need to be open to public scrutiny. Perhaps ironically, the corporate platform ecosystem that preferably bypasses public institutions and their "cumbersome" processes stands to profit significantly from data flows that are kept open so that they can be reused and repurposed.

For the past several years, institutions have actively pushed for open data and open online resources, particularly in the areas of health, science, and education. There is a broad consensus among researchers that open data and open science standards will expedite public accountability; opening up health research data can save lives, and making educational data open can help youngsters to learn. But in pursuing open data policies, public institutions as well as governments supporting openness have so far ignored the elephant in the room: the overwhelming majority of data are gathered *outside* of public institutions. Tech firms solicit user-generated data, which are subsequently processed by tech company's analytics tools, hence turning vital public resources into proprietary assets. Increasingly, scientists have to purchase behavioral and real-time health data as well as analytics tools from tech companies—an expense that public research can ill afford. Without reciprocity, data-driven markets will never become a level playing field. A communal definition of "openness" including fair rules for all stakeholders has yet to emerge. As it stands now, "open," like "sharing," will become an empty, nonreciprocal term; businesses can profit from open data produced by public institutions, while data and knowledge generated by users but processed by corporations become proprietary.[16] Once again, "open" and "public" are not the same things.

Independent public institutions should be encouraged to develop *public* data systems that are open, accountable, and fair. However, they often lack the expertise and financial support needed to develop a truly public alternative, as we have illustrated in chapters 5 (health) and 6 (education). So, while businesses get access to taxpayer-funded "open" data sets at no cost, at the same time they are effectively removing

public institutions from the marketplace because they weaken their position as producer and legitimate assessor of such data (Kitchin 2014, 61). When public data processing gets outsourced to the automated instruments owned and operated by high-tech firms, their measurements and interpretations are also withdrawn from the public eye, so in the long run, these institutions are effectively privatized. In this book, we have not touched upon national statistics agencies as trusted "accountants" of public information. Impressive statistical data sets processed and publicized by these institutions start to look tiny when compared to the data sets accumulated by high-tech and data companies. Google and Facebook arguably collect more valuable data about our economy or well-being every single day than official statistics bureaus may possibly generate in a year. Rather than relying on public statistics, whose tools were always open to being checked by other stakeholders, we are increasingly dependent on data analytics firms; their proprietary algorithms give them a competitive advantage, and they will not yield access to their measuring methods (Davies 2017).

Public institutions have always been anchors of contextualized accountability, for instance, in the form of professional codes and, more generally, as instruments of democratic control. They are in perpetual danger of becoming underfunded and understaffed. If schools, universities, or hospitals are cut off from innovation, they will become stagnant or obsolete. As it stands now, the global platform ecosystem threatens to undermine institutions' status as independent providers of common knowledge and public services. The gap between public and private knowledge gets aggrevated when experts' salaries in the private tech sector are much higher than anywhere else. The destabilization of public institutions comes at a moment when they are already weakened by the withdrawal of government funding and deregulation, particularly in the United States where political outcomes are defined by special interests rather than by the broader public good (Fukuyama 2014). Conversely, if institutions are stimulated to become active (co-)developers of online platforms, with a clear eye for ethical standards and a mandate for creating public value, they not only enhance a level playing field but also generate economic value. Such stimulus and support will have to come primarily from governments.

GOVERNMENTS

As argued earlier, good *governance* need not only come from *governments* but requires a joint effort by all actors. However, governments have historically been assigned the political power to run regulatory systems installed to protect citizens and consumers. It is up to governments to "develop coherent and publicly

accountable methods for identifying, describing, and responding to systemic threats" (Julie Cohen 2016, 374). The term "government" is often taken as a synonym for "regulation"—a term that typically causes widespread allergic reactions in Silicon Valley. Like the banking sector, high-tech companies extensively lobby politicians in Washington and Brussels in favor of self-regulation and against government intervention. Government bodies operating at local, national, and supranational levels can respond to the emergence of multisided, global platform markets in a variety of ways (Just and Latzer 2017; Musiani 2013; Mancini 2015). Besides enforcing the regulation of platforms, they can shift to interfering in the governance of platforms by articulating their public value demands to developers. Moreover, governments are not just *regulators*; they are also *users* and *developers* of platforms. We will discuss each of these roles in more detail.

Governments as Regulators

The task of governments as regulators of digital platforms is traditionally compartmentalized, with each level of government assuming a limited regulatory range. *Local* governments often negotiate public values with single platforms in specific sectors, as we have seen in the case of Airbnb with the city of Amsterdam and with Uber wanting to enter a local taxi market. Each city in each European country fends for itself when it comes to negotiating public values with digital newcomers and legacy companies, even though more recently some cities have started to coordinate their negotiation tactics.[17] This is both a blessing and a curse for platform companies. On the one hand, they profit from the absence of a single European market guaranteeing a level playing field; on the other hand, they have to deal with a costly variety of local and national legislations. While local authorities often lack the influence to remedy "systemic threats," as Julie Cohen (2016) called them, they can certainly leverage their assigned democratic power to send strong signals to higher-level governments. Local governments can muster power by actively articulating the public value standards to which platforms have to comply. Remember how São Paolo proposed a comprehensive online platform strategy to the entire sector by articulating its value-based demands for fair, accessible, sustainable, and affordable public transport in the city (chapter 4).

So far, few *national* governments have initiated comprehensive approaches toward platformization. Most western European states have left it to market players and local authorities to respond to what they call "market failure"—the inefficient allocation of goods and services. National governments have been rather slow to design sectoral strategies, often concentrating on just a few specific sectors, such as urban transport or hospitality. They have also singled out a few legislatory

frameworks, such as consumer rights or privacy standards for regulatory control. Partial approaches have resulted in some provisionary remedies with limited results. Studies on the sharing economy increasingly point toward the benefits of national governments designing comprehensive platformization strategies to ensure a fair and level playing field.[18] Such intervention can take several forms, including the regulation of algorithms, imposing oversight on data flows, and adjusting currently inadequate antitrust legislation (Sauerwein, Just, and Latzer 2015). In addition, national governments can and should take on generic disputes caused by platformization, such as labor relationships involving micro-entrepreneurs, as discussed in chapter 4.

As far as the European continent is concerned, the onus of regulatory accountability has come to rest with the member states in constant interaction with the European Commission. Regulation at the supranational level has proven to be most effective with regard to antitrust and privacy protection. Indeed, the 2.4 billion euro fine Commissioner Margrethe Vestager imposed on Google in 2017 and the effectuation of the GDPR in 2018 issued serious warning signals and had significant impact.[19] However, even if companies face big fines in the case of noncompliance, these single pieces of European regulation all but counter the core problems of the ecosystem—most profoundly because most (supra-)national legislation adresses one single concern at a time, such as privacy, competition, and antitrust issues; consumer protection; and business and taxation laws. What is missing is a comprehensive approach that tackles the widespread structural disparities of power, welfare, and economic opportunity in an online world—an approach that recognizes the interdependent nature of all these legal frameworks (Rahman 2017). Anchoring public values and the protection of the common good into the legislative blueprints of platform societies is a daunting project, where several hurdles need to be overcome.

The first difficulty is that most national legislatures simply *do not have a fitting vocabulary* to capture the socio-technical finesses of an evolving ecosystem of platforms that threatens to undermine many established societal arrangements. They also *lack a refined taxonomy* of techno-commercial mechanisms that can adequately delineate power relationships between various actors. Data flows, path dependency, sector-agnostic algorithms, vertical and horizontal lock-ins, active users as currency for value accretion, and search engine degradation (Stucke and Ezrachi 2016), for instance, are not part of a common legal discourse; and neither are "filter bubbles" or "personalization." Crucial concepts of regulatory oversight are still moored in a pre-digital, prenetworked system of governance leveled at local and state-based societies that all but match a platformized reality (Khan 2017).[20] In most (supra-)national legislation, the vocabulary of antitrust law, drafted to promote fair competition and to prevent monopolies or harmful mergers and acquisitions, does not accommodate the new conditions of interoperability at a cross-sectoral level and at a global

scale, for instance, when it comes to vertically integrated online ad services, aggregator news services, social media networks, and news content producers. As Martin Moore, founder of the Media Standards Trust in the United Kingdom, concisely puts it in his manifesto for a democratic platform society:

> The tools currently available to democratic governments—including legislation, regulation and taxation—are not well suited to dealing with the issues raised by the tech giants. These organisations are very large and transnational, often work to a different economic model to other corporations, and work in a communications environment that is fundamentally different from their predecessors. Until we better understand and communicate the dilemmas they raise, and until the public become concerned about the potential—or actual—threats they represent, it will be difficult to respond effectively. (Moore 2016, 59)

Another problem is that enforcement agencies that are assigned to execute regulation are *insufficiently equipped* to administer even the most basic form of accountability. Regulatory fixes require detailed insights into how technology and business models work, how intricate platform mechanisms are deployed in relation to user practices, and how they impact social activities. For instance, if digital bots impersonating humans should be outlawed, legislators first need the knowledge to understand how they function in order to develop the legal instruments to bar them. The same holds for requiring platform companies to be transparent about who is funding online political advertising: as we argued in chapters 2 and 3, platform mechanisms are very difficult to control because they play out across infrastructural and sectoral platforms. Moreover, they pertain simultaneously to constantly changing algorithms, obscure business models, and incomprehensible terms of service. Governmental regulators need specialized digital teams equipped with combined technical and legal knowledge to probe these complex mechanisms.

A third problem facing regulators and their enforcement agencies is that tech companies are allowed to thrive in a vague, nondescript operating space *between* infrastructural and sectoral platforms as well as *across* (public and private) sectors; under the current regime, these accumulations of market power elude the radars of public scrutiny. When data flows cannot be confined to a particular sector such as health, sector-specific risks appear to become unmanageable because data can be endlessly repurposed beyond the sector in which they were originally produced. So far, big tech companies have resisted any legislation that treats them like sector-specific companies, be it media, transportation, or health firms. By the same token, they defy any attempt to become regulated as infrastructural providers or utilities,

even if there has been a growing choir of public voices pointing at the possibility of such ruling in the United States (Lynch 2017; Swire 2017).

