

I Digital and Datafied Spaces

Promises of technological progress have always intrigued humankind. Throughout history, people have imagined what they could accomplish with stronger tools, faster machines and more advanced technologies. Such hopes about technological transformations continue to shape most domains of life, from economies and production over social relations to politics and knowledge. The hopes associated with contemporary digital transformations are no exception. The internet and mobile technologies make it easier than ever to find information and communicate. Big data gives us direct, precise insights into all aspects of human life. Right around the corner, artificial intelligence may lead to faster and smarter decision-making. While we often experience that the reality of such developments is more complicated, most technological revolutions are welcomed with the same kind of enthusiasm (Marvin, 1988). Likewise, many companies and other organizations scramble to stay up to speed and fear falling behind the pace of technology while they are busy attending to the core of their work. As a result, most organizations contain departments and people who are on completely different pages when it comes to understanding and working with digital transformations. That is, organizations are simultaneously doing some things in very handheld ways, relying on digital technologies for a wide range of activities and experimenting with big data or artificial intelligence in some parts. At the same time, governments and policy makers are struggling to keep up with pace of technological innovations, and may be more measured in their responses than most others. But the importance of digital technologies for social and economic developments and a growing focus on data collection and privacy concerns have made digital transformations a salient and visible issue in the news

and in global politics. This means not only widespread discussions and negotiations over the meaning and ramifications of the digital revolution, but also the emergence of new institutional arrangements and regulatory initiatives addressing this issue area.

This chapter outlines the nature and shape of the technological environments we presently inhabit. This mapping creates the foundation for conceptual reflections on the ubiquity and centrality of digital technologies and data in the lives of individuals, organizations and societies. These reflections are an important stepping stone for the investigation of how digital transformations make us manage visibilities – see, know and govern social affairs – in new ways.

CYBERSPACE AND BEYOND

The ubiquity of digital technologies and data is increasingly natural to us. Still, our ways of talking about these developments are not very precise. We rarely reflect critically on terms such as the internet, digital technologies and cyberspace, but our ways of thinking and talking about technological transformations have consequences for how we engage and live with them. For long, scholars and others have referred to digital developments as cyberspace or simply the Internet. However, these terms are problematic. The term *cyberspace* makes us think of it as separate and independent from social life. Cyberspace is out there, not in here. It is different from “real” life, and has its own rules and dynamics. We can trace this conceptualization of cyberspace back to early discussions about the relationship between real and virtual words. In particular, early advocates and developers of networked computers saw a need to warn against state interference and other attempts to tame cyberspace by applying existing rules and norms to this new domain (Mueller, 2004). Most famously, Barlow’s “A Declaration of the Independence of Cyberspace” published in 1996, sought to cast this domain as different, separate and independent: “Governments of the Industrial World, you weary giants of flesh and steel, I come from Cyberspace, the new home of Mind. On behalf of the future, I ask you of the past to leave us

alone. You are not welcome among us. You have no sovereignty where we gather." At the time, these distinctions between different worlds and spaces may have seemed necessary and important. In subtle ways, these vocabularies also served to highlight how cyberspace differed from normal life. Digital spaces offer liberation, networking and engagement, in contrast to the oppressive, hierarchical and excluding nature of traditional social spaces. Such descriptions of digital domains as different continue to come up. In 2000, President Clinton stressed that regulating the internet was like "pinning Jell-O to the wall" because this space was out of reach, not like the rest of our world and more or less ungovernable (Clinton, 2000). Similarly, US President Trump repeatedly speaks of the frightening forces populating "cyber" and stresses the need to take control of this threatening space. Cyberspace, it seems, is the Wild West of our times, a place where things roam wild, and which requires that we develop new types of intelligence gathering, new weapons and new rules of engagement.

Another issue is the widespread use of the term "the Internet" – in singular, capital form – as a shorthand for a wide range of digital developments. A number of things happen when we describe digital developments using this term. We conflate a wide range of technologies, practices and transformations into a singular thing. Also, we focus our attention on technology rather than its uses or societal roles, such as when people state – in awe or horror – that the internet has changed, say, politics, or disrupted an industry. As Morozov (2014) has argued, the problem is that we conflate too many issues, developments and arguments in discussions of the Internet – a catchall term that becomes an obstacle to actual analysis and critical thinking. In the same vein, Ford (2003) points out that "The metaphor of cyberspace simplifies decision making by allowing us to ignore much of the technical and normative complexity of this new set of technologies and social practices" (Ford, 2003: 154). Just like it would seem puzzling to talk about the Electricity or the Railway, it may be time to decapitalize the internet, and maybe even to leave the term behind. As

technological innovations become integrated into our daily lives we need to stop thinking of them as separate and grandiose.

