Algorithms, regulation and governance readiness

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Abstract

Advances in algorithmically-driven decision-making in the private and public sectors, linked to the manipulation of large data sets underpinned by machine learning and cloud computing, throw up new challenges for public administrators which go to the heart of democratic choices, the rule of law, and human rights. Early evidence shows that across the world regulators, public administrators and political leaders are already having to cope with a range of algorithmic harms. This chapter makes a preliminary examination of the state of governance readiness in the UK, asking whether existing administrative capacity is sufficient. The chapter considers recent parliamentary inquiries and their evidence, and other sources, and highlights the asymmetrical balance of information between governments, regulators and 'Big Tech' companies, giving examples of identified algorithmic 'harms'. The chapter concludes with observations on the state of administrative capacity, including delivery, coordination, regulatory, analytical and discursive capacities, and makes suggestions for further research.

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Introduction

It is noteworthy how little the public administration literature has had to say about digital technologies (Dunleavy 2009; Pollitt 2010, 2012), yet increasingly complex matters such as algorithmic accountability – embracing such issues as artificial intelligence, cloud computing, 'Big Data' and machine learning - have risen up the public agenda in recent years. We have seen a range of reports and inquiries emanating from international agencies, Government scientists and government departments, legislative committees, think-tanks and academic bodies (Cath et al, 2017; Council of Europe, 2017; Data and Society, 2018; Executive Office of the President, 2016; House of Commons, 2018a; House of Lords, 2018; Mulgan, 2016; Royal Society and British Academy, 2017; Walport 2013 and 2014). As Amoore (2017) suggests, two factors have largely driven these issues into the public domain: the availability of 'big data' has transformed the ways algorithms can be designed, trained and executed; and there has been an 'exponential' rise in the use of algorithms with an element of automation or machine learning.

This chapter takes the UK as its subject of analysis, and asks does the UK evidence indicate how prepared are public administrators and political leaders for the challenges of algorithmic decision-making and artificial intelligence: in other words, what is the state of governance readiness? Proposals have been made for a variety of technical, governance, regulatory, legislative and institutional approaches or solutions (House of Commons, 2017;

Andrews, 2017). Ethical factors have been prominent in discussions (Mittelstadt et al, 2016). Governments, local, regional and national, have made use of algorithms in regulatory governance systems, not least for 'risk-based prioritization' for agency resource allocation purposes, as has been systematically documented and analysed (Yeung, 2017). Veale *et al* (2018) point out that public sector practitioners deploying these systems 'are facing immediate, value laden challenges.' Algorithmic decision-making and artificial intelligence are often discussed together. Wachter says 'The most important thing is to recognise the similarities between algorithms, AI and robotics' (Turing, 2017): indeed, the recent House of Commons report on *Algorithms in decision-making* often moves seamlessly between discussions of algorithms and AI (House of Commons, 2018a).

The chapter begins by examining the literature on governance readiness and administrative capacity. It considers whether this literature is adequate to the task of identifying such capacity issues in a context where the discourse is dominated by the larger technology companies – collectively often described as 'Big Tech' - and raises the question of whether 'discursive capacity' is a requirement for governance readiness in this area. It then sets out evidence gathered from empirical research on algorithmic harms and the consideration that has been given to these issues in the political sphere. The chapter then discusses the state of administrative capacity at multiple levels of governance in the UK and concludes by setting out questions which might guide further research.

The benefits of algorithmic analysis are frequently raised, sometimes uncritically, in media reports of their use in a variety of domains. Few would challenge the potential benefits of using algorithmic analysis to identify patterns in medical data which might lead to an assessment of likely preponderance for risk of dementia, provided privacy is protected and premature decision avoided (Lay, 2018), but there are algorithmic processing errors, such as those identified by the UK Secretary of State for Health, which resulted in failures to call women for breast cancer screening who should have been flagged as at risk (Hansard, 2018). The undoubted but limited success of training a computer to beat chess or Go champions, in which moves undertaken by the machine seemed counter-intuitive to human experts, and whose rationale may have been obvious only to the machine itself (House of Commons, 2018a), has reinforced fears of an apocalyptic world in which human decision-making is over-ridden by superior machine decision-making, which may be something of a deflection from the real concerns about corporate and state misuse of these technologies in the here and now (Chollet, 2018; House of Lords, 2018).