The European Court ruling which classified Uber a "taxi company" in 2017 was considered a milestone, just as the Google fine was considered a major step toward the break up of tech monopolies. However, there is still a long way to go for European regulators who are the metaphorical soldiers equipped with hammers and nails facing a well-furnished digital army resourced by deep pockets. Transnational organizations like the OECD have pleaded for the introduction of sophisticated methods of data analysis into law enforcement, "in order to detect and prevent concerted practices in the digital markets" (Organisation for Economic Co-operation and Development 2016, point 85). Preventing such "concerted practices," though, will take a concerted effort from regulators to coordinate what now seems like a patchwork of battles on many legal fronts: antitrust litigation, data storage and privacy laws, labor laws, national security, tax law, and more. While the negotiation to balance public and economic values in pursuit of a sustainable platform society should indeed be a shared responsibility, state actors have the ultimate duty to guard and protect public trust. For states to perform this role, they may need not see a government's function solely as defensive but also as proactive; besides regulators, governments are also users and developers of platforms.

Governments as Users and Developers

Governments and publicly funded organizations function as exemplary users of platforms that should be held to the highest standards of transparency and accountability. If government workers select corporate platforms to use in professional contexts, they are supposed to align their choices with reigning public values in their field. In the current platform ecosystem, though, they often have no choice but to succumb to built-in mechanisms, triggering fundamental questions about conflicting values. For instance, can a public school require its students to use Facebook's login or mandate the use of a Chrome notebook loaded with Google software as a condition to participate in educational activities, knowing that student data are shared with these companies?[21] Police officers and law enforcement agencies are now routinely using Facebook, WhatsApp, YouTube, and Twitter to monitor individual and group behavior online. However, the selection and filtering mechanisms built into their architectures are not free of biases, which may in turn replicate or amplify implicit values and lead to discrimination or ethnic profiling (Meijer and Thaens 2013). Researchers and medical doctors increasingly close deals with big tech companies where patient data are exchanged for analytics services, without looking carefully into the long-term consequences of this trade-off.

Public sector professionals and civil servants have a huge responsibility in handling platforms; they should at least understand the immediate and preferably long-term effects of platforms' architecture on their public mission. Teachers, police officers, and doctors can be held accountable for their appropriate deployment of platforms and handling of data; as public professionals, they should be exemplary users. And yet, every integration with the global ecosystem elicits questions about whether data flows and algorithms can be accessed in order to control their efficacy. Therefore, governments should be more demanding as proactive users: if they insist on value-centric-designed platform services, companies will have no other choice than to provide them. It is important to define at the national level which public values platforms should deliver in each sector and across sectors so that services can be aligned with those demands.

Besides being exemplary and demanding users, governments can also be proactive as *developers* of platforms. In the libertarian discourse prevalent in Silicon Valley, "government as developer" is often associated with the pejorative term "big government" where "big" equals inefficient and cumbersome. And yet, in the United States, as well as in many European countries, national governments and their institutions build digital services that are crucial in the daily lives of citizens, such as online taxation systems, digital ID services, electronic submission and application services, patient health systems, etc. Even if the implementation of these digital systems rarely happens without hiccups, part of the problem may have been a double-hearted approach toward the government's role as a central actor in the platform society. In a number of European countries, government institutions (tax authorities, social security agencies, census bureaus, cadasters, etc.) each developed their own information and communications technology (ICT) systems from scratch, oblivious to the fact that many of these systems might later need to become interoperable.

Very few states have so far developed the idea that governments can develop central plug-ins to be enforced on infrastructural or sectoral platforms. Think, for instance, of a calibrated digital taxi meter open to accountants that digital transport services should integrate in their platforms. Another example is identification services, an area that is now quickly monopolized by Facebook's and Google's login service. Estonia is often mentioned as an advanced example of a proactive government ready to shape its platform society. One single portal gives the citizens of "E-stonia" access to taxation services, identification, cadastral information, public libraries, personalized health information, public transportation services, and much more (Kalmus, Talves, and Pruulman-Vengerfeldt 2013). And in 2015, the United Kingdom initiated the government-as-a-platform approach to offer a comprehensible platform service developed as ICT modules made available through one online service point (GOV.UK 2015).

And yet, as Tim O'Reilly (2011, 2017) has persuasively argued, if governments want to weigh in as actors, it is inevitable they first design a comprehensive platform approach centered on public values and collective goals. Collaborating with citizens' groups, governments can become *facilitators of organized trust*. For European governments, the need for a public value–centered, platform-based, and data-driven ecosystem is quite urgent.[22] According to O'Reilly (2017, 173): "Just as companies like Google, Facebook, Apple, Amazon, and Microsoft build regulatory mechanisms to manage their platforms, government exists as a platform to ensure the success of our society, and that platform needs to be well regulated." Ideally, governments assign distinctive roles to public, private, and nonprofit platform operators, hence promoting a platform society with checks and balances. Governments can, for instance, mandate the use of a nationwide co-developed ID-verification system that is open to democratic control by various nongovernment stakeholders and which is subject to strict privacy and security rules. Countries like Estonia and Sweden have taken promising first steps toward such systems.[23]

Taking this concept one step further, one could argue that governments, nonprofits, and corporations could become participants in multistakeholder collaborations—independent cooperations that develop decentralized yet interoperable systems which put public values at the center of their design (Cowhey and Aronson, 2017). Rather than leaving the regulation of single platforms and market sectors mostly to local authorities, states can guarantee a level playing field where actors are held to conform to democratically agreed upon public values. This will help to create platform solutions that move beyond weighing sectoral costs and benefits and inject long-term public values into the system: democratic values pertaining to information accuracy, sustainability goals, collective costs such as social security and insurance, as well as the accessibility and affordability of services. For instance, to remedy the insidious problem of misinformation in a platform society, an independent High-Level Group instated by the European Commission (2018, 5) proposes multistakeholder collaborations between civil society groups, public institutions like universties, corporate platforms, governments, and news organizations that might "safeguard the diversity and sustainability of the European news media ecosystem."

Considering governments as developers and as partners in multi-stakeholder cooperations requires a more comprehensive approach to the platform society, an approach that reaches beyond governments' common roles as regulators and exemplary users. Whereas some municipalities see the "disruption" of local economies by platforms as an inevitable form of privatization, other cities may see it as an opportunity to revamp the collective system. As public developers, governments can proactively steer the platform society to achieve a balance between market, state, and civil society actors. States, after all, have always been entrepreneurial, taking the lead

in creating common infrastructures that ideally procure democratic values while generating economic value (Mazzucato 2013; Jacobs and Mazzucato 2016). Just as the United Nations sustainability goals can lead to a healthy combination of economic and public value and the Paris climate accord was meant to slow down climate change while also stimulating innovation, a responsible platform society requires forward thinking by governments. A mix of government intervention, regulation, and stimulus measures may enable collaborative frameworks and multistakeholder organizations that are better calibrated toward anchoring trust and accountability (Sauerwein, Just, and Latzer 2015).

A digital world in which large corporations have both an overwhelming market presence and the leverage to influence political actors gives rise to highly unbalanced *polities*. For democracies to work in the age of platformization, they need the concerted effort of all actors—market, state, and civil society—to build a sustainable and trustworthy global platform ecosystem, a system that comes equipped with distributed responsibilities as well as with checks and balances. Indeed, the question *who* governs the platform society and *how* it should be governed based on *what* values is complex and multifaceted. Most of all, it is a geopolitical issue that cannot be handled as a national or even supranational cause; therefore, in the epilogue of this book, we will return briefly to the geopolitics of platform societies. Even though geopolitics is distinctly not the focus of our analytical exercise because it is highly speculative, we feel a need to sketch the contours of its dynamics because the future of platform societies cannot be viewed apart from global political contexts.

EPILOGUE

The Geopolitics of Platform Societies

A CONNECTIVE WORLD requires a profound rethinking of the world's online ecosystems along with the political and legal infrastructures through which they acquire legitimacy. Therefore, we want to end this book by sketching a few scenarios on potential geopolitical consequences of this global paradigm shift toward multiple online platform "spheres." As we laid out in the first chapter, each of the world's two dominant platform ecosystems is firmly entrenched in its own ideological-political system. Over the past few years, we have seen a careful choreography positioning the two ecosystems vis-à-vis states and markets to compete for global power—a choreography in which politicians and business leaders are important props. Roughly put, the neoliberal US-based platform ecosystem is decreasingly deferential to sovereign governments or states now that the market value of the Big Five companies can compete with the gross national products of large countries.[1] Not surprisingly, Silicon Valley chief executive officers (CEOs) and investors have begun to behave like politicians; in August 2016, Peter Thiel supported Trump's candidacy for the US presidency, while Mark Zuckerberg was widely rumored to be planning to run for president in 2020.[2] Libertarian ideologies promoting values such as individualism and minimal state interference like to leave any kind of checks and balances up to the market itself. With the current Republican-led government in place, we can hardly expect any serious effort from state actors to curb the Big Five's expansive powers

in the digital world. Perhaps in a twist of irony, the US government may become increasingly dependent on a corporate platform infrastructure to help curb foreign states' meddling in national affairs, as became clear in the aftermath of Russian meddling with the 2016 American elections and in the wake of the Cambridge Analytica scandal in 2018 which exposed Facebook as a company that puts commercial gain over user privacy.