The problems with terms such as cyberspace and the Internet are also articulated by Ford in his aptly titled chapter “Against Cyberspace” (Ford, 2003). As he puts it: “There is a tendency to describe the Internet as something more than a sophisticated medium of communication – as instead an almost supernatural discovery. In this discourse – the discourse of cyberspace – each computer is a portal to an undiscovered country; online communications and transactions take place in a digitally conjured parallel domain, an e-elsewhere” (Ford, 2003: 148). Such accounts cast the internet as a separate, autonomous domain. The effect is that we either treat it as outside the reach of normal procedures and forms of regulation, i.e. as a wild west that cannot be controlled. Or that we attempt to normalize it by extending our standards and regulatory frameworks to this space. As Hofmann, Katzenbach and Gollatz (2016: 2) put it, much of the early literature was about the “governability” of the internet: about how to tame this space that seemed outside the reach of centralized, hierarchical political control, and about how to fit the internet into existing forms of regulation and state-driven governance frameworks.

It no longer makes sense to distinguish between cyberspace and the real world (Ford, 2003: 149) – they are one and the same space. In a similar manner, Isin and Ruppert (2015) remind us that we are already always online through multiple devices, such as phones, wearables and internet-connected objects. This ubiquity makes the distinction between online and offline and the description of cyberspace as a separate, virtual domain problematic.

DIGITAL, DATAFIED BACKBONES

Despite their critique, neither Ford nor Isin and Ruppert offer an alternative conceptualization that takes us beyond a capitalized Internet and ideas about a separate, independent cyberspace. But this is what we need if we want a more nuanced and extensive understanding of how digital transformations shape the way we

see, know and govern. A vocabulary that highlights the ubiquity of digital and datafied processes needs to focus on the foundational role technologies play in social life. The concept of infrastructures best captures how digital technologies underpin economic, social and political processes. It suggests that we can no longer consider digital technologies to be simple *tools* that organizations and societies can choose to rely on, but must see them as *backbones* that condition human action in very far-reaching ways. This approach also takes us beyond the long-standing focus on contrasting and comparing analog and digital technologies and their respective consequences. The concept of infrastructures acknowledges the centrality and ubiquity of digital technologies, and reminds us that these are real and physical, not virtual. By infrastructures, we normally mean large-scale physical constructions of central importance to societies, such as electrical grids, railways and bridges. Just like we would not consider the railway or other types of societal infrastructure to be separate and independent spheres, we have to see digital technologies as a fundamental component of societies.

However, digital and datafied infrastructures are also different from other ones. Bridges and electrical grids are important, but also largely static things that do little more than allow us to cross water conveniently or turn on the light. In contrast, digital infrastructures do much more than simply transport messages across distance. Such infrastructures consist of multiple digital platforms, different ways of sourcing and aggregating data, and advanced algorithms and visualization techniques. They produce data, not just once or in a form that evaporates. Rather, they keep producing resources – in a form that can be easily copied, stored and reused. This makes digital infrastructures very different from other ones. They can do so many things that a bridge cannot. This also raises the bar on our need to think carefully about what we put into them – the norms and decisions that become built in and come to shape what is possible down the road.

BUILDING DIGITAL INFRASTRUCTURES

Switching on the light in our homes, catching a train or sending an email are so simple to do and we rarely think about what makes them possible. Technologies lay the foundation for many parts of human action and many societal transformations. Just think of the importance of electricity for social, organizational and cultural life. The rollout of electricity to individual households and remote areas was fundamental to the forms and standards of living we now take for granted. With electric light, it became possible to stay up at night and work without being limited by sunshine or less stable sources of light. Electrical engines allowed for the automation of multiple processes, and access to electricity made modern forms of production possible.