Two broad concerns have begun to be articulated by researchers, policy-makers and others: the first set of concerns relates to the existing use of algorithmically-based systems developed by corporations or governments. Evidence is regularly being surfaced that many such systems may raise significant ethical challenges, or even undermine existing laws, including laws on human rights, equality and discrimination, either consciously or unconsciously, or that they may be used by hostile foreign actors to undermine democracy or state security. The second set of concerns relates to future developments: that the advent of machine learning, with the development of algorithms which train on massive inputs of data, and develop their own rules for determining their decisions and judgements

subsequently, could lead to a dystopian future in which human intelligence and human life will be undermined or controlled by intelligent, decision-making machines who set their own rules and codes of behaviour.

Implicit in much of the political, policy and media commentary about these issues are questions of power and agency – notably the ability of government and civic society to shape policies and rules in respect of algorithms in a context where powerful private actors are in the business of creating algorithms and developing artificial intelligence. There is an asymmetrical balance of information, resource and power creating an environment in which these powerful private actors are able to determine the discourse around these issues. So, for example, Google has announced its own ethical framework for the development of artificial intelligence (Pichai, 2018). Meanwhile, a senior executive of Facebook has been actively involved in the shaping of UK Government policy responses to artificial intelligence (DBEIS/DDCMS, 2018). (It should be stated that he was working for a different company when his original work for the UK Government was published: Hall and Pesenti, 2017). Facebook also presented at 'a private, introductory seminar on algorithms' for the House of Commons Science and Technology Committee (House of Commons, 2018a).

These challenges are now being encountered at multiple levels of government: internationally, at national, devolved nation or English regional level, and at the local government level. The challenges in each domain may overlap or may be different. This is a new and emergent field, raising novel questions for public administrators and political leaders. Ethical considerations are proceeding even as algorithmic systems are being utilized. What governance capacities are needed?

Governance readiness

Lodge and Wegrich (2014a) examine issues of administrative capacity and identify the challenge of *governance readiness*. They define governance (15) as 'the interdependent co-production of policies among state and non-state actors across different levels'. Governance readiness, they say (16), 'requires the presence of agreed goals and objectives that inform the identification of problems and the type of responses to address these problems, the presence of appropriate tools to identify challenges and problems, and the presence of a range of resources to address these problems.' They highlight four governance capacities – 'the kind of actual competencies we expect bureaucracies to have' (17): delivery, regulatory, coordination, and analytical. They explain these further: 'delivery capacities deal with affecting the front-line of policy….regulatory capacities are required to conduct oversight over activities….coordination capacities are required to bring dispersed constituencies together; and analytical capacities address demands on forecasting and intelligence that inform policy making'(28).

They note that contemporary governance challenges are often said to be 'wicked problems' which are 'characterised by contestation over the definition of the actual problem and over solutions' which may themselves create new problems (49). The specificity of the problem means that learning is difficult and solutions hard to replicate (Lodge and Wegrich, 2014a). They do not consider leadership, though they are emphatic in their recognition of the political dimension to public administration, whereas Carr (2016) has suggested that political leadership in the 'information age' requires understanding that politics can shape technology. Assessing governance readiness in the context of algorithmic decision-making

requires us to consider what will this mean for public leaders, public bodies and regulatory authorities. For Head and Alford (2015) decisions on problem definition and solution identification also depend on stakeholder perspectives – in other words, technical issues are only part of the discussion. There are not only 'cognitive-analytical challenges but also communicative, political and institutional challenges' (718). Separately they have argued that the term 'wicked problem' is 'inflated and over-used', leading to pressure for 'a dramatic transformative intervention' rather than incrementalist approaches (Alford and Head, 2017:399).

As well as the necessary delivery, regulatory, coordination, and analytical capacities, governance readiness also requires 'discursive capacity' if governments are to reach judgements independent of the large commercial digital multinationals. This is somewhat underplayed in Lodge and Wegrich's account of 'governance readiness', although they do refer to the need for 'sage-type advice on political tactics and scheming' (43). Similarly, Parrado's essay on analytical capacity (2014:88) briefly touches on discursive capacity in reference to one narrow area, that of the role of the 'spin doctor'. Elsewhere Lodge and Wegrich have given further consideration to the 'information-gathering' stage of policy design (2012:119) , drawing on Hood and Margetts' (2007) NATO typology (**N**odality, **A**uthority, **T**reasure, **O**rganization), noting that the digital age challenges 'the monopoly of information provision by government' (Lodge and Wegrich, 2012: 123). Here they identified a need for both 'computer nerd' and ''sage' (political advisory)' skills (128).

