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DOI:
[10.5334/tilr.303](https://doi.org/10.5334/tilr.303)

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Document Version
Publisher's PDF, also known as Version of record

Citation for published version (Harvard):
Yeung, K 2023, 'The New Public Analytics as an Emerging Paradigm in Public Sector Administration', *Tilburg Law Review*, vol. 27, no. 2, pp. 1–32. <https://doi.org/10.5334/tilr.303>

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The New Public Analytics as an Emerging Paradigm in Public Sector Administration

THE MONTESQUIEU
LECTURE

KAREN YEUNG 

 ubiquity press

ABSTRACT

The turn to data-driven approaches within public administration to inform (and even to automate) public sector decision-making can be understood as an emerging movement that I call the 'New Public Analytics' ('NPA'). Central to the New Public Analytics is the use of data analytics a form of computational analysis that has its theoretical foundations in data science and statistics, involving the application of software algorithms (including but not limited to machine learning algorithms) to large data sets in order to identify patterns and correlations in the data capable of generating 'actionable' insight. The lecture will explore, amongst other things, the problematic and potentially dangerous pathologies of NPA, underpinning the need for lawyers to critically scrutinise these developments in order to identify ways in which law can be harnessed to ensure that adequate public accountability for NPA techniques is ensured.

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KEYWORDS:

public sector; digitisation;
datafication; digital
government; New Public
Analytics

TO CITE THIS ARTICLE:

Karen Yeung, 'The New Public Analytics as an Emerging Paradigm in Public Sector Administration' (2022) 27(2) *Tilburg Law Review* pp. 1–32. DOI: <https://doi.org/10.5334/tlir.303>

It is a great honour to deliver the annual Montesquieu Lecture today, particularly because I was originally scheduled to do so in early 2020 just as the Covid-19 pandemic swept across Europe, international borders closed and entire populations were ordered to stay-at-home. As a result, it has been almost three years since I last delivered a lecture to an in-person audience. After all that we have lived through in those intervening years, it is, for me, a wonderful affirmation of life and of human community. There is much to celebrate about humanity, including our capacity for ground-breaking scientific research which enabled the development and production of life-saving Covid-19 vaccines. There are also many reasons to celebrate recent advances in computer science and software engineering which have powered the networked digital revolution that has transformed our lives in less than a generation. These powerful technologies are, however, a double-edged sword: their power, malleability, opacity and their unforeseen interactions and impacts upon the social world renders them dangerous, readily capable of producing unintentional harm and being deliberately weaponized in life-destroying rather than life-affirming ways.

The human cost produced by these technologies, particularly when employed by governments to deliver public services can, and has, devastated thousands of lives. There are many illustrative examples, but let me refer briefly to three, beginning with the Dutch Child benefits scandal. Although you are no doubt very familiar with this scandal, the scale and seriousness of the human cost is so shocking that it bears repeating.¹ In 2013, Dutch tax authorities began using an algorithmic system, which utilised ‘self-learning elements’, to assist in the early identification of benefits fraud.² It created automated risk profiles of individuals to identify suspected benefit fraudsters, configured as a ‘black box’ system (in which the inputs and outputs can be viewed, but the internal workings and logic cannot), deployed without meaningful human oversight. The system was configured to operate in an exceptionally harsh manner, such that, for example, applicants who acted in good faith and accidentally made minor administrative errors or made a late or incomplete payment were accused of fraud, thus triggering a severe penalty requiring repayment of *all* benefit payments that they had hitherto received. As a result, tens of thousands of parents and caregivers, mostly from low-income families, were falsely accused of fraud. People from ethnic minorities were disproportionately impacted by these extortionate debts, several victims committed suicide and more than a thousand children were taken into foster care.³ A similar experience occurred in Australia after the Australian Tax Office began using an automated data matching system to identify whether individuals were paying and receiving the correct amount of tax and benefits in 2016. Due to a mismatch between the underlying assumptions upon which those calculations were made and the way in which individuals earned income over time, almost half a million people received unlawful automatic debt notices demanding repayment of overpaid benefits, including those with disabilities, mental illness and many of whom were desperately poor, resulting in at least three reported suicides.⁴ Likewise, the automation of disability benefit assessment by an algorithmic system employed by the Arkansas Department of Human Services produced a number of apparently perverse decisions: for example, a person with an amputated foot was classed as having ‘no foot problems’ and therefore needed less rather than more assistance. As a result, severely disabled recipients were left alone without access to food, toilet, and medicine for hours on end, with half of the state’s Medicaid recipients negatively affected.⁵

¹ For a helpful, concise summary of the algorithmic decision-making system underpinning the Dutch child benefits scandal within its larger social and political context, drawing on multiple government sources and independent reports (including the Dutch Data Protection Authority), see Amnesty International (2021) *Xenophobic Machines*. Available at <https://www.amnesty.org/en/documents/eur35/4686/2021/en/> (accessed 20.10.22).

² Ibid, pp 15–17.

³ Gijs Herderschee, Ruim “1.100 kinderen van gedupeerden toeslagenaffaire werden uit huis geplaatst” 19 oktober 2021. Available at: <https://www.volkskrant.nl/nieuws-achtergrond/ruim-1-100-kinderen-van-gedupeerden-toeslagenaffaire-werden-uit-huis-geplaatst~baefb6ff/>.

⁴ Tapani Rinta-Kahila, Ida Someh, Nicole Gillespie, Marta Indulska & Shirley Gregor (2022) ‘Algorithmic decision-making and system destructiveness: A case of automatic debt recovery.’ *European Journal of Information Systems*, 31:3, 313–338, DOI: 10.1080/0960085X.2021.1960905.

⁵ C Lecher ‘What happens when an algorithm cuts your healthcare’ (2020) *The Verge*. Available at <https://www.theverge.com/2018/3/21/17144260/healthcare-medicare-algorithm-arkansas-cerebral-palsy> (Accessed 20 Oct 2022).

These are just a few well-known cases demonstrating the human costs exacted from governmental delegation of ostensibly mundane operational tasks to digital machines. Not only do these examples highlight the dangers of such delegation, but they show how the turn to digital machines to undertake governmental tasks can transform how public authority is exercised, distributed and experienced in ways that may result in public power being exercised unlawfully and arbitrarily, producing serious and devastating impacts on people's lives, and to do so at scale yet without meaningful transparency or practical opportunities for recourse by those to whom 'the computer says no'.⁶ Seen in this light, Montesquieu's insights remain as prescient today as they were at the time of his writing. At the heart of his analysis was a warning about the ever-present dangers of the accrual of power without constraint and the threat of despotic rule.⁷ He argued that power must be limited to prevent oppression of the people, and this required institutional safeguards designed into the constitutional fabric to ensure that governmental power is distributed, balanced, and constantly held in check.⁸ These cases suggest that our constitutional, legal and governance frameworks are not fit for purpose in a manner capable of giving effect to Montesquieu's admonitions. But before we, as lawyers and legal scholars, are able to identify why, and what might be done about it, we must understand how digital machines are transforming the way in which power and authority are generated, how it is distributed, exercised, by whom and – importantly, to ensure that we properly grasp the susceptibility of these machines to failure and abuse. Unless we do so first, we will have little hope of building practical, effective and meaningful safeguards.

Hence the primary aim of my lecture is to critically interrogate the growing embrace of datafication, digital automation, and algorithmic systems in the public sector. I make three central arguments, around which this lecture is structured. First, I argue that we are witnessing the emergence of a public sector reform movement I call the 'New Public Analytics', denoting the take-up of digital automation, algorithmic decision-making and data-driven technologies (which I will refer to collectively in this lecture as 'digital machines' for the sake of convenience) in public administration across many countries from around 2010 onwards, which is sufficiently distinctive, important and widespread that it constitutes an emerging 'paradigm' in public administration. To this end, I also sketch the content and contours of the amalgam of ideas that characterise the New Public Analytics as an analytical construct, identifying seven common characteristics that are rooted in their underlying computational foundations. Although its content and contours remain fluid and unsettled, the New Public Analytics can be understood as a conceptual and ideological successor to its most well-known predecessor, the 'New Public Management' and which, I hope, will provide a helpful vehicle for critical investigation and analysis. Secondly, I argue that the New Public Analytics has significant and troubling implications for practice of statecraft and the delivery of public services, for the relationship between states and individuals, including the nature of citizenship, and for the relationship between public and private power, particularly given the extent to which the development and operation of these digital machines are increasingly outsourced to private providers. Thirdly, to argue that the ostensibly procedural nature of the New Public Analytics and its concomitant 'substantive emptiness', enables digital machines to be deployed by governments, including self-described constitutional democratic states, in the service of a wide range of normative values and goals, disguising the pursuit of deeply political projects that are anti-democratic in their effects and consequences, even if not their explicit intention.