On the other end of the ideological spectrum, in China, we find an autocratic regime that controls the platform ecosystem via regulated censorship of tech corporations. If the Cyberspace Administration of China decides to ban specific apps, corporations have to comply with these rules.[3] US platforms wanting to operate in China increasingly cave in to the government's rules on censorship in order to expand their businesses into the largest Asian market.[4] More interestingly, though, China has allowed a rapidly growing market of for-profit institutions which are selling data services (analytics, cloud computing) to help local domestic governments' surveillance of online opinion and activities (Hou 2017). With the emergence of China's own Big Five tech corporations came the stellar rise to fame of iconic entrepreneurs like Jack Ma (Alibaba), Pony Ma (Tencent), and Robin Li (Baidu). Over the past decade, these Silicon Valley–modeled CEOs promoted a Western-style liberal ethos of entrepreneurial success while appeasing party officials to execute a "collectivist national agenda that calls for mass innovation, in which the revitalisation of the nation is first and foremost" (Keane and Chen 2017, 1). Significantly, two of the world's most diverging ideological-political systems have come to rely on digital ecosystems that are remarkably similar in terms of their sociotechnical operation and political-economic governance.

Squeezed between the US and the Chinese models is the European Union, whose member states neither own nor operate any major platforms in either ecosystem but are largely dependent for their online infrastructure on mostly US connective platforms.[5] Over the next few years, it will be crucial for Europe to develop an encompassing strategy with regard to platform societies—both in economic market terms and in ideological-political terms. For European democracies to survive in the information age, its cities, national governments, and supranational legislature need to collaborate on a blueprint for a common digital strategy toward markets and public sectors. European platform societies' reliance on the American ecosystem and its pervasive mechanisms—datafication, commodification, and selection strategies—is now so substantial that member states ought to take stock of the ways in which their democratic systems have become vulnerable to the inconspicuous manipulation of "friendly" and "unfriendly" forces. And "forces" may refer equally to the Big Five platform ecosystem as well as to hostile regimes trying to meddle with a state's sovereignty. European countries and the European Union need to respond to

urgent questions concerning the viability of its public sphere in face of two platform ecosystems that each in its own way exerts unprecedented power over their societal organization which happens largely through the internet.

What we are currently witnessing in terms of geopolitical relationships being shaped by the new material and political realities of a rapidly transforming Internet is just the beginning. With the emergence of artifical intelligence, robotics, and the Internet of things, the challenges are going to be even more formidable. Large states are starting to compete *and* cooperate with globally operating platforms in a political arena where nothing less than a new world order is at stake—a world order where individual users are a collection of data points and where communities are fluid, temporary, and manipulable collections of individual users. In such a scenario, nation-states are decreasingly equipped to counterbalance what Saskia Sassen (2006, 185) calls the formation of "global assemblages" of capital and technologies that are—or consider themselves—more authoritative than states in providing public goods and services; she argues that we are past the "tipping point" that tilts the "private–public divide" toward data-driven high-tech companies, hence derailing the power of national governments and institutions. Some political scientists have come to call this the "postdemocratic" scenario: the nexus of political–corporate–media elite empowered by globalization creates political regimes that overemphasize economic growth and corporate-friendly priorities. Although these societies continue to use all the institutions of democracy, they become no more than a formal shell (Crouch 2004).

If the European Union states want to maintain their historical preference for a democratic welfare state model, it is clear that they cannot expect markets to regulate themselves while also being protectors of the public good. Local, national, and supranational bodies will need to be both protectors and promotors of public values and the common good. Evidently, they need to protect public values by updating relevant legislative frameworks and regulatory instruments. They can also be instrumental in pioneering new forms of multistakeholder governance that combine the benefits of borderless interaction with the concepts of institutionally anchored trust—not to displace national sovereignty but to strenghten and enhance democratic public values (Mueller 2017). Indeed, governing a digital platform society may become a European project that helps overcome the perils of disintegration by designing a platform society that has public values at its core, that is cemented in a multistakeholder agreement, and that defends the notions of common good and common ground. Needless to say, such a vision needs political courage and a lot of confidence and imagination from all actors involved: platform companies must commit themselves to a healthy and balanced ecosystem, while acknowledging the role of state and civil society actors in setting the rules of transparency that should govern the platform ecosystem.

More practically, European states may need to focus on a number of essential infrastructural services, such as online ID services and regulatory oversight to protect consumers' and citizens' freedoms and rights. Governments can no longer afford to restrict their focus to individual sectors; they have to develop a comprehensive cross-sectoral strategy toward the platformization of transport, education, finance, retail, labor, and many more areas and define a strategy toward public sectors that traditionally harbor the common good, such as education and health. Some governments have already taken the initiative to do so. Europe may not be able to start from scratch, but as a supranational force, the European Union could be the first to articulate a value-centric design for a platform society that is forward-looking and respectful of humanistic values. What will labor look like in the future? How do we secure social equality between groups of citizens? How will collective costs be paid for? How can taxation of global tech companies be made fair and mindful of communal benefits?

Independent institutions and a strong civil society are European nations' most defining features; it is the decentralized and diverse nature of Europe's democracies that is both its strength and its vulnerability in the face of competing global platform ecosystems. Its institutions and civil society actors need to be supported morally and financially because they are crucial in the procurement of a balanced ecosystem if we want to maintain checks and balances on states and corporations. From a European perspective, the struggle to define public values in an online world requires not only an acute awareness of how online connectivity works and how its current infrastructural architecture puts collectivity under strain. A comprehensive approach to sustainable and democratic platform societies starts by skecthing a societal design based on a shared concern for the common good and public values—even if these values are often embattled and contested. In fact, their very contestation is testimony to the essence of open democratic societies, namely a continuous debate over cultural ideals, moral standards, and social orders. Articulating diverging values is the first step toward the invention of a platform ecosystem that protects diversity, liberty, and solidarity.

Notes

INTRODUCTION

1. Tarleton Gillespie (2010) was the first to theorize "platform" as a metaphor with an expansive set of layered meanings, including its technical, metaphorical, political, and physical aspects. More recently, Gillespie (2017) further elaborates on this metaphor, arguing why it is at once inevitable and misleading. Although the term highlights certain aspects of online services (equality, openness, sturdiness), "platforms" dangerously downplays others (they are not flat, they are populated by diverse communities, and they elude questions of responsibility). The first chapter will reflect on the "in-betweenness" and hybridity of the platform concept.

2. "Users" is a very general term that not only refers to end users of platforms but more broadly includes any entity that is facilitated by platforms to produce, consume, or aggregate content or services; so businesses and institutions can also be touted as "users." The term is also (intentionally) vague in referring simultaneously to consumers, citizens, (micro-)entrepreneurs, etc. In the remainder of this book, we will not bracket the word "user"; but in various chapters, we will reflect on its strategic vagueness.

CHAPTER 1

1. In March 2016, the Amsterdam mayor and the Executive Board of the Municipality agreed on the Amsterdam Sharing City Action Plan. The plan concludes that "the sharing economy is not a question of ban or authorize, but of monitor and seize opportunities where possible" (ShareNL 2017).

2. In January 2018, the sixty-day limit was further reduced to thirty days.

3. We knowingly skip a level of operation here: platforms are built onto the Internet, the technical infrastructure that is made accessible only through Internet Service Providers (ISPs).

Although ISPs may also be nonprofit or community-owned, they are typically commercial businesses such as Verizon, Comcast, Charter, CenturyLink, and Cox. In 2015, the rules for net neutrality—the idea that all data are treated equally on the Internet—were enforced both in the United States and in Europe. In the United States, the federal government reclassified ISPs as "common carriers," a public utility–type designation that gives the Federal Communications Commission the power to more closely regulate the industry. In Europe, the first European Union–wide rules on net neutrality were accepted in June 2015. In December 2017, the Trump administration revoked the net neutrality law; and at the time of revising this book, it is still everybody's guess what happens next.

4. The distinction between micro, meso, and macro levels of platforms is kind of similar to the framework stipulated by Andersson-Schwarz (2017).

5. According to Webopedia (2018), an API is "a set of routines, protocols, and tools for building software applications. An API specifies how software components should interact. Additionally, APIs are used when programming graphical user interface . . . components." For a more precise description, see Bodle (2011).

6. Facebook's News Feed algorithm, for instance, calculates 100,000 factors into what personalized content a user gets to see (McGee 2013). It is very hard, if not impossible, for outsiders to know how algorithms work and to what effect they are tweaked.

7. Ownership status can be defined by several elements: in very general terms, platform operators can be for-profit or nonprofit. For-profit companies can have a private owner or a public (stock-based) owner. In the case of Facebook, the majority of voting rights (in spite of a minority of stocks) is controlled by Chief Executive Officer (CEO) and founder Mark Zuckerberg. In the case of Uber, the company is controlled by shareholders who, in the fall of 2017, took over the company's management from founder and CEO Travis Kalanick. There are also "public benefit corporations," such as Kickstarter. Nonprofits that own and run platforms can take various forms, including foundations such as the Wikimedia Foundation that funds Wikipedia on the basis of donations.

8. See, for instance, a journalistic report on the rocky transformation of Couchsurfing's direction and its business model (Roudman 2013); see also the story of a disappointed Couchsurfing member (Coca 2015).

9. User valuation means that the more (regular) users a platform has, the more valuable a platform becomes; user valuations have pushed the stock market value of platforms that subsequently became takeover bait.

10. Airbnb charges fees paid by the guest range between 6% and 12% depending on the price of the booking. Airbnb also charges the host 3% from each guest booking for credit card processing. A new provision in Airbnb's service terms in 2016 stated that the platform can share personal information of its users with affiliates and third parties for the purposes of targeted advertising—a condition that could worry users concerned about privacy breaches.

11. The Terms of Service are constantly updated and changed, either as a result of new laws and regulations or as a result of changing business models. According to Obar and Ouldorf-Hirsch (2016), 74% of users ignore privacy policies and ToS when they download an app, and even if they do a quick read, they spend less than a few minutes reading them. See also Pringle (2016).

12. For an interesting explanation of what is behind these changes in Airbnb's terms of service, see Giacomo (2016).

13. US digital ad spending is an $83 billion a year market. In 2017, Google accounted for almost 41% of US digital ad revenues—more than double Facebook's share. Google is absolute leader in the market of search ad revenues with roughly 78% of all revenue (eMarketer 2017).

14. One might argue that Twitter, Yahoo, Reddit, and Snapchat are still independent infrastructural platforms; but their influence compared to the Big Five platforms is marginal. There have been several attempts by the Big Five to buy up these social network services but, so far, unsuccessfully. Facebook and Google are keen imitators of some of these platforms' popular features—think of Facebook's imitation of Snap features.