Governmental 'discursive capacity' is essential to the deliberative process of problem-sensing, problem-definition and problem-solving (Schoen, 1983; Grint, 2010; Hoppe, 2011). This is a necessary task at a time when governments – at whatever level- may not

themselves possess all of the information or understanding internally, and where technology companies may have disproportionate access to resources for shaping discourse on these issues. This in itself is not a new problem – technological pioneers have often over time been able to set the terms of discourse around new technologies, their governance and regulation (Marvin, 1988; Spar, 2001).

Governments, and regulators, in response, need effective discursive capacity. I develop the concept of 'discursive capacity' from the writings of Schmidt (2008, 2010, 2011) on discursive institutionalism. Schmidt (2008:305) argues that 'ideas and discourse matter.' Her concept of discursive institutionalism argues that political ideas have a central role in constituting political action, stressing the power of persuasion in political debate, the centrality of deliberation for democratic legitimation, the construction and reconstruction of political interests and values, and underpinning the dynamics of change. Discourse is not just about ideas but is the interactive process through which ideas conveyed. Discursive process helps explain why some ideas succeed. Discourse may include the development of ideas at several levels – detailed policy, a broader political programme, or the underlying philosophy. Discourse will include types of ideas – cognitive, which illustrate how to do things or normative, the underpinning values which guide action; but discourse can also include form: narratives, myths, frames, collective memories, stories, scripts, scenarios, images and more. Schmidt also considers (310) two kinds of discursive public sphere: the policy sphere – coordinative discourse about policy construction, and the political sphere where communicative discourse about effect of policies takes place:

> In the policy sphere, the coordinative discourse consists of the individuals and groups at the center of policy construction who are involved in the creation, elaboration, and justification of policy and programmatic ideas. These are the policy

> actors – the civil servants, elected officials, experts, organized interests, and activists, amongst others – who seek to coordinate agreement among themselves on policy ideas.

The political sphere is where the communicative discourse takes place and includes political leaders, governments, parties, the opposition, media pundits, academics, activists etc: in other words, informed publics, strong publics, and civil society. These elites may 'interweave the coordinative and communicative discourses into a master discourse that presents an at least seemingly coherent' programme. Discourse involves – 'discussion, deliberation, negotiation and contestation' (Schmidt, 2011:115). In respect of algorithms and AI, it requires identifying and seeking to shape the 'public narratives' (House of Lords, 2018) around specific policy challenges.

In the development of policy on algorithms in high-frequency trading in the UK, for example, we can trace a discursive process of both coordinative and communicative aspects over a period of time, whose development is represented in the policy-making process through deliberative exchanges of views between regulatory bodies, parliamentary select committees, government departments, including their specialist advisors such as the Government Office of Science, European institutions, academics and other specialists. The Foresight Report on the Future of Computer Trading in Financial Markets developed by the Government Office for Science (GOS) alone involved '150 leading experts from more than 20 countries' (4): sponsored by the Treasury, guided by a high level stakeholder group and a lead group of experts, over 50 'driver reviews' (146), working papers, economic impact assessments and surveys informed the final report (GOS, 2012).

Discursive capacity, then, refers to government's ability to frame problems in terms that are capable of a recognised public or political consensus, requiring discussion, deliberation negotiation and negotiation. The *discursive* capacity of governments includes the very important function of *convening* capacity. Governments will use that convening capacity to draw in specialist expertise, but they may also choose to allow external bodies, such as think-tanks or professional bodies, to undertake processes of developing information in new areas of policy. Sometimes this thinking may be done by Select Committees of either House of Parliament, whose role is not only there as a process of scrutiny of Government Departments, but may also, in areas of development around new technologies, act to establish both cognitive understanding and a normative consensus. So the recent Report by the House of Lords Committee on Artificial Intelligence (AI) states that AI raises issues which 'challenge existing ideological questions which have defined politics in the UK', arguing 'AI policy must be committed to for the long-term, agreed by consensus and informed by views on all sides' (House of Lords, 2018:21). Some may argue whether discursive capacity is a legitimate matter for administrative, rather than political capacity: however, Hartley, Alford and others have identified 'political astuteness' as a necessary capacity for public managers (Hartley and Fletcher, 2008; Manzie and Hartley, 2013; Hartley et al, 2013, 2105a and b; Alford et al, 2017).

The discursive power of 'Big Tech'.