6 I have excluded from these examples the British Post Office Scandal, which resulted in the largest and most serious miscarriage of justice in British history in which 738 innocent people who, between 2000 and 2015, were wrongly prosecuted by the Post Office for theft, false accounting and fraud on the basis of balance discrepancies which resulted from seriously flawed financial accounting software system (the 'Horizon' system) produced by Fujitsu and which both the Post Office and Fujitsu were aware of but deliberately and systematically sought to conceal. Those affected are continuing their fight for justice and an independent statutory inquiry is ongoing: see <https://www.postofficehorizoninquiry.org.uk/> (accessed 4.11.22). For a thorough account, see Nick Wallis, *The Great Post Office Scandal* (2021, Bath Publishing, Bath).

7 Montesquieu, *The Spirit of the Laws* [1748] Anne M. Cohler, Basia Carolyn Miller and Harold Samuel Stone trans and ed. (Cambridge, Cambridge University Press, 1989).

8 M Loughlin (2000), *Sword and Scales* (Hart Publishing, Portland) 179–195.

1.1 THE NEW PUBLIC MANAGEMENT AS CONCEPTUAL PREDECESSOR TO THE NEW PUBLIC ANALYTICS

My lecture begins by stepping back four decades, to the era of Margaret Thatcher and Ronald Reagan, in order to understand the larger backdrop against which the New Public Analytics ('NPA') has emerged. During that time, sweeping transformations took place in public administration, which later came to be known in academic scholarship as the 'New Public Management' (NPM).⁹ The term itself, NPM, was coined in the late 1980s by political scientist Christopher Hood to denote a new emphasis on the use of market mechanisms in public service delivery and the use of private sector management techniques.¹⁰ NPM was rooted in the ideology of neoliberalism, particularly faith in the power of markets and competition to drive efficiency and quality improvement in public service delivery. These beliefs underpinned an ambitious programme of institutional restructuring across the public sector with the aim of mimicking private sector managerial logic. It involved organisational separation based on an alleged distinction between 'policy' and 'operational' matters, intended to give heads of public organisations more discretionary decision-space (over operational matters), leaving managers 'free to manage' within clear parameters in exchange for direct accountability.¹¹ The depth, sweep and longevity of the hold which NPM had over public administration was considerable, with British legal scholar Carol Harlow referring in 1997 to the 'overwhelming infiltration of NPM into public administration' describing it as a 'permanent feature of the administrative landscape'.¹² As an idea, however, NPM had been exhausted by 2010,¹³ and as early as 2001 Christopher Hood himself remarked that the term had 'outlived its analytic usefulness', yet 'in spite of its oft-proclaimed death, the term refuses to lie down and continues to be widely used'.¹⁴

1.2 PUBLIC SECTOR DIGITAL TRANSFORMATION

If we fast forward to 2022, another significant wave of reform appears to be unfolding within public administration across many countries, marked by the rapid and widespread embrace of algorithmic systems which rely on digital automation and datafication, albeit with varying degrees of sophistication, across multiple domains for a wide range of operational purposes. Reports from several sources identify substantial growth in the take-up of AI and automated systems in recent years, with the European Commission's Joint Research Centre advocating even greater levels of adoption.¹⁵ Although it is beyond the scope of this paper to offer a taxonomy of

⁹ Gruening, Gernod. "Origin and theoretical basis of New Public Management." *International public management journal* 4.1 (2001): 1–25.

¹⁰ Hood, Christopher. "A public management for all seasons?" *Public administration* 69.1 (1991): 3–19; Greve, Carsten. "Whatever happened to new public management?." Danish Political Science Association Meeting. 2010.

¹¹ Hood, Christopher, and Colin Scott. "Bureaucratic regulation and new public management in the United Kingdom: Mirror-image developments." *JL & Soc'y* 23 (1996): 321, 328. However, in the absence of *real* competition in public service provision, often NPM reforms entailed the introduction of raft of audit, regulation and oversight bodies ('bureaucrats') to compensate for the lack of full discipline of competition to monitor and evaluate performance against pre-specified benchmarks. Hence Hood and Scott refer to rise of bureaucratic regulation as 'mirror image development' of NPM. See Mark Freedland. "Government by contract and private law." [1994] *Public Law* 86–86.

¹² Harlow, Carol. "Back to basics: reinventing administrative law." *Public Law* [1997] 245–261.

¹³ As Greve points out, however, changes in public management and administration have been taking place gradually, piecemeal and over long time spells, so that many elements associated with NPM (such as performance contracts) still persist. Greve, Carsten. "Whatever happened to new public management?." Danish Political Science Association Meeting. 2010.

¹⁴ C Hood (2001). 'Public Management, New' in N.J Smeltser and P.B Bates (eds) *'International Encyclopedia of the Social & Behavioral Sciences*, Volume 12, Elsevier, Oxford 12553–12556. For an assessment of whether NPM delivered on its promises, see C Hood and R Dixon (2015) *A Government that Worked Better for Less? Evaluating Three Decades of Reform and Change in UK Central Government* (Oxford University Press, Oxford).

¹⁵ Algorithm Watch compared its 2020 and 2019 annual reports, commenting in its 2020 report that a notable feature was the "substantial acceleration in take up and variety of systems in the space of a single year, in comparison with the findings from its previous year's annual report" and that "the deployment of ADM systems has vastly increased in just over a year. ADM systems now affect almost all kinds of human activities, and most notably, the distribution of services to millions of European citizens – and their access to their rights," Algorithm Watch, *Automating Society 2020*, Bertelsmann Stiftung at 6. Available at <https://automatingsociety.org/> (Accessed 10 Nov 22); Berryhill J et al (2019) OECD, *Hello, World: Artificial Intelligence and its use in the public sector*. OECD Governance Working Papers Number 36, 72–89; Tangi et al, AI Watch. *European Landscape on the Use of Artificial Intelligence in the Public Sector*, EUR 31088 EN, Publications Office of the European Union, Luxembourg 2022 at 45. The Report states that it is, to the authors' knowledge, the only attempt to make a large inventory of AI cases in the public sector now available at the European level. The cases are available in Open Data at 60'.

these applications¹⁶ it is helpful to bear in mind several key technological dimensions of these systems. In particular, they all rely on computational algorithms which may be either:

- (1) deterministic, rule-based systems, ranging from very simple systems that are little more than digital vending machines (eg. automated payment systems for public services)¹⁷ through to much more complicated applications such as fraud detection systems based entirely on a complex but preconceived and deterministic decision tree.¹⁸
- (2) systems which utilise machine learning techniques for various purposes, including:
 - a) to *inform and support decision-making*, by performing tasks associated with ‘risk management’, ranging from risk detection, identification and assessment tasks, through to the scoring and sorting of ‘risk objects’, whether those objects are individuals (eg. children, migrants, benefit recipients, individuals arrested in taken into custody, suspected terrorists and so forth¹⁹) or things, including organisations, buildings, river quality, residential districts, vehicles, energy consumption etc.
 - b) to *optimise* the dynamic throughput and coordination of movable units to minimise congestion and bottlenecks for process optimisation, such as in timetabling, route planning or resources management under constraints, including traffic flow, human resource deployment and energy infrastructure;²⁰
 - c) to *identify and classify* objects and persons (and additionally to *locate* them), through the use of machine vision technologies, including biometric identification systems which automatically collect and analyse data obtained from or relating to a person’s body or behaviour, which may be used to uniquely identify them; and
 - d) to *automate human language-based tasks*, through automated speech and text recognition systems, such as those used in chatbots to provide citizens with automated advice.²¹

Although algorithms are an essential element of computational systems, four technological affordances appear to be particularly important in the take-up of digital machines in the public sector,²² notably

- the *digital database*, which is an organized collection of data stored and accessed electronically;
- the *data dashboard*, which is a digital interface which displays complex data to a user in visual form to help the user to acquire a quick overview of a situation to inform organisational decision-making.²³

16 See Tangi et al, AI Watch. *European Landscape on the Use of Artificial Intelligence in the Public Sector*, EUR 31088 EN, Publications Office of the European Union, Luxembourg 2022 for examples and their proposed and evolving taxonomy at 30–35. Engstrom et al, *Government by Algorithm: Artificial Intelligence in Federal Administrative Agencies*, NYU School of Law, Public Law Research Paper 20–54 (2020) at 10.

