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GOVERNANCE

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INTRODUCTION

Geographers have long been interested in how societies and places are governed, both with respect to how sovereign states (embodied in local, regional, and national governments and state agencies) manage civil society and markets within their territories, but also how businesses, third-sector bodies (e.g., non-governmental organizations (NGOs), charities), and the general public seek to regulate domains and maintain social order (Herod et al., 2002). Indeed, traditional governmental structures, policies, and legislative bodies are just one component of governance, with many other actors increasingly playing a role in managing social and spatial relations, sometimes in conjunction with or on behalf of the state, or independently. This relationship appears to be in flux at present as the relations between sovereign states, the market, and civil society are renegotiated and blurred, with a shift from centralized and bureaucratic forms of regulation and government to a plurality of coexisting and overlapping networks and partnerships that work at different scales from the local to global.

As I discuss in this chapter, digital technologies have contributed to this flux by introducing a variety of new means to manage and govern society and have transformed the governmentality at work in important ways. For Foucault (1991), governmentality is the logics, rationalities, and techniques that render societies governable and enable government and other agencies to enact governance. The nature of governmentality mutates over time, and periodically its form can shift fundamentally in character – for example, in the shift from a feudal society to modern society, wherein more systematized means for managing and regulating individuals through centralized and institutionalized bureaucracy were introduced. For many analysts, the digital era of ubiquitous computing (the proliferation of

digital devices and computation being embedded into previously dumb objects and being made available everywhere through mobile access to information and communications technology networks), big data (massive amounts of real-time streams of data) and machine learning (computers being able to learn from data and autonomously extract value from them) is producing a similar seismic shift in how societies are managed and controlled. We begin by briefly placing the role of digital technology in government and governance in historical context. We then discuss more contemporary forms of digital governance and how it is changing the practices of security, policing, government administration and operations, and relations between companies and consumers. In the final section we consider how technocratic, algorithmic, automated, and predictive systems are transforming governmentality, shifting disciplinary modes of governance to control and anticipation.

INITIAL FORMS OF DIGITAL GOVERNANCE

Since the 1950s and the birth of digital computing, computation has been deployed by governments in the global North for the purposes of managing populations. Computers were used within bureaucracies to construct, store, manage, and process data for the purposes of administration and the delivery of services. The use of such systems was limited in scope and extent due to cost and technical requirements, but their use formed the bedrock for later developments. Similarly, supervisory control and data acquisition systems were rolled out to monitor and control utility and other infrastructures and to manage city services, with electromagnetic sensors and analog cameras deployed across a network to monitor performance and information flowing to and from centralized control rooms. In the late 1960s, cybernetic thinking, in which it was believed that governance and policy issues could be more effectively managed computationally, was applied to some elements of government. Cities, for example, were envisioned as consisting of a system of systems that could be digitally mediated (Forrester, 1969). Each system, it was argued, could be broken down into its constituent parts and processes, be modelled and simulated to capture its essence, and these models used to plan and operate its functions. Early deployments, however, failed to produce optimal solutions because how cities work proved more complex, contingent, and socio-political than the models permitted (Flood, 2011). As Light (2003) details, the approach adopted in cybernetics and other technology-led approaches to city management sought to adapt military technologies to civilian contexts, and in so doing shifted the rationality of urban management and governance towards technocratic solutions.

In the 1980s and 1990s as personal computers started to pervade central and local government, the use of computation in governance extended rapidly, for the

purposes of both administration and operational delivery. The key geographical technology embedded into government at this time was geographic information systems (GIS) used to document and analyse land use and the spatial constitution of city assets, population, and economy and to aid decision-making and resource allocation. Technologies designed to regulate citizen's spatial behaviour, such as traffic management systems, were also deployed in most cities around the world, enabling the real-time monitoring of traffic flow and the control of traffic light sequencing, and predictions of likely outcomes under different scenarios. With the roll-out of the internet in the 1990 and 2000s, there was a large investment in e-government (the delivery of services and interfacing with the public via digital channels) and e-governance (managing citizen activity using digital tools) and a related reorganization and reduction in government offices. In addition, the first attempts at digitally-facilitated, community-orientated, participatory democracy – public electronic networks – were rolled out, aimed at improving public debate and making decision-making more transparent, as well as new direct channels to access politicians via e-mail and bulletin boards (Kitchin, 1998). The internet also enabled the proliferation of networked surveillance systems, notably digital video cameras and various forms of digital snooping (of e-mail, mobile phones, databases, etc.) in order to monitor and discipline citizens (Lyon, 1994). As well as being a means through which to govern society, the internet itself became a new space to be governed, with a myriad of new customary laws and formal rules and regulations being put in place to police online behaviour (Lessig, 1999; Dodge and Kitchin, 2000).