15. Alphabet, for instance, owns and operates sector-specific platforms, such as aggregators Google News and Google Health, as well as Google Apps for Education and Google Scholar. Moreover, Alphabet has invested substantially in other sectoral platforms: it owns shares in 23andMe (genetic coding services) as well as Uber, while also investing itself in driverless cars through Waymo. Apple has invested in its competitor Lyft.

16. Amazon has branched out into television production with Amazon Studios as well as Game Studios. Amazon Retail is also planning to set its footprint in brick-and-mortar grocery stores and pickup stores signaled by their acquisition of Whole Foods in 2017; Google Express (Alphabet's online shopping mall), around the same time, announced a coalition with Walmart to explore the retail branch. And in July 2017, Facebook started its own television service, Watch, a platform inside the main Facebook app that will host professionally produced video series, such as reality shows and premium content.

17. One could argue that Uber wants to position itself as an "aspiring" infrastructural platform because it is expanding its connective transportation services to a number of sectors other than urban people-transport markets, such as Uber Eats, a restaurant delivery service.

18. The term "platformization" has been extensively theorized by various scholars. Anne Helmond (2015) defines "platformization" rather narrowly as the transformation of the web with interconnected APIs to allow platforms to more easily collect data beyond themselves. We take this technical definition one step further and define it as the transformation of an industry where connective platform operators and their underpinning logic intervene in societal arrangements.

19. As Tom Goodwin (2015) observed, "Uber, the world's largest taxi company, owns no vehicles, Facebook, the world's most popular media owner, creates no content. . . . And Airbnb, the world's largest accommodation provider, owns no real estate." Setting itself apart from normal societal sectors apparently warrants these platforms a separate status.

20. A myriad of new small and medium businesses around platforms have emerged, such as cleaning services for Airbnb hosts.

21. Perhaps a sign of the times, much of mainstream formalistic economics has come to bracket complementors, despite their structural importance, to the abstract category of "externalities."

22. Obviously, power relations between state and markets vary per country, most certainly between the United States and most Western-European countries. European countries have traditionally relied on a large public sector, but over the past four decades, marketization transformed formerly public sectors into hybrid public–private entities, even in Europe's welfare states like The Netherlands, Germany, and Sweden.

23. This focus on user activity is echoed in the tenets of many social science researchers who subsequently ignore the techno-commercial affordances inscribed in the ecosystem's architecture.

24. While the world's leading digital platform businesses have a combined market capitalization of $4 trillion, only 4% of this value has been generated by European firms (Evans and Gawker 2016).

25. Baidu operates the largest search engine in China (comparable to Google Search) as well as several social networks; Alibaba controls the largest Chinese online warehouse, comparable to Amazon and Walmart in the United States; the company also exploits cloud services and a major online pay system. Tencent is the owner of WeChat, the largest online messaging service in China. And Jingodong Mall (JD.com) operates the largest Chinese shopping service and ranks number three on the list of the world's largest online platforms.

26. After years of trying to implement their major services into the Chinese system, Facebook and Google have withdrawn from China because they were unable to align their platform architecture with the government's political demands, including censorship policies and mandatory data sharing. WhatsApp was the latest platform running into China's Internet filtering and controlling system in the summer of 2017. In 2016, Uber withdrew its taxi-driver service from China; instead, Uber joined the Chinese platform Didi, which controls 95% of the Chinese ride-share market, Uber now holding 20% of its market share. Apple has been the most successful company doing business in China: in 2017, it opened a data center in cooperation with a local Chinese company, Guizhou-Cloud Big Data Industry.

27. One example of an unsuccessful effort at expanding platform power is provided by Facebook. In 2015, Marc Zuckerberg launched a nonprofit organization, Internet.org, in India to lobby for the right to offer free Internet access ("Free Basics") in exchange for granting Facebook the position of obligatory gateway to all Internet traffic. After a major lobby offensive, India decided not to accept Facebook's conditions and blew off a deal with the American company.

28. Some scholars have proposed a so-called Rhineland model that would offer a viable alternative to the American or Chinese model. The Rhineland model presumes a government that is actively involved in social issues, such as poverty, the environment, public space, education, and health. In general, the Rhineland model advocates a strong public sector and government regulation. For social democracies, as most European countries are, the Rhineland model implies substantial taxation of its citizens to support public services and strong independent institutions (Peters and Weggeman 2010). Other academics have suggested a "peer-to-peer" model that puts the onus on cooperatively organized platforms to serve the needs of citizens and consumers (Scholz 2016; Bauwens and Lievers 2013).

29. After the so-called right-to-be-forgotten ruling issued by the European Court in 2014, the General Data Protection Regulation is arguably the second largest supranational policy act that requires American platform owners to adjust the techno-commercial architecture of platforms in order to facilitate public values and citizen rights (Goodman and Flaxman 2016; Solove 2011).

30. In January 2018, Facebook announced a major overhaul of its News Feed feature, to give preference to "personal items" over "passive content." We will return to Facebook's attempts at taking responsibility over its social network effects in chapter 7.

CHAPTER 2

1. For example, in chapter 6, we encounter health and fitness platforms that sell data gathered from app users to public institutions and companies. The personalized health platform

PatientsLikeMe, for example, sells user data to large pharmaceutical companies, which use them to develop and improve products.

2. Axciom, one of the world's leading companies in data analytics, headquartered in Arkansas, started to partner with Facebook in 2013, raising questions about privacy infringements. In 2014, the Federal Trade Commission was asked to probe a deal between Datalogix, a consumer data collection company from Colorado, and Facebook, to see if it violated privacy issues.

3. The "freemium" strategy originates from the shareware software distribution model, in which proprietary software can be used for a limited trial period, after which a license must be bought to continue using the software. Since 2006, the term "freemium" has been used for this model.

4. An interesting variant of reputation mechanisms is one that allows users to promote themselves and their work via platforms. Politicians, activists, and news organizations try to reach as many friends and followers as possible through Facebook and Twitter. Taxi drivers solicit positive ratings and reviews on Uber. And academics use ResearchGate and Academia.edu to promote their academic standing and boast citation scores. Self-promotion, soliciting reviews, and monitoring numbers of stars, likes, retweets, views, downloads, followers, and enrollments has become a standard routine for many users.

5. As Foucault (2004) has pointed out, the development of the liberal mode of governance through bio-political techniques, in the eighteenth and nineteenth centuries, is closely tied to the continuous measurement and targeting of living beings understood as population. Calculation in the form of political arithmetic, population statistics, and political economy has, consequently, become a central rationale of governance (Elden 2007).

CHAPTER 3

1. We have used the term "fake news" only between quotation marks in this chapter as it is difficult or impossible to draw a line between what we consider "fake" and what we consider "real" or "factual" news. There is a large middle ground between intentionally deceitful news stories and factual reporting. Consequently, we prefer the term "disinformation" to refer to false information spread deliberately to deceive.

2. In practice, the Facebook Journalism Project entails, among others, the collaborative development of "new storytelling formats," the promotion of news literacy, and the training of news organizations and journalists to work with Facebook's data tools and monetization programs.

3. In 2006, the sales of classified ads by websites in the United States surpassed those of newspapers for the first time (Carr 2008, 152).

4. Research by the Reuters Institute in the United Kingdom and the Pew Research Center in the United States showed that by 2012 about 30% of digital news consumers indeed got news through search engines (Mitchell and Rosenstiel 2012; Newman 2012).

5. In terms of user traffic, aggregators are certainly successful. In May 2017, Yahoo! News and Google News were the top two most popular news sites in the United States, generating double the traffic of the leading legacy news organizations, CNN, the *New York Times*, and Fox News (eBiz 2017).

6. Across Europe there are, however, significant differences, with some countries remaining on the low side of social media news use (Germany 31% and United Kingdom 35%), while other countries are characterized by much higher rates (Greece 74% and Turkey 73%) (Newman, Levy, and Nielsen 2016, 8).

7. Social media are especially important for young people (18–24), constituting their main source of news (28%), beating television (24%) and other offline and online media (Newman, Levy, and Nielsen 2016, 7).

8. Across all twenty-six examined countries, Reuters found that an astounding 44% of these countries' populations get news through Facebook, which almost equals the total share of people who get news through social media (Newman, Levy, and Nielsen 2016).

9. For example, Twitter's analytics tool, launched in 2013, yields metrics concerning numbers of mentions, retweets, replies, link clicks, impressions, and engagements on the platform. Moreover, the tool provides insight into the gender, location, and interests of followers (Twitter 2015). Facebook Insights, in turn, gives companies and organizations that use Facebook Pages metrics concerning the number of page likes, unique users, and demographics of users. It also provides information on when followers are online and what type of post (e.g., "status update," "photo," or "video") generates the highest reach and engagement (Facebook 2018).

10. Within a few years, Chartbeat has become a ubiquitous presence in newsrooms across the globe, servicing over 50,000 media sites, including the top 80% of publishers in the United States (Petre 2015; Cherubini and Nielsen 2016).

11. Since its inception in 2005, HuffPost has expanded its staff and reach, launching local editions, including HuffPost Chicago, New York, and Los Angeles, as well as French-, Spanish-, German-, and Italian-language editions. BuzzFeed followed a similar trajectory. Starting in 2006, it transformed from a content aggregator and "viral lab" into a global media and technology company. Today, it employs 1,300 people and has developed editorial operations in, among other countries, the United Kingdom, France, Australia, Brazil, India, and Germany. In terms of user traffic, it is right behind Yahoo! and Google News but outperforming CNN and the *New York Times* (eBiz 2017a, 2017b).

12. Ky Harlin, BuzzFeed's director of data science, explained in an interview that his team systematically processes such data through "machine learning algorithms that help us map out the relationship between those variables and shareability" (Oliver 2014).