Societies rely on extensive and well-functioning infrastructures and technologies, including electrical grids, railways and technological platforms like the internet. These are largely out of sight and taken for granted. We often focus on the comfort, price and speed of the train ride, or on the contents of the messages and other information we send or receive, and care little about the backbones that make all this possible. Such infrastructures are important because they make some forms of action possible and constrain others. They are not neutral or given, but the result of multiple decisions and negotiations about what is important and what is not. In the early days of the railways, each nation had its own gauge width, which made it impossible for railway cars to cross borders (Briggs and Burke, 2002). As a result, cargo had to be unloaded and transferred to a new carriage multiple times on a trip across Europe. Obviously, with the emergence of shared standards for gauges, such nuisances disappeared. These and similar decisions about standardization and the shape of infrastructures are perhaps most evident at the moments where these decisions and valuations are made, because once they are in place, we take them for granted.

DIGITALIZATION AND DATAFICATION

The emergence of digital technologies and media has had similar importance for social and organizational life. The growing ubiquity of digital technologies is evident, and PCs, smart phones and other increasingly powerful and compact devices have become a priority for anyone with the necessary financial resources. Organizations invest substantial resources in digital technology and most governments have e-strategies of various sorts and consider digital technologies as central to the optimization and development of society. The internet is foundational to the developments that this book explores. It has made speedier and more extensive interactions of many sorts possible. These transformations were initially about doing existing activities in smarter, automated ways. Sharing content, communicating and keeping track of things is just plain easier and cheaper via digital platforms. By extension, it is obvious that the internet has widespread consequences for economic, cultural, political and social activities. The need to advance and protect crucial digital infrastructures is as obvious now as it was with electricity and other technological developments in the past.

By *digitalization*, I mean processes whereby analog objects and activities are turned into digital forms. Such examples include newspapers in digital format, or music made available as digital files. These developments have been long underway, and in 1956 a hard disk containing 5MBs storage space – about the size of one song in decent quality – weighed a ton and was hardly portable or affordable. The ability to turn many kinds of activities and information into digital form, such as scanning a painting or turning the songs on a vinyl record into a digital file, are important and in many ways revolutionary. These changes in form make transportation, distribution and copying considerably more affordable and easy.

The definition of digitalization as a matter of converting and distributing objects into digital form is important because it allows us to highlight what is different about what we can think of as

datafication (Mayer-Schönberger and Cukier, 2014). These two phenomena are not the same. With datafication, multiple parts of social life take the shape of digital data. These activities differ from their analog counterparts, because they leave traces that can be stored, put together and reused in many different contexts. But they also take us beyond digitalization, because the need to transform information or objects into digital form disappears – in datafied settings, they are already digital. Like other technological developments, the current surge in the availability and processing capacity when it comes to digital data is important. Social media searches, phones, internet traffic and many objects all produce a wealth of digital traces that can be compiled, analyzed and used to inform decisions. *Big data* is the term that made such processes of data aggregation and visualization popular and understandable outside IT management circles. Also, the Snowden revelations of mass surveillance schemes and Facebook's Cambridge Analytica scandal have contributed to a general awareness of how our digital traces can be used by others and without our knowledge or consent.

Digital technologies and digital data are woven into the fabric of social life. We hardly notice any more, but most of our activities are increasingly digital and datafied. Buying a common product, such as a refrigerator, involves a number of digital platforms and will leave an extensive stream of digital traces. As to the first, our search for a suitable product will quickly take us through search engines, rating and review pages, and price comparison sites. All of these rely on digital technologies that make the circulation, aggregation and reuse of digital data possible. By the time we decide on a brand and model, we trigger yet another chain of digital events, activating warehouses, sales units and delivery companies. Before all this happened, the sourcing of components and construction of the product involved a wide range of digital transactions, just like many parts of it are likely to contain chips that leave multiple digital traces throughout their travels and assembly processes. The fridge still cools our food and looks roughly the same as when it became a common household

item 100 years ago. But everything around its production and trade has been transformed radically by digital developments and all parts of our engagement with the item produce a long and dense exhaust of data.