'Big Tech' – defined by the House of Lords Select Committee on Artificial Intelligence (2018:44) as 'large technology corporations, headquartered in the United States but with a

global reach' - influences discussions around policy options for new technology. The House of Lords Select Committee (41) calls them 'data monopolies' – I have elsewhere (Andrews, 2018) called them 'information utilities'. Often their operations, including their algorithmic sorting, are entirely opaque, sometimes even to themselves, let alone to governments (Pasquale, 2015; Schlossberg, 2018). Their scale, close control of proprietary information, and technological superiority means that these companies have discursive power, influencing both cognitive and normative views – debates on the practicalities of political action and on the principles of political action. They shape the 'master discourse' underpinning political programmes. The UK Information Commissioner has called their dominance 'a vexing problem' (House of Lords, 2018:45). In Carstensen and Schmidt's terms (2015), they have power *through*, *over* and *in* ideas. They are able to influence understanding of practical policy solutions; they have the power to impose certain ideas through the use of proprietorial code and algorithms; and they have had the opportunity over time to structure what is allowed in discussions on technology policy at elite level. They provide what Gandy (1982: 61) has called 'information subsidies' to the media:

> An information subsidy is an attempt to produce influence over the actions of others by controlling their access to and use of information relevant to those actions. The information is characterized as a subsidy because the source of that information causes it to be made available at something less than the cost a user would face in the absence of that subsidy.

Information subsidies can include advertising, material provided through corporate public relations, speeches etc. Big Tech's information subsidies significantly influence the reporting

of debates on new technologies – but they also influence law-makers and policy-makers. As Gandy (1992:141) notes 'the notion of information subsidies is based on the recognition that access to information represents genuine costs to decision makers'. He particularly emphasises the role of information subsidies in helping to create a positive image of the 'information society'. Gandy's warnings a quarter of a century ago (1992: 154) about issues of surveillance and privacy sound highly contemporary today:

> The information systems that make possible the collection, processing, and sharing of information about individuals allow organizations to restrict, reward, invite, ignore, prod, and probe almost at will.

As Hood and Margetts note (2007:23), these information subsidies do not come entirely free to governments, which has to invest in 'the screening process that it must undertake to separate the gold from the dross.'

Sometimes these Big Tech interventions tend to reinforce the stereotypical tropes of science fiction, confirming established public fears of anthropomorphic forms of artificial intelligence rebelling against humanity or (seeking to) control it (Winner, 1977, 1980), evidenced in a range of audiovisual and written narratives, rather than enabling critical public discussion of some of the real underlying issues connected to power and political choices, a concern expressed by several witnesses in evidence to the House of Lords (2018). Indeed, the 2016 European Parliament Legal Affairs committee report suggested adopting the Robot Laws of the science fiction author Isaac Aasimov (EP, 2016).

Barwise and Watkins (2018: 22) have identified the common element of dominant founders in the development of 'digital dominance' by 'Big Tech' companies, whose role has granted them what Driessens (2013: 16), following Bourdieu's field theory (1984), has defined as 'celebrity capital':

> accumulated media visibility through recurrent media representations, or broadly as recognisability.

To sustain their celebrity capital, 'celebrities' have to play the game of celebrity, reinforcing their status by playing to the rules: there has to be recognition of their status by the media and indeed by the public. In the summer of 2017 TESLA founder Elon Musk and Facebook founder Mark Zuckerberg had a public spat over the dangers of Artificial Intelligence, with Musk fearful, and Zuckerberg optimistic. It has been suggested that their real focus was not AI but rather 'their individual and corporate hopes, dreams, and strategies' in order to 'lay the groundwork for future support among investors, policymakers, and the general public' (Bogost, 2017).

Algorithmic harms and their governance challenges.

The documentation of algorithmic harms and risks by researchers proceeds apace. Amoore (2017) says the overriding risks are 'the introduction of forms of discrimination, injustice, prejudice, exclusion and even violence that are inadequately addressed by all current forms of oversight, law, human and civil rights'. These 'algorithms of oppression' (Noble, 2018) may give rise to 'technological red-lining' on the basis of race, gender to access to capital: so we have well-documented examples of *algorithmic bias*, in which judgements on individual futures – employment, eligibility for loans, likelihood of imprisonment - are determined by algorithmic choices which have in-built human errors or conscious or unconscious biases

(Angwin, 2016, Buolamwini, 2017; Datta et al, 2015; Lum and Isaac, 2016; O'Neil, 2017a and b; Sweeney, 2013; Tatman, 2016). However, as Amoore told the House of Commons Select Committee, bias is 'intrinsic to the algorithm': in other words, its primary purpose is to select (House of Commons, 2018a).