Throughout each of these developments, geographers both contributed to the development of the technologies, undertaking fundamental and applied research, and sought to understand their societal implications. For example, early quantitative geographers built models for policy formulation, and there has been an ongoing debate with respect to the development, use, and politics of GIS. From the vantage point of the present, the geographies produced by digital technologies and their use in governance form the basis for some interesting contemporary historical geography, as the work of Jennifer Light (2003), Joe Flood (2011), Matthew Wilson (2017), Trevor Barnes (2014), Simone Natale and Andrea Ballatore (2017) and others attests. However, rather than explore further the historical development of how the digital reshaped geographies of governance, in the remainder of the chapter we concentrate attention on the contemporary period.

DIGITAL GOVERNANCE OF SOCIO-SPATIAL RELATIONS

The confluence of new digital technologies and techniques – cloud computing, big data, and machine learning – is transforming how people and places are governed. In short, the roll-out of ubiquitous computing and the production of big

data are broadening and deepening the ability to capture fine-grained information about the behaviour and actions of individuals and systems. New data analytics can then be used to extract insight using machine learning and artificial intelligence techniques, including data mining, pattern recognition, modelling, simulation, and prediction, to adapt and control systems to mediate and regulate further behaviour. The generation and use of big data for governance purposes is most obvious with respect to security and policing, but also increasingly pervades how governments manage daily operations and the interface with citizens, and how companies seek to influence and nudge consumer behaviour. In this section, we detail various ways in which digital technologies are impacting on governance; in the following section we set out how they are shifting the nature of governmentality.

The era of ubiquitous computing has radically transformed the volume, range, and granularity of the data being generated about people and places, radically deepening the surveillance of society. Digital technology inherently produces data through their use, and when these technologies are networked the data are easily shared. As more and more aspects of everyday life become mediated by networked digital technologies, more and more data are captured about the people using them or who are visible to their 'gaze' (e.g., people passing by a camera or sensor). The extent of the surveillance and dataveillance (surveillance through data records) being practised means that people are not only having their activities captured, but also subject to almost continuous geosurveillance (Kitchin, 2015) in which their location and movement are routinely tracked in a number of ways, for example by:

- controllable digital high-definition closed-circuit television (CCTV) cameras (increasingly used with facial recognition software);
- smartphones that track phone location via cell masts, GPS, or WiFi connections, sharing data with the mobile phone company and app developers;
- other smart devices such as GPS-enabled fitness trackers and smart watches;
- sensor networks that capture and track phone identifiers such as MAC addresses;
- smart card tracking that capture the scanning of barcodes/RFID chips of cards used to enter buildings or use public transport;
- vehicle tracking using automatic number plate recognition cameras, unique ID transponders for automated road tolls and car parking, on-board GPS;
- other staging points such as the use of automatic teller machines, credit card use, metadata tagging of photos uploaded to the internet, geotagging of social media posts;
- electronic tagging of children and paroles with GPS tracking devices;
- shared calendars that provides date, time and location of meetings.

Importantly, as Leszczynski (2017) notes, the capture and circulation of these data are:

- indiscriminate and exhaustive (involve all individuals, objects, transactions, etc.);
- distributed (occur across multiple devices, services, and places);
- platform independent (data flow easily across platforms, services, and devices);
- continuous (data are generated on a routine and automated basis).