13. MacGregor (2007, 294), drawing from interviews with senior journalists from, among others, the *Financial Times*, the BBC, and CNN, observed that online data are only "sometimes viewed with great intensity—'obsessively'—to deliver a variety of editorially significant messages." Yet, most of the time, "news and brand values" continued to "influence journalists towards traditional behaviours" (280). Similarly, Dick (2011) and Singer (2011), respectively studying news production at the BBC and at local newspapers in the United Kingdom, came to the conclusion that in the end editorial independence still wins out over the many available metrics and search engine optimization and social media optimization tactics. This is also the conclusion reached by Graves and Kelly (2010) in their interviews with journalists from, among others, the *Wall Street Journal* and the *Miami Herald*.

14. The report, authored by a committee headed by the publisher's son, Arthur Gregg Sulzberger, concluded that the *New York Times* newsroom was too focused on the front page of the print newspaper, whereas it should be focusing on becoming a "digital first" newsroom—the *New York Times* was increasingly falling behind its digital competitors HuffPost and BuzzFeed, which were making new investments in quality journalism while "Facebook, Twitter and LinkedIn waded deeper into the journalism business by hiring editors and announcing new products" (Wills 2014, 14).

15. For example, at the *Guardian* all editors are expected to regularly check the metrics provided by the in house–developed analytics tool Orphan—the idea being that staffers can improve

how their stories perform and provide additional information to readers on the basis of these data. At the end of 2015, the newspaper reported that the tool was indeed widely used by employees, who are provided with real-time data on individual articles regarding page views, attention time, readers' location, and social shares on the leading platforms (Cherubini and Nielsen 2016, 14).

16. According to Turow (2012, 78), the average CPM for major print newspapers is about $50. Online, these newspapers can sell about 20% of their advertising positions through direct sales for $25 to $40 per CPM. The remaining 80% remains unsold and is auctioned off through ad networks from Google, Microsoft, ValueClick, Adbrite, etc. at a CPM rate of $2 to $4.

17. Research by the Tow Center for Digital Journalism shows that there has indeed been a huge uptake of these programs. In early 2017, all of the fourteen news organizations examined by the Tow Center, including BuzzFeed, HuffPost, the *New York Times*, the *Washington Post*, CNN, and Fox News, published content through one or multiple platform hosting programs (Bell et al. 2017, 24).

18. This type of advertising gives publishers an edge over online platforms, which do not produce professional content. And it provides the opportunity to capitalize on the exponential growth of online video consumption: branded videos are central to many native advertising campaigns and especially important in mobile advertising (Sasseen, Olmstead, and Mitchell 2013; Trimble 2015).

19. The algorithmic curation of News Feed is primarily driven by friend relationships, user interests, and engagement (DeVito 2017). Discussing the values that guide the development of the News Feed's algorithms, Facebook emphasized in 2016 that it predominantly focuses on "projects that try to help people express themselves with their friends or learn about their friends or have conversations with their friends." To illustrate the point, the company subsequently tweaked the News Feed algorithms to enhance the prominence of posts by friends over those by news organizations (Manjoo 2016).

20. Reviewing its internal data, Facebook, for example, found that "touching, emotional and inspiring stories" and "provocative, passionate debates" generated two to three times the engagement of other stories (Osofsky 2010). This conclusion appears to hold up across different cultural settings and social platforms (Berger and Milkman 2012; Chen and Sakamoto 2014).

21. While HuffPost is more focused on general interest news and BuzzFeed on shareable content, their most viral items clearly fall in either the infotainment or breaking news category. At the time of this writing, the headlines of the top "trending" HuffPost US posts read as follows: "Bizarre Video Shows Runaway Toilets Chasing People During Storm," "Chiropractor's Car Seat Carrier Hack May Just Change Your Life," "Kentucky Official: All the State's Bourbon Wouldn't Make Fed Voter Demand Seem Sensible," and "Trump Just Undermined the Work of His Own 'Election Integrity' Probe." In turn, BuzzFeed's "Trending Now" posts were as follows: "16 Confessions from People Who Work in Porn That Might Surprise You," "Order an Expensive Meal and We'll Tell You the Age of Your Soul," "Which Weird National Day Falls on Your Birthday?," and "The Founder of the Disastrous Fyre Festival Has Been Arrested and Charged with Fraud."

22. Explaining why BuzzFeed has made a large effort to develop investigative journalism, Chief Executive Officer and founder Jonah Peretti maintains that the majority of BuzzFeed users are between 18 and 34 years old and highly educated. "Those are people who are interested in politics and in business and in sports and in news, and all these other things. They weren't getting it from BuzzFeed. But that audience is hungry for those things" (Geddes et al. 2013).

23. Note that the insulated media system discussed by Benkler and colleagues is not the same as a filter bubble. They maintain, "Our analysis challenges a simple narrative that the internet as a technology is what fragments public discourse and polarizes opinions, by allowing us to inhabit filter bubbles or just read 'the daily me.' If technology were the most important driver towards a 'post-truth' world, we would expect to see symmetric patterns on the left and the right. Instead, different internal political dynamics in the right and the left led to different patterns in the reception and use of the technology by each wing. While Facebook and Twitter certainly enabled right-wing media to circumvent the gatekeeping power of traditional media, the pattern was not symmetric" (Benkler et al. 2017).

24. ProPublica's nonprofit newsroom is an interesting example of the collaboration between a network of nongovernmental organizations and academic institutions, aiming to enhance the quality of contemporary journalism by assisting news organizations in developing investigative journalistic work. One of the key ways in which it pursues this objective is by producing "data rich news applications," which can be used by other news organizations. A prominent example is the "Dollars for Docs" project, which enables journalists and regular users to check payments received by US doctors from pharmaceutical companies. The nonprofit newsroom supports investigative journalism across the entire news ecosystem.

CHAPTER 4

1. Especially its UberPOP service, a digital platform service that allows private car owners to offer themselves as drivers to other citizens, has been under attack. Incumbent taxi operators see the service as a form of unfair competition as these private drivers do not comply with official regulations. By the end of 2016 some of Uber's services had been outlawed or restricted in countries like The Netherlands, France, Germany, Italy, Spain, and Belgium (Robinson 2016; Sundararajan 2016). Similar cases have been brought against other transportation network companies. For instance, regional authorities in Madrid fined BlaBlaCar, a ride-sharing service that matches private drivers with passengers traveling to the same destination, for operating without the proper authorization (Scott 2016).

2. See also Josh Cohen (2016), Shaheen and Chan (2015), and Shaheen et al. (2015) for overviews and categorizations of urban transport platforms.

3. The rise of these platforms is often discussed in the frameworks of collaborative consumption (Botsman and Rogers 2010a) or the sharing economy (Van de Glind and Van Sprang 2015). The term "sharing economy" has been (mis)used so broadly that Frenken and Schor (2017) have proposed a differentiation between various instances. They reserve the term "sharing economy" for "consumers granting each other temporary access to under-utilized physical assets ('idle capacity'), possibly for money." In relation to transport this would include car- and ride-sharing services such as BlaBlaCar or SnappCar. This is different from ordering a ride (a service) through platforms such as Lyft and Uber as these lead to additional use of resources (Frenken and Schor 2017). The latter is often called the "gig economy." This distinction can be useful for regulators when they have to decide whether a particular transportation offer should be classified as a commercial service or rather as an informal practice in which citizens are helping each other out.

4. Companies or local governments can also act as complementors when they make their vehicles or other mobility-related resources such as parking spaces available through these platforms.

5. As various scholars have pointed out, the rise of these platforms may lead to a shift from "ownership" to "access" in which transport becomes envisioned as a "service" that citizens can access on demand, rather than it being tied in with managing ownership of a private car (Dillahunt, Arbor, and Malone 2015; OCU Ediciones SA 2013; Ranchordas 2015; Rifkin 2014; Schor and Fitzmaurice 2015; Stokes et al. 2014). In the end, of course, someone needs to own the cars and manage the fleet, which may explain the recent interest of car manufacturers and rental car companies in setting up these access-based schemes.

6. One of the more advanced instances of these apps is currently piloted in Helsinki. There, the Whim app gives customers access to car-sharing, public transport, and taxis, all from a single app, including an integrated payment system. Similar services have been operating in Vienna and Hannover (International Association of Public Transport 2017).

7. As various media have reported, in early 2015 Apple almost decided to delete the Uber app from its appstore after the company had violated its terms of service (Isaac 2017b).

8. In addition, the European car-sharing platform SnappCar allows users to display links to their social media accounts on their profile pages so that other users can gauge their trustworthiness.

9. Apple maps has also started to integrate information about transport services on its platform.

10. For instance, Google Ventures has invested in peer2peer car-sharing service Turo. A traditional car rental company such as Europe Car has taken a stake in SnappCar, whereas Avis now owns Zipcar. Car producer Daimler owns Car2Go as well as Moovel. General Motors has invested in Lyft, and both Google Ventures and Microsoft have invested in Uber.

11. Other examples are so-called micro-transit services offered by companies such as Bridj. Bridj offers transportation in vans that can stop on request on routes that themselves can also be managed much more flexibly. Customers use an app to indicate their current location and destination, and stops and routes can be adjusted based on this information.

12. For instance, public transport providers in Dallas and Atlanta allow customers to book an Uber taxi for their first or last mile connections to and from transit stations directly through their own travel apps (Jaffe 2015b). In Los Angeles and Minneapolis public transport companies offer Uber rides as a backup for customers who need more flexibility in their schedule, for instance, if working late prevents them from taking the train back (Jaffe 2015a). Conversely, in a number of markets Uber now offers public transit information once passengers approach a terminal (Levy 2017). Similarly, Transloc, a company that develops technology services for public transport companies, has struck a deal with Uber to offer the service in its real-time travel planning apps (Sommerville 2017).

13. Uber offers subsidized rides in Pinellas Park, Florida, whereas Lyft has been contracted by Centennial, Colorado, to provide subsidized transport services (Brustein 2016). Innisfil, a Canadian town near Toronto, also contracted Uber for subsidized transport services (Smith 2017).