Second, we have clear examples of *algorithmic manipulation*, in which judgements about, for example, news, information or advertising, are constructed on the basis of data collected on individuals and used to channel what is presented according to inferred preferences, as with Facebook's News Feed algorithm (Luckerson, 2015, Tambini, 2017; Thompson, 2018).

Thirdly, we have perceived or actual *algorithmic law-breaking*, in which algorithms are apparently deliberately constructed to deceive law-makers and regulators, for example, in terms of Volkswagen's evasion of emissions controls (Congressional Research Service, 2016; Environmental Protection Agency, 2017), Uber's resistance to enforcement of local traffic management laws (Isaac, 2017) or algorithmic price-fixing, which the Royal Statistical Society told the House of Commons Science and Technology Committee should be the subject of a Competition and Markets Authority inquiry (House of Commons, 2018a). (Other potential examples of algorithmic crimes are set out in King et al, 2018).

Fourth, we have growing evidence of algorithm usage in propaganda, from disinformation campaigns by unfriendly countries to election campaign bots, sometimes exploiting the algorithms of major social media platforms like Facebook or Youtube (Cadwalladr, 2017; Grassegger and Krogerus, 2017; Keter, 2017; Office of the Director of National Intelligence, 2017; Solon and Siddiqui, 2017) .

Fifth, there is *algorithmic brand contamination* where through programmatic advertising (IAB, 2014) major brands have found their advertising placed alongside hate speech or terrorist material (Mostrous and Dean, 2017; Solon, 2017; Vizard, 2017).

Sixth, there is what I call *algorithmic unknowns* - the question of how machine learning means algorithms are becoming too complicated for humans to understand or unpick, a situation well-described by the evidence from the Information Commissioner's Office to the House of Commons Science and Technology Committee (2018a). Pasquale (2015) has noted that algorithms may be seen as inscrutable 'black boxes' – while this may be true of many proprietorial algorithms, it may be particularly true of algorithms developed through machine learning.

Therefore, algorithms are becoming challenges for multiple levels of government. We need to return to questions of governance and accountability. As the House of Lords Select Committee noted (2018), trust in these new systems will depend on governments providing a governance framework or frameworks that offers the public reassurance. Yet it is striking how little consideration is given to multi-level governance in recent reports (House of Commons, 2018; House of Lords, 2018; Royal Society and British Academy, 2017). Some of the issues outlined are likely to affect law-makers and policy-makers at local and devolved levels of government as well as at UK level, and these may not be captured through the work of existing regulators. Some question whether that discursive capacity exists.

These challenges require us to assess a number of the elements of governance readiness outlined by Lodge and Wegrich. So, for example, the range of algorithmic judgements made about individuals may arise in respect of local or devolved government, or UK government, or by agencies such as the police – county or regional level ordinarily in England and Wales, national i.e. devolved level in Scotland; in health, at a number of different levels, sometimes on a national (Wales, England or Scotland, or Northern Ireland) basis, but possibly at regional or more local levels. Were algorithms to be deployed in the UK for decisions on school-teacher accountability or performance, as O'Neil cites in the US case (O'Neil, 2017 a) then the level of governance would vary – in England, possibly at individual academy, or academy chain level; in Wales or Scotland, at school or at local authority level: where discrimination is involved on the basis of the protected characteristics, then the Equality and Human Rights Commission would become involved at UK level, and data breaches would engage the Information Commissioner's Office at UK level. In the case of the second examples, these are likely to be UK-wide level, though under current UK law and regulation there is a regulatory lacuna, and this is under consideration in current inquiries in both the House of Commons and House of Lords (House of Commons, 2018a; House of Lords, 2018).

Algorithmic law-breaking could become an issue for authorities at national, devolved and local levels: for example, if Uber, or Airbnb were to operate in ways which breached local planning or traffic management laws, then this could be an issue for local and devolved governments; Volkswagen's breaches of emissions controls have become an issue for the Mayor of London; price-fixing issues could be matters for the Financial Conduct Authority or Competition and Markets Authority. In respect of propaganda and disinformation, then the

police, the UK's intelligence agencies and the National Cyber Security Centre would be engaged, but as we know from recent UK experience, so are the Electoral Commission (2018) in respect of referendum spending and the Information Commissioner's Office (2018a) in respect of data breaches. The policing of advertising next to abusive media content could engage the Advertising regulator, the ASA, but also the media regulator, OFCOM. In respect of algorithmic unknowns, then the new Centre for Data Ethics and Innovation would have a lead role.