As Zuboff (1985; 1988) suggested long before the present hype about big data and data-driven strategies, digital transformations allow us to not only automate, but also “informate.” By this she means that digital traces and other outputs produced by technologies create novel possibilities for making sense of processes and gaining new insights. If we realize the value of such data, digital technologies can become a resource for organizations and others seeking to develop human capacities and improvements. As suggested by Zuboff (1985; 1988), most digitalization projects still take the shape of attempts to automate existing processes, and to replace humans with machines. Today, more than 30 years later, these kinds of digital transformations – turning handheld processes into automated ones – make up the bulk of what states, corporations and organizations seek to achieve by investing in technology. This is a shame, Zuboff (1985: 18) suggested, since automation focuses on “smart machines” at the expense of “smart people,” and leads mainly to the “depletion of skills.” If digital technologies are mainly used to automate, “human capacities for teaching and learning, criticism, and insight” are lost, she points out.

Datafication is important because it produces a massive and malleable stream of digital traces that can be a valuable resource in decision-making processes and knowledge production. These developments already shape multiple parts of social life. The main argument of this book is more specific, namely that developments in digital technologies and widespread datafication open up novel issues related to visibility – how we see, know and govern things. If the emergence of the internet was central to the information society, the current dominance of large tech companies and the growth in digital data shape what we may think of as information circulation and information control. This raises important questions about the inner operations of digital infrastructures. An understanding of the workings and operations of digital

infrastructures is central when seeking to articulate how visibilities are managed and our attention is guided in digital and datafied spaces (Flyverbom and Murray, 2018).

DATA SORTING PRACTICES

Internet companies and social media platforms focus on compiling and extracting value from user data, and use them to map and target very intimate parts of our lives. To understand how this happens, we need to look at what happens inside digital and datafied infrastructures.

Datafication and the reliance on digital infrastructures involve a wide range of activities that often go unnoticed. Discussions of big data often revolve around the large-scale transformations that people fear or hope for. Data is the new oil, a raw material that will revolutionize economies and business operations, some tell us enthusiastically (Vanian, 2016). Likewise, the reliance on data will solve long-standing problems such as human bias and the limits of science, because “good data beats opinion” (Toonders, 2014). Or as a Google policy director told me, datafication makes it possible to base policies on “data rather than emotions.” Similar hopes about the value of data-based insights have been expressed more boldly by *WIRED* editor Chris Anderson. In 2008, he suggested that data could be the “end of theory” because we will have all the answers from data speaking for itself. Others stress that datafication and the reliance on algorithms will have far-reaching consequences because “algorithmic cultures” (Galloway, 2006) will take over the “traditional work of culture: the sorting, classifying, and hierarchizing of people, places, objects and ideas” (Striphas, 2015). And some warn us about the possible pitfalls of relying on digital traces and automated, algorithmic processes because they ignore human experience (Kallinikos, 2013), produce segregation in the shape of “filter bubbles” (Pariser, 2011) and may undermine politics and democracy (Morozov, 2014).

But these grandiose discussions about the societal consequences of datafication take place at the expense of a deeper understanding of the actual processes of analysis and knowledge production involved

(Flyverbom and Madsen, 2015). That is, we have to account for the “little” analytical operations (Amoore and Piotukh, 2015), ways of organizing data (Alaimo and Kallinikos, 2017; Flyverbom and Murray, 2018) and infrastructural arrangements (Easterling, 2015) that underpin and condition digital and datafied knowledge production. Such practices of sorting and structuring digital traces are often overlooked or hard to grasp, but they are central if we want to articulate the ramifications of datafication. The term *sorting* is important here, because it captures the essence of what I am suggesting. Data analysis involves multiple steps, procedures and decisions that can be separated analytically. This unpacking of the work that goes into the production of data-based knowledge is an important addition to existing considerations about datafication. By sorting, I mean processes of compilation and ordering carried out by humans and technologies. These insights draw from science and technology studies, which have for long insisted on the assembled and fragile nature of all kinds of social phenomena and the work of collecting and sorting that go into the production of all sorts of knowledge (Latour, 1988; 2005; Hackett et al., 2008). Sorting processes can be understood as the steps and procedures involved in the making of big data analyses. For instance, data projects involve a wide range of analytical operations, such as the *production of data sources*, the *aggregation of diverse forms of data*, the *alignment between data and commercial, organizational or societal objectives* and the *visualization of data* for purposes of understandability (see Flyverbom and Madsen, 2016 and Madsen et al., 2016 for more elaborate accounts). I think of these as analytical concepts that make the work that goes into data projects understandable. The attention to sorting processes allows us not only to reflect on the work that goes into the production of these kinds of analyses, but also to consider the worldviews and rationalities involved. Knowledge production always starts from particular ways of thinking about the world, is driven by certain aspirations and holds assumptions about human action. If we seek to make the world around us knowable through qualitative methods and situated