17 Simple deterministic algorithms are sometimes referred to in organisational parlance as ‘business rules’: C Gavaghan, A Knott, J Maclaurin, J Zerelli and J Liddicoat (2019) *Government Use of Artificial Intelligence in New Zealand*, New Zealand Law Foundation, Wellington at 14–15.

18 Hildebrandt, Mireille. ‘Smart technologies.’ *Internet Policy Review* 9.4 (2020): 1–16.

19 In the English local authority context, see Dencik, L., Redden, J., Hintz, A., & Warne, H. (2019). The ‘golden view’: data-driven governance in the scoring society. *Internet Policy Review*, 8(2), 1–24. In the US Federal context, see Engstrom et al, *supra*.

20 Gavaghan et al, *supra* n.17 at 14–15. Tangi et al. *supra* n.17 at 38.

21 Tangi et al *supra* n.17 at 38.

22 For an account of the development of ICT in social welfare over time, see P Henman ‘Digital Technologies and Artificial Intelligence in Social Welfare Research: A Computer Science Perspective’ in M Adler (ed) (2022) *A Research Agenda for Social Welfare Law, Policy, Practice and Impact*, Edward Elgar.

23 For example, in late 2012, the UK Government Digital Service (GDS) created a new way for the Prime Minister to keep track of top events, which became known as the ‘Number 10 Dashboard’, providing performance indicators on a number of government services, real-time information on aspects of the economy, trends from social media and expert commentary, all integrated into a single screen with the capacity to ‘drill down’ as needed: J Barlett and N Tkacz (2017) *Governance by Dashboard*, Demos, London at 7.

- *digital sensors and sensing technology*, which detect changes in the environment, converting a physical phenomenon (sound, image, audio, temperature etc) into a measurable digital signal.²⁴
- *global positioning systems* (GPS) which enable GPS receivers (now routinely installed in smartphones) to connect to a space-based radio-navigation system that broadcasts highly accurate navigation pulses to users on or near Earth to pinpoint the receiver's location and thus facilitate navigation and location mapping.²⁵

1.3 CONTEXT AND DRIVERS: WHY HAS PUBLIC SECTOR DIGITAL TRANSFORMATION FOUND FAVOUR?

Like NPM which preceded it, no single factor explains the 'algorithmic turn' in public sector administration.²⁶ Rather, it has been fuelled by a conjunction of technological advances and socio-economic factors, providing fertile soil in which the seeds for experimentation with digital machines, and their permanent deployment, have taken root. The most significant technical advances are the emergence of the internet and the rise of cloud computing through which data can be stored, processed and managed on remote servers in real-time. These have enabled the rapid and widespread take-up and diffusion of internet-enabled 'smart' devices embedded in everyday use which have, in turn, facilitated the on-going 'data deluge'. Together with advances in machine learning, these technological developments have precipitated the rise of 'big data analytics' (or simply 'big data') entailing the automated application of machine learning algorithms parsed on massive data sets generated by user click streams ('digital breadcrumbs') to generate predictions about the likely behaviour and interests of individuals across a population.²⁷ Big data analytics is now commonly used to automate a wide range of functions in the commercial and consumer contexts, having rapidly and radically transformed the marketing, entertainment and retail sectors.²⁸ Moreover, these technologies have fuelled the rapid, meteoric rise of digital platforms and the so-called 'platform economy' which rely on automated digital intermediation, utilising machine learning algorithms to identify, distribute and deliver personalised media content and services to users in real-time, so that six out of the top eight largest companies in the world by market capitalisation are now occupied by digital tech titans Apple, Microsoft, Alphabet (Google), Amazon, Tesla, and Meta (Facebook).²⁹

A number of social, economic and political drivers have also contributed to the growing take-up of digital automation and data-driven technologies within the public sector, with the phenomenal success of these technologies in commerce being the most significant.³⁰ In addition, the pursuit of austerity policies that have seriously reduced public sector budgets has prompted growing interest in automation to reduce labour costs while increasing efficiency and productivity.³¹ Recognition that existing troves of administrative data held by public sector organisations might be usefully repurposed fuelled by prominent representations of data in public and popular discourse as a highly valuable asset (the 'new oil') and a desire to be seen as 'innovators' employing the latest cutting-edge technologies rather than crusty

²⁴ Cf Johns, F. (2017). Data, Detection, and the Redistribution of the Sensible in International Law. *American Journal of International Law*, 111(1), 57–103. doi:10.1017/ajil.2016.4.

²⁵ See 'GPS Navigation' Britannica. Available at <https://www.britannica.com/technology/GPS> (Accessed 21.10.22). Tangi et al report from their landscape survey of AI use within the public sector in the EU that 24 % of the cases identified employed location data at 43.

²⁶ Hood (1990) *supra*, 6.

²⁷ Mayer-Schönberger, V., & Cukier, K. (2013). *Big data: A revolution that will transform how we live, work, and think*. Houghton Mifflin Harcourt.

²⁸ Agrawal, A., Gans, J., & Goldfarb, A. (2018). *Prediction machines: the simple economics of artificial intelligence*. Harvard Business Press.

²⁹ Statista Research, 'The 100 largest companies in the world by market capitalization in 2022'. Available at <https://www.statista.com/statistics/263264/top-companies-in-the-world-by-market-capitalization/> (Accessed 7 October 2022).

³⁰ This process of organisational mimicry is referred to as 'institutional isomorphism' in academic literature: P diMaggio, Paul J., and Walter W. Powell. "The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields." *American sociological review* (1983): 147–160.

³¹ Dencik, Lina. "The datafied welfare state: a perspective from the UK," In Andreas Hepp, Juliane Jarke & Leif Kramp (eds.) *New Perspectives in Critical Data Studies*. Palgrave Macmillan, Cham, 2022. 145–165.

bureaucrats wedded to out-dated practices, are also likely to be significant drivers.³² Finally, global technology and management consultants have (and continue to be) important agents of change, peddling a variety of automated, ‘data-driven solutions’ accompanied by glittering promises of better, faster, cheaper and more personalised public sector processes and outcomes,³³ which may be particularly attractive to public sector managers operating in a climate of distrust of professional elites and growing reliance on standardisation, auditing, central control and a desire for ‘synoptic legibility to the centre.’³⁴

2. WHAT IS THE NEW PUBLIC ANALYTICS (NPA)?

What, then, do I mean by the New Public Analytics (NPA)? I use the term as a convenient, shorthand expression intended to serve three purposes. First, to denote a wide variety of public sector reform projects and programmes involving the take-up of digital automation, algorithmic decision-making and data-driven technologies in public administration and public service delivery across many countries from around 2010 onwards. Secondly, to signify that the distinctiveness, growing significance and increasingly broad diffusion of this trend across multiple sites amounts to an emerging ‘paradigm’ in public administration whose contours remain fluid and unsettled.³⁵ In so doing, I am not suggesting that it is the only, or most important reform movement, but it is clearly a significant one and worthy of critical investigation.³⁶ Furthermore, by labelling this movement the ‘New Public Analytics’ I intentionally seek to invoke both continuity and discontinuity with the ‘New Public Management’.³⁷ Thirdly, I use the term to refer to an analytical construct, referring to a wide range of technological applications that rely on networked digital technologies taken up in public administration that display a number of common characteristics (see Table 1) and which seek to mimic or borrow from the success of commercial techniques.

2.1 NPA AS A VEHICLE FOR UNDERSTANDING AND INVESTIGATING PUBLIC SECTOR DIGITISATION AND DATAFICATION

The take-up of IT and ICTs in government has been examined by scholars over the last 40 years or so using a variety of terms and labels including e-government,³⁸ information age

³² In addition, the ‘open data’ movement and associated legal and policy initiatives to facilitate the ‘opening up’ of data held by public authorities, is grounded on a shared assumption that datasets can generate economic value and hence making them openly available will allow the potential value of data to be ‘unlocked’. See for example the work of the Open Data Institute available at <https://theodi.org/>.

³³ As Rieder puts it ‘big data is not just a fashionable catchphrase; it is a modern myth that has inspired an almost religious following....structured around a logic of promise and obligation that deals in metaphors and visions, hopes dreams and ambitions....[which] acts as a powerful rhetorical device designed to boost support and ensure public consent’: Rieder, Gernot. “Tracing big data imaginaries through public policy: the case of the European Commission.” In A.R Saethan, I Schneider and N Green (eds) *The Politics and Policies of Big Data: Big Data, Big Brother?*. Routledge, New York, 2018. 89–109.