The House of Lords Select Committee has identified a number of areas where there is legislative, regulatory or governance uncertainty. It has called on the Law Commission to consider the adequacy of existing legislation on liability. It has questioned whether the recent spate of UK policy announcements on new institutions, including the Centre for Data Ethics and Innovation, the Government Office for AI, and the UK AI Council, and the designation of the Alan Turing Institute as the national research centre for AI, have been 'produced in concert with one another', and with existing policy, calling for a national policy framework for AI, and for clearly designated Ministerial leadership at Cabinet-level, saying that the public and the technology industry need to be clear about who is responsible for what kind of 'authoritative advice' on AI. It also says that the new bodies need to 'take heed' of the work of longer-established bodies such as the Information Commissioner's Office and the Competition and Markets Authority. It argues that the work programmes of the new bodies should be subject to quarterly agreement with one another, and should take into account work taking place across government as well as recommendations from Parliament, regulators and 'the work of the devolved assemblies and governments'. It

identifies capacity issues which need to be addressed, notably in terms of staffing but also in terms of support for research posts and studentships in AI (House of Lords, 2018: 111).

Some have argued for a specific AI Watchdog or Machine Intelligence Commission (see evidence from the Oxford Internet Institute to the House of Lords, 2018; also Mulgan, 2016). The House of Commons Science and Technology Select Committee, in its report on algorithms in decision-making, wanted the Centre for Data Ethics and Innovation and the Information Commissioner (ICO) to review algorithm oversight by all UK regulators. (House of Commons, 2018a). The Committee also urged the Centre and the ICO to consider whether the EU GDPR (General Data Protection Regulation) legislation in respect of 'data protection impact assessments' provided sufficient guarantees to individuals and society: others have urged the undertaking of algorithmic impact assessments (see for example, Reisman et al, 2018). The House of Lords Select Committee also looked at regulatory responsibility, ruling out proposals for general AI-specific regulation in favour of existing sector-specific regulation, but noting that there could be a substantial 'additional burden' on existing regulators, who would have to identify gaps in legislation and regulation and give consideration to the impact of AI in their sectors. They urged the development of 'a cross-sector ethical code of conduct' to be drawn up by the Centre for Data Ethics and Innovation, which could, if necessary, in future 'provide the basis for statutory regulation' (House of Lords, 2018:116).

There is a significant international dimension to the issues of governance readiness. The European Parliament's Legal Affairs Committee suggested a European Agency for Robotics

and AI (EP, 2016). Cath et al (2016) argued for an 'international, independent multi-stakeholder Council on AI and Data Ethics', stating:

> AI is not merely another utility that needs to be regulated only once it is mature; it is a powerful force that is reshaping our lives, our interactions and our environments. It is part of a profound transformation of our habitat into an infosphere.

They suggest that the concept of human dignity assumed in the European General Data Protection Regulation (GDPR), which draws on 1948 Universal Declaration of Human Rights should be the pivotal concept for the 'good AI society'. The House of Lords Select Committee urged the UK Government to convene a global summit in London in 2019 'to develop a common framework for the ethical development and deployment of artificial intelligence systems'.

Assessing governance readiness.

Both the House of Lords and House of Commons Select Committees have identified potential resource implications for regulators in respect of the emergent new issues being raised by algorithms and AI. What does this mean for governance readiness across the UK? The two Select Committee reports are part of a process of ensuring that *discursive capacity* exists at a UK level for governance of algorithms in decision-making, and can be allied to previous work undertaken by the Royal Society and British Academy on data governance, and the ICO in preparation for the introduction of GDPR (Royal Society, 2017; ICO, 2017). However, if we turn to the areas of administrative capacity identified by Lodge and Wegrich as being necessary for governance readiness, and ask also about the existence of discursive

capacity at local or devolved levels of government, then the picture becomes more cloudy. As they have argued, more is said about the transformative character of Big Data and associated technologies, rather than the capacities needed by governments to regulate them. (Lodge and Wegrich, 2014a).