Such datafication has profound effects with respect to privacy. People are now subject to much greater levels of intensified scrutiny than ever before. Moreover, the pervasiveness of digitally-mediated transactions and surveillance, plus the increasing use of unique identifiers to access services (e.g., names, usernames, passwords, account numbers, addresses, e-mails, phone details, credit card numbers, smart card IDs, license plates, faces), means that it is all but impossible to live everyday lives without leaving digital footprints (traces we leave ourselves) and shadows (traces captured about us). Further, these data enable a lot of inference to be made beyond the data generated to reveal insights that have never been disclosed. Those to whom the data refer often have little control over the data generated, their form, extent, or how they are used.

Importantly, these data enable the refinement of existing modes of governance and the production of new modes. For example, it becomes possible for state agencies such as the police and security services to routinely monitor the views (via social media, e-mail, messaging, phone conversations), associations (social networks), activities, and locations of populations. As the revelations of Wikileaks, Edward Snowden, and other whistleblowers have demonstrated, there has been a step change in the extent and nature of state-led surveillance and securitization in many nations (e.g., the various programmes of the US National Security Agency and UK Government Communications Headquarters). As well as being analysed for strategic intelligence, the data are analysed to identify who might pose a potential security threat. Beyond special operations to target suspected terrorists, where such security screening becomes most obvious to us is in international travel and border control (Amoore, 2006). Passing through an airport now involves the multiple checking of identity (at check-in, security checkpoints, boarding, immigration) via documents and biometric measures (as well as tagging, scanning, and tracking of baggage), with information cross-referenced against other government databases, in which there are very limited rights for passengers to query or to appeal decisions to deny travel or entry (Kitchin and Dodge, 2006). Increasingly, such screening also involves predictive profiling that analyses communications, associations, and locations in order to to forecast levels of risk as to who should receive additional scrutiny. In effect, air travel passengers are funnelled through a closed, closely monitored physical and data security apparatus designed to ensure they act

as what Foucault (1991) termed 'docile bodies' (compliant passengers who act as required with no resistance to authority).

Such data is also to useful to everyday policing when conjoined to data analytics. As well as enhancing surveillance and creating a databank of material and new tools to search for evidence when a crime has occurred (e.g., conducting facial recognition on digital CCTV), data are now being used to guide operations and conduct predictive policing. For example, a number of police forces have invested heavily in new command-and-control centres that employ enhanced and extensive multi-instrumented surveillance (e.g., high-definition CCTV, drone cameras, sensors, community reporting) to direct on-the-ground policing (as well as act as a deterrent to criminal acts) (Wiig, 2017). In addition, police forces monitor the communications of known activists and agitators to try and anticipate and control social unrest. When protesters do gather, police will seek to keep abreast of activists' plans by scanning social media and identifying and tracking the mobile phones of leaders within radio-cell grids, using a form of 'digital kettling' to isolate protestors into a contained area (Paasche, 2013). A number of forces are now also using predictive policing to identify potential future criminals and to direct the patrolling of areas based on an analysis of historical crime data, arrest records, and the known social networks of criminals (Stroud, 2014), though such an approach has been critiqued as effectively reproducing racial profiling (Harcourt, 2006).

Beyond security and policing, big data and analytics are used by the state for the purposes of public administration and managing operations. All nation states conduct biopolitics seeking to monitor and manage populations and their entitlements (to services, welfare, housing, health, etc.) and compliance with laws and regulations (attending school, paying taxes, obeying traffic rules). Increasingly, more and more interactions with the state are conducted online, directly interfacing with government services and databases. Analytics are applied to these databases to identify potential cheats and reduce fraud. Such systems also work to monitor the performance of government itself, with data being used to assess efficiency and effectiveness of programmes and policies, and to design new ways of delivering services (Kitchin, 2014). In terms of operations, new digital technologies are transforming how services are configured and deployed. For example, sensors in rubbish bins monitor how full they are, communicating that information to waste management services so that garbage trucks only visit those that need emptying. With respect to traffic management, dense networks of cameras and inductive loop sensors monitor the flow of traffic across a road system, automatically adjusting traffic light sequencing to try and minimize congestion and keep traffic flowing, with this information also being communicated to the public via apps and radio to try and nudge them to take alternative routes or forms of transport (Coletta and Kitchin, 2017).