³⁴ Scott, *supra* n.17 at 219. M Moran, *The British Regulatory State* (2003) OUP, Oxford at 7. For example, it is reported by 2017, the UK Government Digital Service had created over 800 dashboards for use by government departments following the renewed interest in transparency following the 2009 ministerial expenses scandal and a more general shift towards opening up government data: Barlett and Tkacz (2017) *supra* at 7. See Tangi et al, *supra* n.16 at 47 for a list of contextual factors identified as likely to influence AI implementation in the public sector.

³⁵ By using term ‘paradigm’, I simply mean that reforms to public administration appear to be on the cusp of a ‘paradigmatic shift’, defined by the Cambridge Dictionary as a ‘time when the usual and accepted way of doing or thinking about something changes completely’ rather than suggesting that discoveries in the ‘science’ of public administration and management are bringing about a revolution in understanding and practice in the Kuhnian sense. Gruening (*supra* n.9) observes that NPM is ‘not’ a paradigm in the Kuhnian sense because the ‘administrative science’ does not fit Kuhn’s definition and understanding of science.

³⁶ See for example Reiter, Renate, and Tanja Klenk. “The manifold meanings of ‘post-New Public Management’—a systematic literature review.” *International review of administrative sciences* 85.1 (2019): 11–27; Greve (2010), *supra* n.10.

³⁷ For an analysis of the similarities and differences between NPA and NPM see Karen Yeung, ‘From the New Public Management to the New Public Analytics: Towards a New Public Law 2.0?’ Keynote Address, Swedish Network on Automated Decision-making in the Public Sector, 16 November 2020, hosted online due to Covid restrictions. See <https://annekaun.com/adm-network/> (Accessed 4.11.21). In terms of continuity, the ‘use of IT’ was identified by Hood as one of the 7 characteristics of NPM see Hood *supra* n.10. See also Greve, *supra* n.10, who includes in his description of NPM a ‘focus on technology (IT) as a key tool to achieve efficiency’ at 6.

³⁸ Silcock, Rachel. “What is e-government.” *Parliamentary Affairs* 54.1 (2001): 88–101; Morison, John. “e-Government: a new architecture of government and a new challenge for learning and teaching public law.” [2003] *Public Law* 14–23; Mosse, Benjamin, and Edgar A. Whitley. “Critically classifying: UK e-government website benchmarking and the recasting of the citizen as customer.” *Information Systems Journal* 19.2 (2009): 149–173. Norton, P. (2008). Directgov: the right direction for e-government or a missed opportunity?. *The Journal of Information, Law and Technology (JILT)*, 1.

CHARACTERISTIC TRAIT	DESCRIPTION	VALUE PROPOSITION
Governance through algorithms	Algorithmic ordering rests on mathematical logic	Reliance on the parsing of data by software algorithms to produce useful outputs, including predictions based on past data patterns, enabling the automation of tasks, including anticipatory interventions
Theoretical foundations in data science and statistics and other computer-science related fields	Data scientists rely on maths and statistics and, in order to prepare data for effective analysis, must be capable of writing efficient and maintainable software code and using machine learning and artificial intelligence (AI) techniques	Can develop and apply algorithms to datasets to generate informational, prediction-based tools via algorithmic identification of patterns in historic datasets to generate predictions that may be useful for organisational decision-making
Reliance on datafication, databases and data access	Quantification of everything in terms of digital data	Increased consistency, objectivity and traceability of decisions while offering accurate predictions and synoptic legibility at a highly granular level yet extending across large populations and diverse yet broad geospatial areas and environments
Automation of tasks involved in governmental functions and/or service delivery	Tasks formerly performed by human can be performed by machines	Reduces burden of human labour and associated labour cost while enhancing productivity
Typically developed through iterative adaptation and experimentation	Agile methods approach to software and system development via continual trial and error	Allows early discovery of mistakes during development, more responsive to client feedback and changing needs
Embedded within complex, socio-technical systems purposefully configured to pursue 'optimal' system outcomes, viewed from the perspective of the system's director	These systems include computational networks, people (data scientists, software engineers, interface designers, operators, reviewers, users), organisations, norms and practices, all connected to a broader social endeavour oriented towards knowledge production	System can be configured to 'optimise' designated system outcomes (as indicated by quantifiable performance metrics) viewed from the perspective of the system director and may therefore be sub-optimal for others
Seeks to mimic the success and experience of using digital technologies and data systems by commercial organisations to 'improve' operations, thus politically agnostic and largely procedural in orientation	Aim is process improvement rather than grand substantive ambitions	Procedural orientation nevertheless incorporates technical properties and development and design styles associated with tacit political promises of: (i) datafication (ii) automation (iii) smartness (iv) continuous experimentation and (v) the seamless user experience

Table 1 The Seven Common Traits of the New Public Analytics.

government,³⁹ digital government,⁴⁰ digital era governance,⁴¹ the digital state⁴² and more recently increasing attention has turned to both automation ('the automated state'⁴³) and

³⁹ Bellamy, Christine. "Implementing Information-Age Government: principles, progress and paradox." *Public Policy and Administration* 15.1 (2000): 29–42.

⁴⁰ West, Darrell M. *Digital government: Technology and public sector performance*. Princeton University Press, 2005. Robertson, S. P. and Vatrappu, R. K. (2010), 'Digital government' *Ann. Rev. Info. Sci. Tech.*, 44: 317–364. doi:10.1002/aris.2010.1440440115.

⁴¹ Dunleavy, P., Margetts, H., Bastow, S., & Tinkler, J. (2006). 'New public management is dead—long live digital-era governance'. *Journal of public administration research and theory*, 16(3), 467–494; Margetts, Helen, and Patrick Dunleavy. "The second wave of digital-era governance: a quasi-paradigm for government on the Web." *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences* 371.1987 (2013): 20120382.

⁴² Borins, Sandford F., Kenneth Kernaghan, and David Brown (eds). *The Digital state at the leading edge*. University of Toronto Press, 2007.

⁴³ Calo, Ryan, and Danielle Keats Citron. "The automated administrative state: A crisis of legitimacy." *Emory LJ* 70 (2020): 797; Coglianese, Cary. "Administrative law in the automated state." *Daedalus* 150.3 (2021): 104–120.

the use of machine learning in government ('artificially intelligent government'⁴⁴). Until very recently, scholarly examination of these technologies has been a relatively limited and rather niche field⁴⁵ but academic interest has exploded following the growing embrace of 'big data analytics' and the use of machine learning in government to inform decision-making and practice.⁴⁶ In the discussion which follows, I seek to establish the groundwork for developing NPA as an analytical construct which I hope will serve as a heuristic to facilitate further systematic, critical investigation and comparative examination, much like the role played by its conceptual predecessor, the New Public Management.

2.2 NPA'S SEVEN COMMON TRAITS

By looking across the range of automated digital tools and socio-technical systems that are being taken up in the public sector, it is possible to identify the following seven distinctive logics, beliefs, assumptions and practices that, to a greater or lesser extent, are present within any given NPA project or system.

(1) NPA techniques entail governance through algorithms

At the heart of all NPA technologies, techniques and systems are computational processes. Accordingly, they rely on two critical elements, data and algorithms, which together constitute both sides of the computer's ontological world.⁴⁷ For present purposes, algorithms, which are basically lists of mathematical instructions encoded into software programs, include both deterministic rule-based algorithms (grounded in knowledge representation and symbol manipulation) and machine learning algorithms (which are capable of learning from feedback and experience to improve their performance against a specified performance metric).⁴⁸ Accordingly, NPA relies on what I have referred to elsewhere as 'algorithmic regulation' as its underpinning form of social ordering and mode of governance, grounded in the mathematical logic as its basis for ordering and coordination.⁴⁹ As media scholar Gillespie observes, when the descriptor 'algorithmic' is typically used by social scientists, their central concern is with the commitment to a computational procedure and the way that procedure distances its human operators from both the point of contact with others and the mantle of responsibility for the intervention they make.⁵⁰ Unlike earlier academic investigations of the use of ICT in government (such as 'e-government') which were primarily concerned about internet-enabled communication between state-citizen and public sector organisations/actors, NPA is concerned primarily with the automation of *task performance*, including the algorithmic processing of data to inform decision-making and/or automate action. Where these systems employ machine

⁴⁴ D.F. Engstrom and D.E. Ho 'Artificially Intelligent Government: A Review and Agenda' in Roland Vogl (2020) ed, *Big Data Law*.

⁴⁵ On forecasting the impact of ICT in the public sector, see Bannister, Frank, and Regina Connolly. "The future ain't what it used to be: Forecasting the impact of ICT on the public sphere." *Government Information Quarterly* 37.1 (2020): 101410.