Beginning with delivery capacity, Lodge and Wegrich (37) define this as 'the exercise of mediated authority, regardless of whether delivery activity involved services or coercive activities.' On both counts, it is questionable whether sufficient delivery capacity exists. Police forces using algorithmic devices for facial identification of terrorists have found their systems to be wanting (Burgess, 2018). The English National Health Service's recent challenges with regard to cancer screening are illustrative of a different kind of selection problem dedicated to the delivery (or not) of a service. Sometimes delivery capacity may be constrained or criticised with reference to a different kind of discursive narrative: so when the Mayor of London followed the advice of Transport for London in banning Uber in 2017, he immediately came under fire from the UK Government's Minister for Innovation for undermining 'business and innovation' (Schomberg, 2017). The Royal Statistical Society suggested in evidence that public sector authorities, including in the NHS, did not always understand the value of their data, and the House of Commons Science and Technology Committee therefore made suggestions for a standard procurement model (2018). Would every relevant local authority in the UK have the capacity to challenge Uber or, for the sake of argument, Airbnb, if they were felt to be in breach of relevant by-laws or planning rules? It seems unlikely, given the variable scale of different local authorities. With an estimated significant shortfall of data scientists in Europe by 2020 (EU, 2015), skills issues are likely to remain an inhibitor of delivery capacity.

Regulatory capacity is defined by Lodge and Wegrich (38) as 'the way in which coercive powers of the state are used to constrain economic and social activities.' They note that frequently, self-regulation of or by firms is preferred, that there has been an emphasis on risk-based regulation, and also that regulatory capacity can depend on the recruitment of expertise. It is notable that only a limited range of regulators gave evidence to the House of Commons Select Committee inquiry. Both the House of Lords and House of Commons Select Committees have identified potential weaknesses in delivery capacity for regulators as they attempt to get to grips with these new challenges. However, both have expressed a preference for sector-specific regulation. Without conducting a formal audit of regulatory capacity in this field, it is possible to identify that certain regulators, such as the Financial Conduct Authority, have been in the business of addressing issues of algorithmic regulation for some years, and have deep experience in this field, giving practical examples of their work in their evidence (House of Commons, 2018a). Following the Cambridge Analytica case, the regulatory powers of the Information Commissioner are being upgraded in the recent Data Protection Act (House of Commons, 2018b), and certain requirements are being imposed for data controllers to inform individuals when decisions about them were essentially determined by algorithms, though the House of Commons Select Committee questioned whether this should be expanded to include a wider range of algorithmic decisions than those simply 'required or authorised by law'. The Electoral Commission meanwhile, has identified areas where it believes that the law needs to be strengthened to take account of digital developments, and has clearly found it difficult to address the challenges thrown up during the Brexit referendum under existing law. Ofgem gave a comprehensive overview of where algorithmic judgements were made within the energy

sector. Ofsted, the English education inspectorate, explained how algorithms were used to prioritise school inspections. Ofcom suggested in evidence to the House of Commons Select Committee that it did not have 'a direct regulatory role in overseeing the use of algorithms' but said it could use existing powers where algorithms resulted in consumer detriment (House of Commons, 2018a). The House of Lords Select Committee (2018:134) recommended that the Government and Ofcom research the impact of AI on conventional and social media outlets, specifically in respect of attempts to 'mislead or distort' public opinion.

In terms of coordinative capacity, Lodge and Wegrich identify that coordination has become ever more important as states delegate powers to agencies and to 'subnational' and 'supranational' levels of government: they also identify the need for 'boundary-spanners' in public services who can lead this work (141). I have already dealt above with proposals for international coordination. Coordinative capacity in the space of algorithmic regulation is identified as a necessary role for the UK Government itself, by the House of Lords Select Committee on AI, which is urged to ensure that the Government Office for AI develop 'a national policy framework for AI, to be in lockstep with the Industrial Strategy, and to be overseen by the AI Council' (House of Lords, 2018:136), as well as establishing a Ministerial lead on this subject. Coordination amongst regulators is suggested by the House of Commons Science and Technology Select Committee to be a matter that should be led by the ICO and the new Centre for Data Ethics and Innovation, as I set out above. It is clear that some of the issues raised by big data, algorithms and artificial intelligence may cross regulatory boundaries: the regulation of political advertising, based on personalised advertisements targeted through data analysis, to take one example, could engage electoral

regulators, media regulators, advertising regulators and data protection authorities, requiring cross-organisational attention. However, these are intra-Whitehall and inter-regulator roles. No consideration has been given to the need for coordination across the devolved administrations, or with local government or through the NHS in each of the UK's four nations, or through the UK's 40-plus police forces, for example, though potentially the UK Government's Data Ethics Framework (DDCMS, 2018) which recently replaced the Government Digital Service's *Data Science Ethical Framework* (GDS, 2016), could provide a coordinating framework for discussions across multiple levels of government and public services and regulators.