14. The company did enter into a voluntary agreement with the city of Boston, but that was not a big success because the kinds of data made available and shared with city managers prevented useful analysis. For instance, data were aggregated at zip-code level, which turned out to be not fine-grained enough for a local transport company to get insights into its operational network (Tsay, Accuardi, and Schaller 2016).

15. Fees vary from market to market and in some markets may include an extra flat-rate booking fee that is applied to each ride. That implies that for shorter rides total commissions may be approximating 40% (see, for instance, Huet 2015; Kerr 2015; Korol 2016).

16. Calo and Rosenblat (2017, p. 30) describe how platforms can use data analysis to engage in what has been called "persuasion profiling." Data analysis can reveal consumers' individual cognitive biases, and these could be used to nudge consumers into consuming more, for instance, by adapting the information and design of the interface. For instance, Uber has found that passengers are willing to pay more for a ride when their phone battery is low. The company says it is currently not using this information in its pricing schemes, but, the authors warn, "the very fact that they are monitoring battery life raises questions about the information to which Uber has access as well as the criteria the firm might find suitable for use in pricing."

17. In an interview with Bloomberg, Uber's Daniel Graf explains the ever more sophisticated machine learning techniques for financial engineering that are used to determine the price of a ride. This capacity is seen as the competitive advantage that the company has over its rivals. At the same time, the exact process through which this happens is opaque, and there is an incongruence between these pricing mechanisms and drivers' earnings. In the case of route-based pricing, passenger fees would vary; however, drivers receive a set fee that is still based on mileage and time (Newcomer 2017).

18. Uber has introduced services such as UberPoP, allowing private drivers to pick up passengers, that are illegal in many markets in the hope of breaking open the existing regulations. This has resulted in numerous lawsuits against the company and even some of its managers across the globe. In essence, the company and its defenders find that current regulations serve existing interests and hamper innovation. To push that point, the company often ignores democratically set rules in the hope that acquiring a large customer base before lawsuits set in will prove its point. Meanwhile, the *New York Times* reported that Uber uses a data-profiling tool called Greyball to recognize government inspectors and to exclude these officials from using the service. The tool was originally developed to recognize potentially aggressive competitors and other assailants. Once particular users are identified by the system, it serves them a fake version of the app, displaying ghost cars (Isaac 2017a).

19. In response, Uber claims that many existing regulations are outdated and that customers are better served by doing away with them (Baker 2015).

20. In 2016 Washington DC also saw a decline in metro ridership (Lindsay 2017).

21. This vision of the organization of labor in the platform society is not limited to Uber but is at the core of the "gig economy," a term used to refer to platforms that mediate between freelancers of all sorts offering their services to a clientele—from cleaners to Web designers, from data processors to consultants.

22. According to Sundararajan, the rise of these platforms can be understood as broader development of "disintermediation" of traditional firms. Since the industrial revolution, larger and larger companies have arisen that incorporated more and more tasks, varying from manufacturing to research and management in a single hierarchy. Sundararajan sees a reversion of this trend as many tasks can now be outsourced through digital platforms. Not only simple tasks can be outsourced to marketplaces like Mechanical Turk but also more complex intellectual work such as the writing of consultancy reports can be cut up in various subtasks and carried out by freelancers, coordinated by platforms (Sundararajan 2016).

23. In fact, a number of lawsuits have been filed against Uber and Lyft by drivers in, among other places, California and London. Drivers claim that they should be classified as employees rather than as independent contractors (Calo and Rosenblat 2017).

24. For instance, the company found that sending text messages from a female persona called Laura would lead to greater uptake about scheduling and location advice. See Scheiber (2017) for a detailed account of nudging tactics employed by Uber.

25. Another attempt to create a decentralized, blockchain-based alternative ride-sharing platform, Arcade City, has seen a similar fate. Arcade City advertises itself as a "peer-to-peer everything—with networks built by communities, not corporations." Again, there are a lot of expectations around the platform and a strong rhetoric that promises to cut out the middleman and empower taxi drivers and users to negotiate transactions on their own terms. Despite its being announced as a "blockchain Uber-killer" (Carmichael 2016), the functionalities still have to be realized; and in lieu of a decentralized blockchain authentication, for a while it depended on a Facebook login and forum to arrange rides. At the time of this writing, the project offers no concrete opportunities for ride-sharing.

26. In a somewhat similar vein, in the United States various public transport agencies have started to subsidize rides operated by TNCs. The transit authority of the St. Petersburg area in Florida gives riders a maximum discount of $3 in particular areas and at particular times. In Altamonte Springs, Florida, the city provides Uber riders a 20% discount on their fares. This rises to 25% when they are dropped off or picked up at a commuter rail station (Tsay, Accuardi, and Schaller 2016). GPS technology makes it possible to subsidize rides in particular locations, for instance, those that are underserved by traditional public transport, or so-called first- or last-mile rides that connect riders to the public transport system. In fact, the system is regulated in a way to encourage the use of public transport rather than undercutting its efficacy.

27. Lyft uses a similar system. Other transportation apps, for instance, Blablacar, provide more information about drivers and passengers to users so that they can use the ratings and written reviews more extensively in their individual selection process. The Dutch car-sharing site SnappCar also uses individual written reviews as well as social media profiles.

28. From an economic perspective, the rise of reputation systems may also lead to a winner-takes-all effect, something that Sundararajan (2016) has labeled "digital Darwinism." Selection mechanisms are usually tuned to display actors that have received high recommendations first in search results. Even if they are not algorithmically sorted out, users may prefer providers with higher reputations. This in turn may leverage the position of these very actors to attract new business at the cost of others. Small and arbitrary differences in initial ratings between actors may in the end lead to large differences in earning capacity and increase inequality in society (de Groen, Maselli, and Fabo 2016).

29. On the level of the interfaces, the publication of particular types of data could also help consumers to attune their choices with public values. For instance, some transportation platforms display data about the exhaust of carbon dioxide or—when using a bike-sharing scheme—calories burned in correspondence to their route options. This could stimulate consumers to optimize their decision for a particular trajectory based on more than efficiency alone. Others have argued to leave out or add particular data about service providers in the interface. This could, for example, stimulate consumers to choose drivers who are unionized or have health insurance, provided these types of data are assembled and made part of the interface (Gorbis 2016; Tonkinwise 2016).

30. Data about transport movements, traffic, and road conditions could also be of public value beyond their immediate functionality. They could provide urban planners and politicians with strategic insights for long-term infrastructural investments or insights into what roads need maintenance. "Open data" could even invite contributions about the debate from outside parties, such

as local civic technology communities or online data journalism ventures like the US-based blog *FiveThirtyEight* (Tsay, Accuardi, and Schaller 2016).

31. This is not just a hypothetical idea. For instance, in 2013 the *Telegraph* noted a loan provider that used analytics of one's Facebook friends in combination with online behavior analysis to determine whether prospective clients would be eligible for a particular type of loan (Telegraph Reporters 2013).

CHAPTER 5

1. The legal basis of the NHS-DeepMind agreement is currently under investigation by the Information Commissioner's Office, to which the report is submitted as evidence.

2. According to a study by Research2Guidance (2017), the total number of mHealth apps in major app stores grew by 25% since 2016 to 325,000. Apple's App Store and Google's Play Store are the main distributors of health apps.

3. These can be all kinds of data, ranging from clinical data (e.g., glucose levels) to performance data (e.g., cognitive tests), from experiential data (e.g., experienced pain levels) to health history data, and from information on administered medication doses to genetic data; they may also include statistics or open health data collected through public databases.

4. Individual consumers are more or less willing to share their data with third parties, depending on whom they trust their data to. Physicians and researchers are trusted most with collecting people's health data, while insurance companies, technology companies, and governments trail behind. A survey of 4,017 people in the United States showed that only 8% said they would share health data like medical records and lab results with "a technology company." Of those interviewed, 86% said they would hand over their health history to their own physician, while 36% said they would give it to a research institution (Gandhi and Wang 2015). A major UK study on public trust and access to health data was published by the Wellcome Trust (2016).

5. Researchers and doctors have long discovered that the major social network sites (Facebook, Google+) are platforms that can be utilized for health communication and research (King et al. 2013; Fox 2011; Santillana et al. 2014). Social media networks and search engines, from the very beginning, have been used by medical researchers to obtain health and illness information from user-generated content.

6. Since 2014, Apple has launched Health App, HealthKit, ResearchKit, and CareKit. Health App comes preloaded into the iPhone as part of iOS 8. HealthKit allows developers to feed information to and from the app. ResearchKit targets medical researchers to load and store their data via Apple's platform. CareKit, finally, promotes care management among patients. These various "kits" offer templates to develop apps for specific types of medical research or clinical trials. Commercial apps built on the CareKit framework include OneDrop, Glow Nurture, Glow Baby, and Start.

7. To address these questions and find information about each site's operation and intention, we have examined promotional material, platform policies, terms of service, and published interviews with owners or operators in general information sources and trade journals.

8. 23andMe presents itself as a partner to the research community: according to the fact sheet, the company has collected more than two million individual survey responses from its active online research community. On average, one individual contributes to 230 different research studies. To date, 23andMe has published more than seventy-five research papers (23andMe 2018).

9. In 2015, the 23andMe testing kit was approved for carriers of Bloom syndrome, a rare disease associated with an increased risk of cancer. After reapproval, the company put together another thirty-five similar tests for other inherited conditions, which also passed the Food and Drug Administration's seal of approval. The original testing kit gave assessments on 254 diseases (Ouelette 2015).

10. In 2012, 23andMe acquired CureTogether—a patient experience exchange site much like PatientsLikeMe—incorporating the data from communities reporting on some 500 medical conditions (23andMe 2016a).

11. In an interview with Bloomberg Technology (Chen 2015), 23andMe's chief executive officer Anne Wojcicki explained that pharmaceutical companies do not have a direct relationship with consumers, while platforms like 23andMe acknowledge the contributions of users to its product.

12. Perhaps not unimportantly in this respect is the fact that 23andMe's owner and chief executive officer, Anne Wojcicki, is also the (ex-)wife of Sergey Brin, Google's co-founder and current president of Alphabet.