⁴⁶ Eg. Hu, Margaret. "Big data blacklisting." *Fla. L. Rev.* 67 (2015): 1735; Houser, Kimberly A., and Debra Sanders. "The use of big data analytics by the IRS: Efficient solutions or the end of privacy as we know it." *Vand. J. Ent. & Tech. L.* 19 (2016): 817; Cobbe, Jennifer. "Administrative law and the machines of government: judicial review of automated public-sector decision-making." *Legal Studies* 39.4 (2019): 636–655; Veale, Michael, Max Van Kleek, and Reuben Binns. "Fairness and accountability design needs for algorithmic support in high-stakes public sector decision-making." *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*. 2018.

⁴⁷ Manovich L (1999) Database as Symbolic Form. *Convergence* 5(2), 80–99.

⁴⁸ Mitchell, T. M., & Mitchell, T. M. (1997). *Machine Learning* (Vol. 1, No. 9). New York: McGraw-hill.

⁴⁹ Yeung, Karen. "Algorithmic regulation: A critical interrogation." *Regulation & Governance* 12.4 (2018): 505–523 at 507; Yeung, Karen, and Martin Lodge (eds). *Algorithmic Regulation*. Oxford University Press, 2019, Oxford; Ulbricht, Lena, and Karen Yeung. "Algorithmic regulation: A maturing concept for investigating regulation of and through algorithms." *Regulation & Governance* 16.1 (2022): 3–22.

⁵⁰ Gillespie, Tarleton. "The relevance of algorithms." *Media technologies: Essays on communication, materiality, and society* 167.2014 (2014): 167.

(2) Is theoretically grounded in data science and statistics

The analytic techniques through which the datasets are transformed into organisationally useful knowledge (‘actionable insight’) are theoretically grounded in computer science and related fields including data science, statistics and software engineering and human computer interaction. ML techniques make advanced forms of statistical analysis possible by utilising computational power to automate data analysis via the application of ML algorithms to historic datasets (which are often large and unwieldy in structure and organisation) to generate a statistical model.⁵² The data scientist employing supervised ML techniques to create a prediction model does not begin with a pre-specified hypothesis but begins instead with an existing ‘bag’ of data, and then applies an ML algorithm that automatically seeks out patterns and correlations in the data to undertake the model-building process.⁵³ These techniques differ substantially from ‘conventional’ statistical approaches to data analysis. Conventional statistical approaches are best understood as *scientific endeavours* aimed at generating robust and replicable knowledge that proceeds through careful research design involving several steps: (1) formulation of a statistical hypothesis, (2) data collection (3) data analysis and testing of hypothesis (4) interpretation of results.⁵⁴ In contrast, algorithmic tools used to inform organisational decision-making are best understood as a technology: a useful tool for achieving a given organisational purpose, rather than a scientific endeavour aimed at generating robust and replicable scientific knowledge about a given phenomenon.⁵⁵ As several management scholars explain:⁵⁶

ML science had different goals from statistics. Whereas statistics emphasised being correct on average, ML did not require that. Instead, the goal was operational effectiveness. Predictions could have biases so long as they were better (something that was possible with powerful computers)...traditional statistical methods require the articulation of hypotheses or at least human intuition for model specification. Machine learning has less need to specify in advance what goes into the model and can accommodate the equivalent of much more complex models with many more interactions between variables.

Both conventional statistical and ML approaches operate through calculative processes that seek to identify correlations among data, which are *not* indicative of causal relationships between data.⁵⁷

⁵¹ Aradau and Blanke use the term ‘algorithmic reason’ to describe a form of ‘political rationality’ which requires access to and algorithmic processing of ‘big data’ as conventionally understood in terms of volume, velocity and variety in which machine learning algorithms works ‘through decomposing and recomposing the small and large and thus recasting the political relationship between individuals and populations... [that] makes differences through partitioning and ‘cutting’ through a world as data’ (at 7). They claim that its ‘distinctive promise is not that of endless correlation or infinite association, but that of surmounting the epistemic separation of large-n/small-n through relations that are endlessly decomposable and recomposable’ (at 25): Claudia Aradau & Tobias Blanke (2022) *Algorithmic Reason*, Oxford University Press, Oxford at 7.

⁵² Bzdok et al, “Statistics versus machine learning,” Agresti and Franklin, *Statistics: The Art and Science of Learning from Data*.

⁵³ Mannila, Heikki. “Data mining: machine learning, statistics, and databases.” *Proceedings of 8th International Conference on Scientific and Statistical Data Base Management*. IEEE, 1996.

⁵⁴ Agresti, Alan, and Christine Franklin. *The Art and Science of Learning from Data*. Upper Saddle River, New Jersey 88 (2007).

⁵⁵ It is important to recognise, however, that ML *can* be and is used as a scientific tool for data-gathering for the purposes of scientific investigations aimed at producing robust, replicable knowledge. On the difference between conventional statistics and machine learning for anomaly detection in a variety of application areas, see Aradau and Blanke (2022) *supra* n 51 at 79–80.

⁵⁶ Ajay Agrawal, Avi Goldfarb, and Joshua Gans, *Prediction Machines: The Simple Economics of Artificial Intelligence* (Boston: Harvard Business Review Press, 2018), 40.

⁵⁷ However, conditional probability techniques may be employed in ways that may help to isolate and identify causal pathways: Pearl, Judea & Dana Mackenzie. *The Book of Why: The New Science of Cause and Effect*. Basic books, 2018.

(3) Relies upon processes of datafication, databases and access to data sets

Without digital data to serve as inputs, even the most sophisticated algorithm is little more than a hollow shell. The success of these technologies in the service of commercial digital platforms and intermediaries relies on their capacity continuously and automatically to collect the ‘digital breadcrumbs’ gleaned from tracking online user behaviour, reflecting conventional understandings of ‘big’ data in terms of its very high ‘volume, velocity, variety’.⁵⁸ The production of, and ready access to, digital data sets to feed algorithmic systems is therefore a vital element which NPA technologies ideally require. In other words, NPA relies on processes of *datafication*, a term popularised by Cukier and Mayer-Schönberger who claim that ‘to datafy a phenomenon is to put it in a quantified format so it can be tabulated and analysed’.⁵⁹ However, as critical studies of datafication have emphasised, the production of data cannot be separated from two essential elements: the external infrastructure via which it is collected, processed and stored, and the processes of value generation, which include monetisation but also means of state control, cultural production, civic empowerment, etc.⁶⁰ According to Mejias and Couldry, the term ‘datafication’ has rapidly acquired an additional meaning, referring to the wider transformation of human life so that its elements can be a continual source of data.⁶¹ Furthermore, for big data to deliver on its promise of accurately predicting and therefore pre-empting every aspect of our professional, personal and social behaviour, Andrejevic argues that this requires data collection on such a comprehensive scale that is only imaginable with pervasive, automated surveillance through distributed, embedded, always-on sensing networks that allow comprehensive monitoring not just of individuals, but also of populations and environments.⁶² For governments in liberal democratic states, however, this kind of behavioural data may not (yet) be readily or routinely available, for it is largely in the hands of the private tech titans, relying instead of administrative data which is far more episodic, incomplete and often error-prone.⁶³

(4) Utilises digital automation to undertake governmental functions and deliver public services

One of the most significant transformations enabled by the take-up of networked digital technologies is the automation of tasks and functions, either fully or partially, referring to the capacity of a system to function without direct human intervention.⁶⁴ The range of tasks and functions which may be automated, and the decision-objects upon which they operate, vary widely depending upon the domain and context of application. Tasks may include sorting, scoring, ranking, visualisation, reporting and verification, intended to inform or even to automatically trigger a specific action, whether to prioritise, distribute, manipulate, admit or exclude, while the list of potential objects that may be subject to algorithmic analysis and automation is virtually infinite, including individual persons claiming eligibility for a specific governmental benefit or status, organisational tasks, packages and objects, vehicles and so forth. The outputs produced by these socio-technical systems, particularly when deployed in ‘rights-critical’ contexts⁶⁵ to determine how a person is treated by the state, can have significant

⁵⁸ Rob Kitchen (2014) ‘Big Data, new epistemologies and paradigm shifts’ *Big Data & Society* 1–12. From his review of academic literature, Kitchen distils a further set of traits, in addition to the so-called ‘3 Vs’ to satisfy big data ideal, namely exhaustive in scope, striving to capture entire populations or systems (n = all); fine-grained in resolution and uniquely indexical in identification; relational in nature, containing common fields that enable the conjoining of different data sets; flexible, holding the traits of extensionality (can add new fields easily) and scalability (can expand in size rapidly) at p 1–2.