modes of analysis – for instance by observing or interviewing – particular features come to the fore. What will be considered in such forms of knowledge production are mainly issues such as human experience, appearance and narratives. In contrast, quantitative and statistical approaches will start from different points of departure – such as numbers or rankings – and have little interest in other aspects. Similarly, data-based analyses rely on particular resources and involve particular kinds of, often automated, analysis and visualization (Hansen and Flyverbom, 2015).

All forms of knowledge production also involve ways of managing visibilities. Different modes of analysis are not merely a matter of choosing one set of tools over the other, but that the world around comes to appear differently as a result of what we look for and take in. If we extend this suggestion to digital and datafied contexts, we realize that only some parts of social life are “algorithmically recognizable” (Gillespie, 2017a) and possible to grasp through data analytics. The point is not simply that only people who are using digital technologies leave traces that can be used for analysis, but rather also that big data analyses start from particular criteria about relevance, focus their attention on some aspects rather than others and rely on technologies with particular affordances.

CRUCIAL MOMENTS AND DECISIONS

Situating processes of digitalization and datafication historically and in relation to social transformations is important because we face a “constitutional moment” (Mueller, 2004) in the making of digital infrastructures, and the decisions we make at present will shape the future. This is why it is important to consider carefully and critically how digital infrastructures – the networks, algorithms and data-sharing platforms that are in the process of becoming natural to us – are designed and institutionalized. Large internet corporations such as Google, Amazon and Facebook have taken on roles as entry points for many uses of digital spaces, and increasingly shape the way we work. They offer a wide range of efficient tools

and services, often at no or little cost to individual users and organizations selling services or products. Through these offerings, internet companies are building a position as the primary infrastructures and gateways in the digital domain. At the same time, they are harvesting data, building insights and commercializing these on a scale that no others can match. Histories of technology are full of such accounts of moments when crucial decisions about technological formats and standards have been made, and they remind us that once decisions are made, they are very difficult to alter. Technological infrastructures become invisible and almost untouchable. The values, norms and design choices we accept or decide on will become natural and long lasting, and they could be different. Seemingly, technical standards and decisions matter. One telling example is how the original idea about hypertexts would have created a very different internet if it had not been sidelined early on by a less ambitious system – the world wide web – consisting of URLs and links. In this system, texts and other objects are linked in digital spaces – the web – but we can only jump from one to the other. We may see the same piece of text or a piece of data in different places, but we do not know where they come from or where they go as links can be easily be cut by copying and pasting. Ted Nelson, an early internet developer, had an alternative vision for linking objects in digital spaces that we have almost forgotten about. This system, termed Xanadu, would create permanent and visible two-way links between digital objects and their original producer, and allow us to maintain the connection between digital objects and their origins. If we could keep track of a given piece of data, many of the issues related to property rights and invisible, commercial uses of data would look very different. Royalties for data could be paid, and we would not need Google to organize information for us because the system would always keep information organized, accessible and visible (Hern, 2014; Lanier, 2014). At present, we see similar ideas about embedding information permanently in digital objects, such as block chain technologies, which can be used to

embed permanent and verified information in products and records of various sorts.

The more general point is that the history of humankind can hardly be understood without attention to the role of technology and infrastructures, and that our ways of thinking about and dealing with these have wide-reaching consequences.

This chapter has offered an overview of contemporary digital transformations and then highlighted how digital technologies shape the way we collect, circulate and make sense of information. Digital traces from multiple sources allow for new ways of producing knowledge and recognizing patterns (Mayer-Schönberger and Cukier, 2014; Hansen and Flyverbom, 2015). Such messy, real-time correlations constitute a particular, yet subtle, form of ordering that shapes how problems and opportunities are made visible, knowable and thus governable. Articulating how digital technologies are woven into social fabrics offers an inroad into a more nuanced investigation of the social and political consequences of digital transformations. Having articulated how this book conceives of digital technologies, we can shift our attention to the effects of digital and datafied infrastructures for the management of individual, organizational and societal visibilities.