In addition to states, companies now routinely generate data with respect to all aspects of their business, including their customers and their patterns of

consumption, using the information to influence behaviour, assess risk, predictively profile, and socially and spatially sort consumers. Companies seek to monetize their data by more effective micro-targeting of advertising, or nudging consumers into purchases, or by selling the data to data brokers who consolidate and repackage data into new products and offer a variety of data services (e.g., people and place profiling; search and background checks; assessments of creditworthiness; provision of tracing services; undertaking predictive modelling as to what individuals might do under different circumstances or how much risk a person constitutes). Data brokerage is a multi-billion dollar industry with vast quantities of data and derived information being rented, bought, and sold daily across a variety of markets – retail, financial, public administration, health, tourism, logistics, business intelligence, real estate, private security, political polling, and so on (Kitchin, 2014). One such data brokerage company, Acxiom, is reputed to have constructed a databank concerning 500 million active consumers worldwide, with about 1500 data points per person, and claims to be able to provide a '360-degree view' on consumers, meshing offline, online and mobile data (Singer, 2012). Data brokers contribute to forms of governance through social and spatial sorting – creating profiles of citizens and (potential) customers as to the likely value or worth of an individual, or their credit risk and how likely they are to pay a certain price or be able to meet payments. While the aim is to provide customers with personalized treatment, including dynamic pricing that reflects their preferences and worth, it is also used by vendors to reduce risk by identifying which individuals to marginalize and exclude, for example denying credit, housing, and career opportunities. Through the practices of geodemographics, data brokers also profile places and spatially sort locations with respect to investment (Harris et al., 2005).

FROM DISCIPLINE TO CONTROL AND ANTICIPATION

For many scholars the increasing use of digital technologies for the purposes of governance is shifting the nature of governmentality – that is, the underlying logics and mechanisms as to how governance is organized and works. The contention is that governance is becoming more technocratic, algorithmic, automated, and predictive in nature (Kitchin and Dodge, 2011). Technocratic forms of governance presume that social systems can be measured, monitored, and treated as technical problems which can be addressed through technical solutions. That is, it is possible to effectively tackle the management of populations and social problems, and to deliver services, through computational systems rather than through other governance mechanisms such as regulation, policy, social partnerships, and community development. These technocratic systems are underpinned and driven by algorithms

that process and assess data feeds and determine outcomes based upon their underlying rule-set. Increasingly, these algorithmic machines work in automated, autonomous, and automatic ways (Dodge and Kitchin, 2007) with human oversight being limited to three levels of participation (Docherty, 2012):

- human-in-the-loop – system identifies and selects decisions, but people perform the key decision-making and actioning role;
- human-on-the-loop – the system is automated, making key decisions and acting on them but under the oversight of a human operator who can actively intervene;
- human-out-of-the-loop – the system is automated and makes decisions and acts on them without human input or interaction.

Automated systems often employ machine learning and seek to learn from the outcome of previous decisions, and they also predict how people will behave and act on that prediction (Amoore, 2013). Within such automated systems, the rules for acting on data and making decisions are black-boxed and thus lack transparency and accountability. As such, they can be Kafkaesque in terms of how they work; for example, no-fly lists where people are not informed as to why they have been placed on the list, yet nor can they argue against the decision.

The effect of technocratic, algorithmic, automated, and predictive systems is to shift governmentality from disciplinary forms towards social control and anticipatory governance. Foucault (1991) argued that governmentality in the late twentieth century – through its interlocking apparatus of institutions, administration, law, technologies, social norms, and spatial logics – exercised a form of disciplinary power designed to corral and punish transgressors and instil particular habits, dispositions, expectations, and self-disciplining. A key aspect of disciplinary governmentality is that people know that they are subject to monitoring and enrolment in calculative regimes (e.g., bureaucracies that monitor and reward them) and thus self-regulate their behaviour accordingly to avoid incurring penalties. Technologies such as CCTV are thus disciplinary in nature, designed to make people act appropriately for fear of being witnessed transgressing and punished.