⁵⁹ Mayer-Schönberger and Cukier, *supra* n.27 at 78.

⁶⁰ Mejias, Ulises A. and Nick Couldry. “Datafication”. *Internet Policy Review* 8.4 (2019). Accessed 8 Oct. 2022.

⁶¹ *Ibid.*

⁶² Andrejevic, Mark. ‘Automating Surveillance.’ *Surveillance & Society* 17 (2019): 7–13. On the need for material devices to render a multitude of acts into computable data to create ‘new regimes of truth and knowledge’ see Aradau and Blanke, *supra* n.51 at 35–41.

⁶³ Electronic Government: 17th IFIP WG 8.5 International Conference, EGOV 2018, Krems, Austria, September 3–5, 2018, Proceedings. (2018). Germany: Springer International Publishing at 229.

⁶⁴ As Luke Munn explains, at the root of the word ‘automation’ is a claim to become self-acting, to move and act on its own’ – essentially, without the need for direct human intervention: Munn, Luke. *Automation is a Myth*. Stanford University Press, 2022 at 11.

⁶⁵ I have argued elsewhere that both ‘rights critical’ and ‘safety critical’ contexts are ‘high stakes’ decision contexts, but the former cannot be adequately understood without legal knowledge, understanding and expertise: Karen Yeung and Adam Harkens ‘How do technical design choices made when building algorithmic decision-making tools for criminal justice authorities create constitutional dangers?: Part I’ [2023] *Public Law*, forthcoming.

(5) Are typically developed through iterative adaptation and experimentation

The model of development through which NPA typically proceeds is strongly influenced by the so-called ‘agile methods’ approach which emerged in software development during the late 1990s, originally conceived for small software projects. Agile development emerged in response to perceived failures and shortcomings of the traditional ‘waterfall’ approach to software development which conventionally applied to government IT projects. Waterfall methods entail step-wise programming and larger project testing with no possibility of reverting to earlier development phase. They are typically slow and unwieldy, requiring the client to await delivery at the end of the traditional IT contracting agreement and are prone to substantial cost and project overruns yet often fail to meet client needs and expectations. In contrast, agile software development approaches involve creating, testing, and improving software programmes incrementally and dynamically in short, iterative ‘sprints’ aimed at responding rapidly to changes or mistakes discovered in the development process through early and continuous client feedback.⁶⁶ This development mindset is, according to Orit Halpern and her collaborators, characteristic of ‘smart’ systems which are fed by real-time data streams, based on an operational logic of permanent ‘experimentation’ through continual iterative revision and the production of ‘demos’ (‘always in beta’, ‘even then, we won’t be done’⁶⁷) in place of deliberative planning reliant on expert judgement, reason, rationality, expertise and discretion, drawing on the ‘collective intelligence’ generated from data collected on a highly granular basis from across large populations.⁶⁸

(6) NPA technologies are embedded within complex, socio-technical systems purposefully configured to pursue ‘optimal’ system outcomes, viewed from the perspective of the system’s director

Although discussions of digital transformation often focus on their underlying computational core, these technologies are typically embedded within complex socio-technical systems comprised of heterogenous assemblages of people, processes and things, including material and non-material components, norms, practices and understandings. Hence social scientists typically use the term ‘algorithmic’ as an adjective to describe the sociotechnical assemblage that includes not just algorithms but also the computational networks in which they function, the people who design and operate them, the data (and users) on which they act, and the institutions that provide these services, all connected to a broader social endeavour and constituting part of a family of authoritative systems for knowledge production.⁶⁹ Despite the heterogenous composition of these socio-technical systems, for organisational purposes, the design and configuration of these systems is intentionally directed towards generating ‘optimal’ outcomes, viewed from the perspective of the commissioning organisation’s director. As a result, there will invariably be instances in which others affected by the system’s operations may

66 See for example <https://www.gov.uk/service-manual/agile-delivery/agile-government-services-introduction> (Accessed 26.10.22). The UK’s digitisation of ‘universal credit’ was intentionally undertaken via the use of agile methods: see Universal Credit 2020 report referred to below. M Beaven ‘Riding the paradigm: where agile meets programme’ (2012) UK Government Digital Services Blog. Available at <https://gds.blog.gov.uk/2012/06/20/riding-the-paradigm-where-agile-meets-programme/> (Accessed 25 Oct 22).

67 See Stephen Foresheaw-Cain, UK GDS Blogpost 11 May 2016 ‘What government might look like in 2030’ which sets out the author’s vision of government in 2030. Available at <https://gds.blog.gov.uk/2016/05/11/what-government-might-look-like-in-2030/> (Accessed 4.11.22). Discussed by Karen Yeung, ‘Towards an Understanding of Public Policy and Administration After the Agile Turn’, Keynote Address, WZB Mercator Forum Science and Politics 2018, *Big Data 4 Policy: Experimental Policy Through Big Data*, Berlin 6–7 December 2018, Berlin.

68 Halpern, Orit, Robert Mitchell, and Bernard Dionysius Geoghegan. “The smartness mandate: Notes toward a critique.” *Grey Room* 68 (2017): 106–129. On the use of digital and data-driven tools for ‘humanitarian experimentation’ see Sandvik, K., Jacobsen, K., & McDonald, S. (2017). ‘Do no harm: A taxonomy of the challenges of humanitarian experimentation’. *International Review of the Red Cross*, 99(904), 319–344. doi:10.1017/S181638311700042X.

69 Gillespie, *supra* n.50 As anthropologist Nick Seaver puts it ‘algorithms are not autonomous technical objects but complex sociotechnical systems...while discourses about algorithms sometimes describe them as ‘unsupervised’ working without a human in the loop, in practice there are no unsupervised algorithms. If you cannot see a human in the loop, you just need to look for a bigger loop’: N Seaver (2018) ‘What should an anthropology of algorithms do?’ *Cultural Anthropology* 33(2) 375–385.

receive and experience less-than-optimal outcomes. For example, location-based services like Waze and Google Maps (offering navigation and live traffic services) are configured to provide users with ‘optimal’ driving routes defined as the fastest route to their specified destination. But their suggested routes may disadvantage others, for example, by redirecting users away from major routes through what were once quiet, relatively traffic-free suburban neighbourhoods, transforming them into busy, noisy, polluted and more dangerous places of residence.⁷⁰

(7) NPA’s offers process improvement, eschewing grand substantive ambitions

By seeking to mimic the successful use of digital technologies and data systems by commercial firms to ‘improve’ and ‘optimise’ public sector operations, NPA emphasises process improvement, appearing politically agnostic and eschewing grand substantive ambitions. However, the overarching substantive goal of public sector service delivery or decision-making is elusive, multifarious and contestable, unlike the objective of commercial firms, which is widely understood as a quest to maximise shareholder value.⁷¹ Accordingly, the configuration of algorithmic systems in public administration rarely entails the straightforward translation of a single, clear overarching objective into a series of operational goals that can be quantified and measured.⁷² Unlike NPM, which explicitly championed the value of efficiency,⁷³ NPA lacks a unified and explicit substantive ambition. NPA digital reform projects are instead presented as devoid of grand political aspirations with more mundane procedural ambitions of ‘improved’ or ‘better’ public service delivery analogous to NPM’s portrayal as politically agnostic, affiliated with neither a Right or Left political agenda.⁷⁴ Nevertheless, advocates of NPA appeal to a series of distinct but related ideas and beliefs (associated with the properties of networked digital technologies and a particular kind of development style) that bear distinct ‘ideological overtones’, even if they fall short of a fully developed, systematic set of political beliefs and commitment concerning politics, economics, or society forming the basis of action or policy and to which I now turn.

2.4 NPA’S TACIT POLITICAL PROMISES

Although digital transformation of the public sector is portrayed as devoid of grand political aspirations, the take-up of NPA technologies and systems bears distinct ideological overtones associated with particular technological properties and design & development styles. While the extent to which these properties and/or styles are evident in any given socio-technical system through which public sector services are delivered will vary depending upon its specific domain and context of application, I suspect that it would be difficult to identify any case in which less than three are present. Their significance, for the purposes of my analytical framework, lies in the *tacit political promises* that they imply. Each is associated with a particular set of beliefs and assumptions about their anticipated value and virtues, and/or which arise from the way in which NPA technologies are imagined and translated into real-world socio-technical systems, notably reliance upon:

- (i) automation;
- (ii) datafication;
- (iii) smartness;
- (iv) continuous experimentation; and
- (v) the seamless user experience.