13. 23andMe has included a similar warning in its terms of service (2016c): "Genetic Information you share with others could be used against your interests. You should be careful about sharing your Genetic Information with others. Currently, very few businesses or insurance companies request genetic information, but this could change in the future."

14. Sage Bionetworks is funded by foundational and private grants, for instance, from Quintiles, a large health information company; and it partnered with Takeda Pharmaceutical Company in 2011. Participants in the study have a choice of sharing their data more widely with pharmaceutical and biotechnical companies through Synapse, Sage's research platform.

15. Online health platforms—nonprofit and for-profit—increasingly collaborate with data companies and insurers in programs that commoditize everyday life data about consumers to predict individuals' health risks. See Christl (2017, 80) for examples of intricate entanglements of data flows where the private interests of insurance companies, data firms, and tech companies are closely intertwined.

16. A score of online broker platforms, such as Validic, Fitabase, and Open mHealth, serve as connectors between individuals and researchers, between patients and health products, between data(bases) and knowledge.

17. The guidance was developed by the Department of Health and Human Services in collaboration with the Office of the National Coordinator on Health Information Technology, the Food and Drug Administration, and the American Civil Liberties Union as an information tool for developers to "test" to what legal regulations their apps can be subject (US Department of Health and Human Services 2016). As the website states: "Does your mobile app collect, create, or share consumer information? Does it diagnose or treat a disease or health condition? Then this tool will help you figure out which—and it may be more than one—federal laws apply. It's not meant to be legal advice about all of your compliance obligations, but it will give you a snapshot of a few important laws and regulations from three federal agencies."

18. As Julie Cohen (2016) observes, many US federal agencies "now routinely issue 'guidances' that are intended to signal regulated entities about their interpretations of governing statutes and rules and about likely enforcement stances" (398). Although they seem to guide both compliance and enforcement, they have no legal power to enforce these rules and often leave this to private or self-regulation.

19. The European Commission is still working on the legislation of mHealth apps; the European Medicines Agency, and the Medicines and Healthcare Products Regulatory Agency are expected to introduce guidelines regulating mobile medical apps similar to those of the US Food and Drug Administration. After a first round of consultation in 2014, a second draft of the guidelines was presented and opened up for consultation in 2016 (European Commission 2014, 2016).

20. The Healthdata.gov (2017) project is the US government's most comprehensive "catalogue" of health data sets. Through the government platform's underlying technology, researchers, providers, entrepreneurs, policymakers, and health insurance teams are given equal access to health data and are aided to create big data aggregations from its original data sources, in the hope for better outcomes for all. The Department of Health and Human Services oversees a number of data flows originating from health vaults, including the ones operated by the Center for Medicare and Medicaid Services, the Centers for Disease Control, the Food and Drug Administration, and the National Institutes of Health, to name just a few.

21. MiData (a Swiss initiative) should not be confused with MyData, a Finnish initiative proposing the "Nordic model" for a human-centric approach to managing and processing personal information. This model does not just encompass health but is designed to allow individuals the right to access and control their own data in the fields of learning, mobility, shopping, energy, public services, communication, and so on. For more information, see Poikola, Kuikkaniemi, and Honko (2017).

CHAPTER 6

1. In the Spring of 2017, Google's influence in the classroom led to a poignant series of articles in the *New York Times*, reporting how entire school systems are infiltrated by high-tech companies, particularly the ones that are underfunded and in need of new equipment (Singer 2017a, 2017b).

2. The market for educational hardware and software in the United States has grown exponentially in the past decades. In 2015, US nursery schools and high schools spent more than $13 billion on hardware (tablet, laptop, and desktop computers) and software (learning tools, administrative systems, digital content, etc.) (Singer, 2015). The American school computer-and-software market is expected to reach $21 billion in sales by 2020 (Singer and Ivory 2017).

3. Amazon Inspire looks conspicuously similar to Amazon's familiar shopping interface with features such as a search bar at the top of the page, user reviews, and star ratings for each product (Amazon Inspire 2017).

4. Most notably, the Chan-Zuckerberg Foundation has substantially invested in Summit Schools; Reed Hastings, chief executive officer of Netflix, has donated large sums to a nonprofit charter-school fund so that it could acquire DreamBox, a Silicon Valley educational program combining video games with math assignments. Code.org is a nonprofit consortium financed by Silicon Valley investors, which aims at teaching computer science in every public school in the United States. The latter example is typical of a skills-oriented initiative in online education (Singer 2017b). And in 2017, tech company Oracle announced an existing charter school, Design Tech High School, to be built on its campus in Redwood Shores in Silicon Valley.

5. Independent platforms in the educational market are, for instance, Tes.com, a site based in London with over eight million users worldwide; according to its mission statement, "educators can discover, share and sell original teaching materials" and through TES-Teach, a lesson-building product, "those resources can be freely integrated and implemented" through Wikispaces, an

"open classroom-management platform that facilitates student–teacher communication and collaboration" (TES.com 2016). Another example is TeachersPayTeachers (TPT), a nonprofit initiative that later turned into a privately owned platform based in New York, "where teachers buy and sell original educational materials"; TPT engages over two million teachers in exchanging course materials on a variety of subjects (Teacherspayteachers 2016).

6. The center of educational governance, as Williamson (2016a) argues, "is being distributed and displaced to new digitized 'centres of calculation'" (123). Massive information transfer to "calculation centres" and data hubs tallies with the concentration of power by a few large data companies, which may serve commercial rather than pedagogical interests (Lawson, Sanders, and Smith 2015).

7. As Mead (2016) explains in a profile in the *New Yorker*, AltSchool also opened a physical location in Brooklyn Heights; as of March 2018, AltSchool has two locations in San Francisco and two more in in Brooklyn.

8. Reputational ranking and recommendation systems in educational platforms have been particularly criticized because they are informed by the techno-commercial logic of platforms; assessments happen *instantly* and *continuously*, mostly on the basis of *perception* or *likability* (Coetzee et al. 2014). However, educating is a process very different from "liking" or "recommending." Students do not always like what they learn; learning often requires endless practice or involves unexpected encounters with content that only much later turn out to be valuable. The instantaneity of recommendations and likability of perceptions may be squarely at odds with long-term pedagogical values of curriculum-based education.

9. Pedagogical principles and teaching expertise are readily traded for managerial systems and information technology (IT) experts. As Hartong (2016, 530–31) observes: "In the perfect world of digital-era governance, state-organized educational institutions (such as schools) become gradually substituted with intelligent education networks, which operate as interactive online learning cultures, while schools and teachers are expected to secure IT-handling skills."

10. In September 2015, Facebook's Mark Zuckerberg announced he would start to fund the Summit Public Schools in San Francisco—an initiative that develops software to help create tailored lessons and projects, administer individualized quizzes that special software can grade, and track individual children to learn at their own pace. According to Chris Cox, Facebook's chief product officer, the initiative "operates completely separate from Facebook and doesn't require a Facebook account" while everybody working on the project "is subject to strict privacy controls that help protect student data" (Cox 2015).

11. Although Coursera (backed by Stanford and private equity funds) is a for-profit platform and edX (backed by MIT and Harvard University) is a nonprofit initiative, it is not a clear-cut distinction; after all, MIT and Harvard are private universities with large financial resources. While Coursera and edX have different business models, the way they are driven by platform mechanisms and how they control data flows are very similar. For more information on business models in MOOCs, see Dellarocas and Van Alstyne (2013).

12. Udacity, for instance, started in 2012 as a general MOOC for university students but has since developed into a platform aimed at professional education, mostly in the field of information and computer science.

13. Initially backed by four American universities, Coursera, in 2017 engaged with 149 partnerships across 29 countries in North America, Europe, South America, and Asia. In 2017, Coursera had over 24 million registered users and offered more than 2,000 online courses.

14. The estimated average production costs of a MOOC are $50,000 per online course (including teachers' salaries).

15. Indeed, over the past ten years, there has been sharp criticism of the way in which colleges, particularly in the US, increasingly invest in material facilities at the expense of teaching and research. Universities spending too much money on facilities (sports facilities, buildings, etc.), tend to increase tuition and fees, rendering a college education decreasingly affordable to many students. In Europe, publicly funded university systems are still the norm, but some countries (e.g., the United Kingdom) have recently substantially raised tuition and fees for individual students.

16. According to Bogen (2015), Coursera's contracts with universities promise 6–15% in revenue-sharing per course with the university and 20% of gross profits on aggregate sets of courses, paid out every quarter.

17. Another variant is the full master-degree program online, offered by a platform. In 2015, Coursera started to offer a degree MA program in collaboration with Georgia Tech University in exchange for an unknown percentage of tuition fees. As of 2017, Coursera offers several full Masters degrees, including several degree programs at the University of Illinois.

18. As Coursera's terms of service state, 'If you participate in an online course, we may collect from you certain student-generated content, such as assignments you submit to instructors, peer-graded assignments and peer grading student feedback. We also collect course data, such as student responses to in-video quizzes, standalone quizzes, exams and surveys" (Coursera 2017).

19. In response to deep cuts in state spending on higher education, American public colleges have enrolled fewer poor and middle-class students (Leonhardt 2017).

20. The first studies on the efficacy of MOOCs and their ability to open up education, particularly a study by Hansen and Reich (2015), show that MOOC users on average stem from economically advantaged groups, so they increase rather than decrease inequality.

21. The edX platform is backed by a large consortium of private and public universities, colleges and polytechnics (led by MIT and Harvard), nonprofit institutions, national governments, non-governmental organizations, and multinational corporations, including Microsoft (edX 2017).

22. There are some very successful examples of public infrastructural facilities that have enormously benefitted the sector of higher education; think of Eduroam, an international roaming service that allows teachers and students easy and secure network access when visiting educational institutions around the world.

23. Walthausen (2016) published an interesting (professional and journalistic) inquiry into the usefulness of a variety of open resources, both paid for and so-called open resources promoted by the Department of Education's Go Open campaign. She concludes that neither online resource provides ready-made classroom material because each teacher needs to repurpose the material for local, personalized classroom use. In other words, the repurposing of online course material remains a labor-intensive effort, in spite of "free" reusable materials.