Analytical capacity, say Lodge and Wegrich, requires both on-the-job experience and subject knowledge, and is bound up with both understanding current performance and identifying future need. Contemporary governments, they say, need to be intelligent consumers of different sources of expertise both inside and outside government itself. Foresight, as Cath et al propose, needs a key element of what is now to be called the Centre for Data Ethics and Innovation, though this work clearly needs to be connected to existing Foresight operations such as that in the Government Office for Science which along with the Council for Science and Technology has taken the lead in promoting issues to do with algorithms and AI in recent years (Walport 2013 and 2016). Contemporary UK regulatory discussions have identified specific policy solutions advocated for future regulation of algorithms and big data, which include technical, governance, regulatory, legislative and institutional solutions (for a fuller summary, see Andrews, 2017). The DDCMS gave a summary of existing UK government initiatives (House of Commons, 2018), with significant sums being invested in the creation of data trusts, for example. Some regulators, notably the ICO, with its

responsibilities under GDPR for which it has been preparing for some time, and the FCA, with a long-standing commitment to address abuse through its market surveillance activities and its deployment of a 'Regulatory Sandbox' where companies can test innovative ideas for their implications for consumers. Parrado (2014) notes that austerity policies have had an impact on analytical capacity within UK government: the singular focus on Brexit since 2016 has had an impact on the analytical capacity of the UK Government in other policy domains, with the Brexit process absorbing an increasing number of civil servants (Owen et al, 2018). The immediacy of some of the algorithmic challenges may not be sufficiently apparent to underpin investment in analytical capacity in these areas. The impact of austerity on other levels of government, including the budgets of the devolved governments and local government, will have had a direct impact on analytical capacity in particular. Regulators have also been urged 'to do more with less' since 2010.

Finally, discursive capacity. The exchanges around the Select Committee reports, and the prior work by the Royal Society and the Information Commissioner, indicates that at UK level discursive capacity does exist. But is there space or scope for the effective development of discursive capacity on these issues at devolved or local levels? The Welsh Government has commenced a review of digital innovation, including artificial intelligence (Welsh Government, 2018) led by a senior academic from Cardiff University. The Scottish Government has identified artificial intelligence and robotics as growth sectors (Heriot-Watt, 2017). It is not clear that any branch of UK local government has gone as far as New York in creating an Automated Decision Systems Task Force, including individuals from academic and legal communities, experts in data and technology, and leaders of nonprofits and think tanks to address how its own administration uses algorithms (NYC Mayor, 2018). Indeed, this may be a general problem. Mulgan notes 'visiting many city governments has

confirmed for me that their tools for thought and decision making lag far behind their tools for traffic management or infrastructure' (Mulgan, 2018: 147).

Conclusion

This chapter has considered current developments within the UK, seeking to take a preliminary snapshot of the state of governance readiness in respect of algorithmic decision-making. It is evident from the documentary material surveyed that this is an emergent field of governance, but that certain UK regulators, notably the FCA and ICO, have significant experience. The documentary evidence suggests that at this stage little account has been taken of multi-level governance, whether at devolved or local government level. The chapter has also sought to expand our understanding of the nature of the necessary administrative capacities required for governance readiness, adding the dimension of discursive capacity to those areas of capacity previously identified by Lodge and Wegrich and their collaborators (Lodge and Wegrich 2014a and b), which is felt to be especially importance given the dominant position of the 'Big Tech' companies, as noted by the House of Lords Select Committee. Further research could be undertaken by an audit of the algorithmic governance readiness of individual sectoral regulators and inspectorates, or of different levels of government within the UK, including through surveys or elite interviews, and deeper analysis of documentary materials. Comparative work that looks at the development of governance capacities in this domain in states other than the U.K. would be of great interest. The conclusions in this chapter must necessarily remain preliminary, as policy is developing at national and international levels and public and media awareness of the issues is largely restricted to elite audiences at the present time. As yet, we can only speculate whether algorithmic regulation will be disruptive of existing bureaucracies and

regulatory structures. What is certain is that the development of multi-level governance capacities in respect of algorithmic decision-making in society is urgent, if effective practical governance is not to be solely the domain of private 'Big Tech' companies.

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