70 S Gürses, R Overdorf, E Balsa (2018) ‘POTs: The revolution will not be optimized.’ arXiv preprint arXiv:1806.02711. Available at <https://dl.acm.org/doi/pdf/10.1145/3351095.3372853> (Accessed 4.11.22).

71 M Mazzucato, *The Value of Everything* (2019) Penguin, London, 165–167.

72 As Halpern and her colleagues explain, ‘Contemporary optimization is a fundamentally quantitative but calculation-intensive operation: it is a matter of finding, given specified constraints, maxima or minima’, Halpern et al *supra* n.68.

73 The overarching substantive goal of NPM was *efficiency* in government, reflecting the aspirations of economic theory, based on the premise that economic waste was unequivocally ‘bad’. It is universally accepted that it is better to allocate resources efficiently than to ‘waste’ them, based on an assumption reflected in mainstream economics that willingness to pay is a reliable indicator of individual preferences.

74 Hood, *supra* n.10.

Due to limitations of time, I am not able to unpack each of these claims at length but merely offer a brief outline, highlighting the virtue or value that each property or style is expected to generate.

- (a) Automation:** Automation refers to the capacity of a system to function without direct human intervention.⁷⁵ Although it is typically portrayed as ‘eliminating’ human labour, several critics emphasise that, in reality, automation merely transforms labour, concealing it from view while the human tasks that are essential for machinic systems to function as intended are rendered more mundane yet emotionally and often physically strenuous. Hence Astra Taylor regards automation as both a reality and an ideology, railing against the very term ‘automation’ due to its basis in the myth of human obsolescence, preferring the term ‘fauxautomation’.⁷⁶ Similarly, feminist sociologist Judy Wajcman remarks that although contemporary digital technologies are claimed to facilitate ‘less work’, they serve in practice to facilitate ‘worse jobs’.⁷⁷ Yet to the extent that routine tasks once performed by human workers *can* be automated by networked digital technologies, this enables the scaling of those tasks at orders of magnitude that far exceed the capacity of human workers. Even though the pursuit of full automation through which society will be unburdened from its toilsome labour may remain a long-standing fantasy,⁷⁸ provided that the cadre of human workers required for automated systems to function results in significant productivity enhancement and/or generate substantial savings in overall labour costs (often facilitated by shifting human tasks offshore to be performed by low-paid workers with little job security and few legal protections against exploitative labour practices), then the appeal of automation for cash-strapped public sector authorities required to deliver services may be hard for public managers to resist.
- (b) Datafication:** The rapid datafication that continues apace as smart networked technologies and the development of the so-called ‘internet of things’ (IoT) have proliferated has fostered the ideology of ‘dataism’. The specific beliefs that dataism purports to encapsulate vary amongst scholars. For media theorist Jose van Dijck, dataism is an ideology characterised by a widespread belief in the objective quantification and potential tracking of all kinds of human behaviour and sociality through online media technologies which assumes a self-evident relationship between data and people and a belief that aggregated data can be algorithmically mined to reliably and accurately predict individual behavior.⁷⁹ For sociologists Fourcade and Gordon, dataism is a ‘philosophy of governing’ one in which society is understood largely as data flows which the state is responsible for collecting and processing such that a ‘well governed society is one in which events are aligned to the state’s models and predictions’.⁸⁰ And for historian Yuval Harari, dataism is even more fundamental in character, referring to it as an ‘emerging religion’ rooted in a belief that humans can no longer distil the immense flows of data into information, knowledge or wisdom, so that the work of processing data should therefore be entrusted to computational algorithms, whose capacity far exceeds that of the human brain.⁸¹ Despite their differences, these understandings of dataism are united in a belief in datafication through which

75 Munn, *supra* n.64.

76 Astra Taylor, *The Automation Charade* (2018) *Logic*, Issue 5. Available at <https://logicmag.io/failure/the-automation-charade/> (Accessed 4.11.22).

77 Judy Wajcman (2017). Automation: Is it really different this time? (2017) *British Journal of Sociology* 68 (1) 119–127.

78 Munn, *supra* at 11–12.

79 Van Dijck, José. “Datafication, dataism and dataveillance: Big Data between scientific paradigm and ideology.” *Surveillance & society* 12.2 (2014): 197–208 at 199. Similarly, Dencik claims that ‘datafication strives to order the social world in particular ways through the reduction of environments into data points for the purposes of classification, categorization, sorting and profiling’, Dencik, Lina, ‘Situating practices in datafication—from above and below.’ In Nick Couldry, Hilde Stephansen & Emiliano Treré (eds). *Citizen Media and Practice*. Routledge, 2019. 243–255.

80 Fourcade, Marion and Jeffrey Gordon. ‘Learning like a state: Statecraft in the digital age.’ *Journal of Law and Political Economy* 1.1 (2020) at 79.

81 Harari, Yuval Noah. *Homo Deus: A Brief History of Tomorrow*. Random House, 2016 at 368.

ever-growing volumes of continually produced digital data must be algorithmically mined to produce the knowledge, tools and environments that are essential pre-conditions for living and governing well.

- (c) **Smartness:** the term ‘SMART’, used as an adjective to describe technologies, originally referred to the acronym of self-monitoring (SM), analysis (A) and reporting technology (RT) (‘SMART’), mainly used for failure prediction in hardware, although it is not a technical term in computer science, law, the life sciences or social sciences.⁸² Nevertheless, in contemporary discussions about networked digital technologies, ‘smart’ denotes the capability of a system to respond and adapt to changes in its environment based on input data, so that the notion of remote control over an environment and the ability to steer are central to the way ‘smart’ technologies are now understood. Legal philosopher Mireille Hildebrandt offers the example of hardware failure detection combined with automated interventions once failure is detected, observing that smartness is a range property rather than a categorical attribute.⁸³ What is crucial is the capacity of smart technologies for both perception and action, providing the system with the ability to respond to its environment in a way that sustains its own endurance and prevents or repairs failure modes, particularly in the face of uncertainty.⁸⁴ Thus, smart technologies are dependent on both automation, sensor technologies and data-feedback loops to produce a kind of machinic agency that is designed to foster system resilience and endurance, virtues that are likely to be considered particularly important in the face of emerging but unknown threats.
- (d) **‘Continuous experimentation’:** the logic of continuous experimentation central to agile software development methods via the ‘perpetual development’ of software-enabled services rather than oriented towards the creation of a ‘finished product’ has grown in prominence within public sector digitization projects, described by Fleur Johns as ‘governance by prototype’.⁸⁵ By performing quality assurance activities throughout the development process, agile methods seek to optimize defect avoidance through iterative revision and continuous testing rather than by defect-identification after project completion. Its claimed virtue lies in the production of ‘better’ quality software understood in terms of the values of flexibility and responsiveness, brought about by rapid development via continuous trial-and-error which is better able to meet changing user needs and environments.⁸⁶
- (e) **Seamless user experience:** The proliferation and commercial success of smart consumer devices has been accompanied by the emergence of UX (‘user experience’) design professionals who specialise in digital interface design. UX design appears to be largely a field of practice rather than an academic sub-discipline which grew out of user-design research within studies of Human-Computer Interaction (HCI). UX designers are primarily concerned with the non-instrumental dimensions of digital interface design, which Hassenzahl and Tractinsky describe as oriented towards ‘designing for pleasure rather than for absence of pain’.⁸⁷ Strengers and her collaborators coined the term

82 Hildebrandt, Mireille. “Smart technologies.” *Internet Policy Review* 9.4 (2020): 1–16, 6.

83 Hildebrandt explains that levels of smartness vary depending upon the extent to which adaptive behaviours have been premeditated by the developer in configuring the technology to express its own agency and upon the complexity of the environment: *ibid* at 6.

84 Royal Academy of Engineering (2012) ‘Smart Infrastructure: The Future’. Real-time automated adjustment is also inherent in the notion of ‘smartness’: see Kaun, Anne, and Fredrik Stiernstedt. “Doing time, the smart way? Temporalities of the smart prison.” *New Media & Society* 22.9 (2020): 1580–1599.

85 Johns, Fleur. 2019. From Planning to Prototypes: New Ways of Seeing Like a State. *The Modern Law Review* 82 (5): 833–863; Johns, F. State Changes: Prototypical Governance Figured and Prefigured. *Law Critique* (2022). <https://doi.org/10.1007/s10978-022-09329-y>. Fourcade and Gordon describe this development style as a ‘constant state of real-time experimentation and reactivity to indicators’ which ‘opens up the horizon of planning to allow the pursuit of moving targets’ per Fourcade and Gordon, *supra* n.80 at 87.