24. OpenupEd was the first pan-European MOOC initiative. It was launched in April 2013 by the European Association of Distance Teaching Universities in collaboration with the European Commission (OpenupEd 2017).

25. The MySchool portal was launched by the Australian Curriculum Assessment Report Authority in January 2010. The platform's original purpose was to make all school performance data open in order to improve teaching quality and enhance student performance. Positive effects were the growth of employment due to new online opportunities for teachers, but the researchers found several unintended consequences of datafication and personalization that were

not anticipated. The most eye-catching one was a significant increase of anxiety levels among students, parents, and teachers who could now see all individual performance indicators and compare them to other schools and school systems. This resulted in adverse effects ranging from the withdrawal or exclusion of low-performing students from some schools to an increase of real-estate prices in areas around well-performing schools, reinforcing inequality between students from different neighborhoods.

CHAPTER 7

1. As Fukuyama (2016) observes, there is no clearly agreed upon definition of "governance," just as there is no single definition of "accountability." On the one hand, a group of scholars defines governance as "activities by traditional governments," whereas another group extends this definition to actors outside of governments. We tend to accept the broader definition, even if we agree with Fukuyama that "it is not so clear how accountability works . . . in a world in which public policies are implemented by a host of shadowy networked actors operating in parallel (or perhaps even at cross-purposes) with one another" (99).

2. Users who voluntarily yield their data to Facebook by signing the terms of service may not know Facebook has a partnership with Axciom, one of the largest data processing firms in the world which leverages over 500 million profiles of people, each of which covers some 1,500 "data points" on average.

3. In March 2016, Microsoft revealed that an experiment in "conversational understanding" had shown how it took less than 24 hours of training on Twitter feeds to teach an "innocent" artificial intelligence chatbot (named Tay) to parrot the misogynistic and racist remarks dominant in the tweets and in responses from users.

4. Some scholars have coined the possibility of launching "(big) data accountants" (Coyne, Coyne, and Walker 2017). In the emerging platform world, independent controllers of data flows are just as indispensable as those guarding the transparency of money flows (Julie Cohen 2016).

5. The Open Data Institute (2016) in London is just one example of a nongovernment, nonprofit organization that is keen on developing transparent frameworks that help maximize the creation of public and economic value out of data flows while articulating fair conditions for ownership and accessibility.

6. Some critics argue that blockchain itself sprouts from an extreme libertarian view that dismisses the very role of states and governments and may lead to a disempowerment of citizens and even to the emergence of a global society without states and governments (Atzori 2015; Golumbia 2017).

7. In 2017, Facebook was accused of copying Stories, a feature on Snapchat that allows users to share user-generated video montages that will disappear after 24 hours. The feature had also been "tested" on Instagram six months earlier. European countries have ordered Facebook to stop sharing WhatsApp data (including phone numbers) with its other platforms; Facebook is also facing scrutiny over WhatsApp from the European Union's data protection taskforce (Article 29 Working Party).

8. For instance, advertisers and publishers are trying to impact the unfair advantages of adtech platforms owned by Facebook, Google, and Acxiom (a Facebook partner) by requiring transparency in advertising metrics; the ads.txt initiative is one such example. And some legacy publishers have started national publishing platforms in response to challenges posed by Facebook and

Google, for instance, media companies like Bonnier and Schibsted which started their own journalism platforms.

9. In late 2017 and early 2018, Facebook demonstrated a willingness and ability to change—if only after being scrutinized by US Congress—its handling of political advertising practices and the involvement of state actors on its platform, showing that platforms are not fixed but perceptive to normative changes in society. In January 2018, Mark Zuckerberg announced a sweeping overhaul of its News Feed feature in order to prioritize people's "most meaningful personal interactions" over passive content after users had said they felt swamped by outside posts from publishers and brands.

10. In 2013, Austrian law student Max Schrems filed his privacy complaint against Facebook with the Irish Data Protection Commissioner because Facebook has its European headquarters in Ireland. The Irish court referred the case to the European Court of Justice, which ruled in 2015 that it was not allowed for companies to transfer personal data from the European continent to the United States because privacy safeguards in this country are not sufficient—a landmark win for a European citizen.

11. Public advocacy efforts, such as a successful disruption of the Anti-Counterfeiting Trade Agreement negotiation process, have illustrated the power of social media organizing in democratic decision-making processes (Losey 2014).

12. Besides La'Zooz in the urban transport sector (chapter 3) and MyData in the health sector (chapter 6), there are a number of other noteworthy examples, such as The People's Ride in Michigan and Yellow Cab Cooperative (California), which built and now run their own taxi apps and where drivers also own the company and share the proceeds. Enspiral is a European network of professionals and companies that promotes social entrepreneurship (Pazaitis, Kostakis, and Bauwens 2017).

13. Even for a renowned platform like Wikipedia, known for the dedication of its contributors, it would have been impossible to scale without the support of companies such as Google (Van Dijck, 2013, chap. 7).

14. In May 2017, Jimmy Wales announced that, in the light of the wave of fake news distributed by major commercial platforms, he wanted to start "Wiki-Tribune"—a news platform that brings together journalists and a community of volunteers; together, they want to run a service that produces fact-based articles that can be easily verified and improved—a kind of Wikipedia for news.

15. Examples of these initiatives in Europe are D-CENT (2018), a "Europe-wide project developing the next generation of open-source, distributed, and privacy-aware tools for direct democracy and economic empowerment"; DECODE (2018) is another European project that provides privacy-aware tools that "keep personal information private or share it for the public good"; and CommonFare (2018) is a "means through which collaboration, experimentation, and solidarity can be expressed and spread to the whole Europe." In The Netherlands, a nonprofit, open source–based initiative to create an authentication system is I Reveal My Attributes (IRMA 2017); the IRMA app assigns the authority to reveal personal attributes to individual users and is designed to provide privacy, security, and flexibility for the electronic ID infrastructure.

16. As Rob Kitchin (2014) concludes in *The Data Revolution*, "If open data merely serve the interests of capital by opening public data, but keeping proprietary data locked behind pay walls and protected by intellectual property regimes . . . then they have failed to make society more democratic and open" (61).

17. Just in the past years, European cities have started to coordinate their efforts to leverage more power in the negotiation with specific platform services, such as Airbnb and Uber; the city of Amsterdam, for instance, has joined forces with Barcelona, Paris, Lisbon, Vienna, Madrid, and Reykjavik to take up the regulator's challenge.

18. One such report was published by a group of researchers from Norway; in their *Power in the Sharing Economy*, Newlands, Lutz, and Fieseler (2017) argue for a more encompassing regulatory approach to the sharing economy. In The Netherlands, the Rathenau Instituut produced a comprehensive report on how to deal with sharing platforms (Frenken et al. 2017).

19. The GDPR will take effect on May 24, 2018, and will cover all twenty-seven member states of the European Union. The most important tenets of this rule include limitations to the collection of data: data should be obtained with the knowledge and consent of the data subject; data should be relevant to the purposes for which they are to be used and should be accurate, complete, and kept up-to-date; and data should not be used for anything other than the original intention without again notifying the data subject (European Union 2018). At the time of finishing this book (January 2018), we can only observe how some of the Big Five companies, in anticipation of this law, organized intensive publicity campaigns to encourage users to set their privacy settings. Google, for instance, started to alert users on its various platforms but also in newspapers and magazines to (re)set their privacy settings.

20. As legal scholar A. Khan (2017, 803) eloquently argues in the *Yale Law Journal*: "To revise antitrust law and competition policy for platform markets, we should be guided by two questions. First, does our legal framework capture the realities of how dominant firms acquire and exercise power in the internet economy? And second, what forms and degrees of power should the law identify as a threat to competition? Without considering these questions, we risk permitting the growth of powers that we oppose but fail to recognize."

21. As we argued in chapter 6, in the United States we see a growing number of public school districts save costs by closing deals with one of the tech companies, particularly Google and Facebook. In Sweden, though, the implementation of Google software in public schools has led to major discussions about data surveillance (Lindh and Nolin 2016).

22. In a 2017 policy brief, the Dutch Central Planning Agency proposed a number of governmental measures to guarantee a fair and public value-centered platform society, including a permit system for platforms, rules to render selection mechanisms transparent, the duty to mark and filter harmful (mis)information, the right to a verified account, and the right to recognizable political advertisements (Straathof, Van Veldhuizen, Bijlsma 2017).

23. In 2010, Sweden developed a mobile bank app, based on its efficient BankID system—developed by a consortium of leading banks and the government—which promoted digital innovation and lessened dependency on less trustworthy transnational ID systems such as those managed by Facebook and Apple (Andersson-Schwarz 2017). The Swedish system differs from the Estonian example because the development of its electronic ID system BankID is the result of a collaboration between the government and nationally operating banks.

EPILOGUE

1. The market value of all Big Five tech companies combined, in July 2017, is nearing $3 trillion, which makes them (in market value) the fifth largest economy on earth, after the economies of the United States, China, Japan, and Germany (Sommer and Russel 2017; Taplin 2017).

2. The congressional inquiries into the influence of the Big Five's meddling into the US 2016 elections in connection to Zuckerberg's presumed political aspirations to run for the highest office were extensively discussed in various news media in the United Kingdom and the United States (Haenschen; Ohlheiser 2017).

3. In May 2017, dating app Rela (for lesbians) was effectively outlawed, while Zank, the Chinese equivalent of Grindr, was forbidden a month earlier.

4. In July 2017, Apple decided to conform to China's censorship rules and pulled several virtual private networks from its Chinese App Store. Since a cybersecurity law took effect in January 2017, every app must be registered, and big fines are imposed on unregistered apps.

5. Very few of the largest platforms dominating modern online societies are developed and based in Europe; Spotify, owned and operated by a Swedish company, is probably the largest European platform in the global ecosystem. In December 2017, Spotify and the Chinese company Tencent took a minority share in each other's company.

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