In the twenty-first century, the implementation of algorithmic forms of governance that process big data has greatly intensified the extent and frequency of monitoring and shifted the governmental logic from surveillance and discipline to capture and control (Deleuze, 1992). Here, people become subject to constant modulation through software-mediated systems, such as a transport network controlled by an intelligent transport system, or checking in online for a flight, in which their behaviour is directed explicitly or implicitly steered or nudged rather than being (self-)disciplined. Governmentality is no longer solely about subjectification

(moulding subjects and restricting action) but about control (modulating affects, desires and opinions, and inducing action within prescribed comportments) (Braun, 2014). Rather than power being spatially confined and periodic (at set times in set places, such as schools and work), systems of control are distributed, interlinked, overlapping, and continuous, enabling institutional power to creep across technologies and pervade the social landscape. For example, as Davies (2015) notes with respect to Hudson Yards, a smart city development in New York that is being saturated with sensors and embedded computation, residents and workers will be continually monitored and modulated across the entire complex by an amalgam of interlinked systems. The result will be a quantified community with numerous overlapping calculative regimes designed to produce a certain type of social and moral arrangement, rather than people being regulated into conformity within institutional enclosures.

As detailed by Amoore (2013), the rationality of algorithmic governmentality is also rooted in possibilities – calculating potential future outcomes to direct action in the present. Anticipatory governance uses predictive analytics to forecast future risk and to produce appropriate responses. Predictive policing, identifying the possible location of future criminal acts and who might perpetrate them, is one example. Social and spatial sorting is another. In such cases, a person's data shadow does more than follow them; it precedes them, seeking to anticipate behaviours that may never occur yet have real consequence (e.g., being subject to more stop and search; not being able to travel overseas; being denied a job or a place to live) (Harcourt, 2006). The worry for some is that new forms of 'data determinism' are emerging, in which individuals are judged and treated not only on the basis of what they have done but also based on predictions of what they might do in the future (Rameriz, 2013).

It should be noted that the tactics and techniques of governmentality in contemporary society are highly varied, for example, utilizing a range of technologies, each of which can be configured and deployed in different ways. More fundamentally, the nature of governmentality can be diverse, with several related and overlapping forms of governmentality enacted and promoted by different entities (state bodies, companies, communities) at work at the same time. Indeed, Ong (2006) argues that contemporary governmentalities associated with neoliberalism are not uniform and do not possess universal global logics. Rather they have mutable logics which are abstract, mobile, dynamic, entangled, and contingent, being translated and operationalized in diverse, context-dependent ways. Just as disciplinary power never fully replaced sovereign power, control is likely to supplement rather than becoming dominant to discipline (Davies, 2015). In turn, power, governmentality, and governance are resisted and alternative forms of social relations enacted through more participatory forms of community development (see Chapter 22 below).

CONCLUSION

Since the first digital computers, the forms and modes of governance have adapted to take advantage of computation. With the advent of ubiquitous computing, big data, cloud computing, and machine learning, the practices of governance have become thoroughly digital in nature, in turn changing the nature of contemporary governmentality. We now live in age of algorithmic and anticipatory governance in which huge amounts of data are generated with respect to our everyday actions, movements and views, with computational systems processing and acting upon these data to make decisions that manage, discipline, control, and nudge our behaviours. Governance is becoming increasingly technocratic, automated, and predictive in nature, and many more actors are involved beyond the state, such as companies, public–private partnerships, NGOs, and community bodies. Geographers are particularly interested in how the digital age is transforming the governance of socio-spatial relations and producing new spatialities and mobilities. There is still, however, much theoretical and empirical research needed to more fully understand how different digital technologies – e-government systems, city operating systems, performance management systems, urban dashboards, centralized control rooms, surveillance systems, predictive policing, coordinated emergency response, intelligent transport systems, logistics management, smart grids and smart meters, sensor networks, building management systems, app-controlled smart appliances – are reshaping the rationalities, logics, and practices of governance and producing new modes of governmentality, and how these are being resisted and contested by citizens. Such work is important if we are to comprehend and challenge the politics and economics driving technocratic and algorithmic governance and think of alternative ways of benefiting from digital technologies while minimizing some of their pernicious effects (see Chapters 22 and 23 below).

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