86 See for example Jan Shelley Brown et al, McKinsey & Co, ‘Implementing agile ways of working in IT to improve citizen experience’, 13 March 2020, available at <https://www.mckinsey.com/industries/public-and-social-sector/our-insights/implementing-agile-ways-of-working-in-it-to-improve-citizen-experience>, Accessed 29 September 2022.

87 Hassenzahl, Marc & Noam Tractinsky. “User experience-a research agenda.” *Behaviour & information technology* 25.2 (2006): 91–97.

‘pleasance’, to refer to the way potential users of smart home technologies are invited into an imaginary future where everyday life is simplified, personalized, secure and more pleasurable.⁸⁸ Although seamlessness and convenience are key aspirations in the design for contemporary consumer technologies, these aspirations are directly transferable into public sector service design, at least according to global consulting giant McKinsey’s & Co who claim that user-design for digital public services should provide ‘delightful’ and ‘seamless’ user experience and a ‘coherent look and feel’ to promote ‘familiarity and adoption’ which ‘increases trust in the government’s digital brand’.⁸⁹ In other words, the goal of prioritizing pleasurable, ‘seamless’ user experience can and should be the aim of public services delivered with the aid of networked digital technologies thereby fostering reputational trust in the government,⁹⁰ even as the frontline officers in government disappear and the realities of highly restricted internet access and lack of digital literacy of poor and vulnerable communities are ignored.⁹¹

These five technological properties and/or styles of digital design and development direct attention towards the ideological claims or ‘tacit political promises’ underpinning the attraction of NPA technologies.⁹² Hence automation will relieve us from human toil, machine learning techniques will enable us to navigate and make sense of the on-going data deluge so that, provided the state has access to relevant data troves, it can generate a synoptic yet highly granular understanding of individual and collective activities (and provide reliable predictions about how to solve any emerging problems thereby created), smartness will ensure the resilience of our interconnected socio-technical systems, automatically adapting to any emergent threats, and seamless user experiences will ensure that services are easy to use while enhancing our comfort, convenience and deepening public trust in government. Further questions arise about the relationship between them and whether, and to what extent, they are borne out real-world experience but are beyond the scope of this lecture.⁹³

2.5 NPA’S IDEOLOGICAL FOUNDATIONS: NEOLIBERALISM WITH A TECHNO-SOLUTIONIST MAKEOVER?

The promises described above can also be understood as ‘socio-technical imaginaries’, a term introduced by STS scholars Jasanoff and Kim to describe attainable futures and prescribe futures that states believe ought to be, thus influencing technological design, the channelling of public expenditures, and the distribution of the benefits of technological progress among citizens.⁹⁴ Socio-technical imaginaries concern how technologies are imagined and publicly portrayed as contributing to a desirable political future, rather than with the political ideologies underpinning them.⁹⁵ Absent from the above imaginaries is the ‘technological fix’, referring

⁸⁸ Within the broad vision of “pleasance”, their study revealed seven main qualities of pleasance: (1) aesthetic experience, (2) fun and cool, (3) customization and control, (4) convenience and simplicity, (5) peace of mind, (6) extension and expansion, and (7) effortless energy-saving: Yolande Strengers et al ‘Pursuing pleasance: Interrogating energy-intensive visions for the smart home (2020) *International Journal of Human-Computer Studies* 36: 102379 <https://doi.org/10.1016/j.ijhcs.2019.102379>.

⁸⁹ Matthias Daub et al, McKinsey & Co, ‘Digital public services: How to achieve fast transformation at scale’, 15 July 2020. Available at <https://www.mckinsey.com/industries/public-and-social-sector/our-insights/digital-public-services-how-to-achieve-fast-transformation-at-scale> (Accessed 29.9.22).

⁹⁰ These design aspirations are also evident in the design of government data dashboards: Barlett and Tkacz (2017) at 15–17.

⁹¹ Eubanks, Virginia. *Automating inequality: How high-tech tools profile, police, and punish the poor*. St. Martin’s Press, 2018. Alston, Philip. *Report of the UN Special Rapporteur on Extreme Poverty and Human Rights*. (2019).

⁹² On understanding technology as a cultural phenomenon, see for example Mackay, Hughie, and Gareth Gillespie. “Extending the social shaping of technology approach: ideology and appropriation.” *Social Studies of Science* 22.4 (1992): 685–716.

⁹³ See Halpern et al, *supra* n.68 at 116–117. For example, according to the logic of dataism, the massive volumes of data produced as a result of on-going processes of datafication and digitisation of contemporary life can only be navigated and understood by reliance on algorithms through which the data can be parsed, ideally produced from feedback automatically collected from sensors embedded in the environment through the operation of surveillance infrastructures through which ‘smartness’ is enabled.

⁹⁴ S Jasanoff and S H Kim (2009) Containing the atom: Socio-technical imaginaries and nuclear power in the United States and South Korea, *Minerva*.

⁹⁵ Waller, Paul. “Nightmare of the Imaginaries: A Critique of Socio-technical Imaginaries Commonly Applied to Governance.” Available at SSRN 3605494 (2020).

to a belief that engineering or technology can be harnessed to ‘solve’ any given problem, however complex.⁹⁶ In the following discussion, I will suggest that firstly, a particular version of the technological solutionist imaginary has played a prominent ideological role in the turn to NPA and secondly, I will consider the extent to which the neoliberalism, the political ideology underpinning NPM, also underpins the emergence of NPA. Although it is too early to associate NPA with a single, definitive political ideology, I suspect that NPA’s ideological foundations might be helpfully described as ‘neoliberalism with a techno-solutionist makeover’, the precise contours and content of which will continue to evolve alongside the evolution of NPA.

Although its meaning is contested, for present purposes I will adopt Jodi Dean’s definition of neoliberalism as the ‘reformatting of social and political life in terms of its ideal of competition within markets’, denoting ideas and policies that seek to create markets and rely on market forces.⁹⁷ So understood, the rise of NPM techniques under Thatcher and Reagan were unmistakably neoliberal, resting on a belief in the superiority of market mechanisms such that, through institutional restructuring, public sector operations could be exposed to the competitive forces of the market which would drive improvements in operational efficiency. The relationship between markets, the rise of networked digital technologies and their impacts and implications for contemporary society continues to be the subject of sustained academic reflection, albeit largely discussed through the lens and language of capitalism rather than neoliberalism.⁹⁸ Scholars have employed various terms, including ‘digital capitalism’,⁹⁹ ‘surveillance capitalism’,¹⁰⁰ ‘platform capitalism’¹⁰¹ and the ‘platform economy’¹⁰² which together suggest that although the logic of capitalism has evolved along with the unfolding networked digital revolution, the role of markets remains central, retaining its role as the dominant mechanism through which contemporary economic exchange relations take place.

Following neoliberalism’s ascendancy, a distinct but related set of political beliefs subsequently rose to prominence as the internet revolution gathered steam and smart devices became widely taken up, fuelled by the extraordinary success of Apple’s iPhone, launched in 2007. By that time, prominent Silicon Valley entrepreneurs had acquired almost celebrity status, portraying their foundational mission as oriented towards promoting the common good by harnessing networked digital technologies in the service of solving social problems.¹⁰³ Yet in defiance of the warm and welcome public reception of these entrepreneurial manifestos, tech commentator Evgeny Morozov offered a stinging critique of what he originally termed ‘Silicon Valley solutionism’¹⁰⁴ but now calls ‘technological solutionism’ claiming that it has transcended its origins in Silicon Valley and ‘now shapes the thinking of our ruling elites’.¹⁰⁵ For Morozov, technological solutionism is more than a belief that social problems can be solved by technological means but an ideology¹⁰⁶ through which digital technologies and

96 M Huesemann and J Huesemann (2011) *Techno-Fix – Why Technology Won’t Save Us or the Environment*, New Society Publishers, British Columbia.

97 Jodi Dean (2009), *Democracy and Other Neoliberal Fantasies: Communicative Capitalism and Left Politics*, Duke University Press. See also Vallier, Kevin, “Neoliberalism”, *The Stanford Encyclopedia of Philosophy* (Summer 2021 Edition), Edward N. Zalta (ed.), URL = <<https://plato.stanford.edu/archives/sum2021/entries/neoliberalism/>>. (Accessed 20 Sept 2022).

98 Cf K Birch ‘Automated Neoliberalism? The Digital Organisation of Markets In Technoscientific Capitalism (2020) *New Formations* 100 (100):10–27. 10.3898/NewF:100-101.02.2020.

99 Sadowski, Jathan. ‘When data is capital: Datafication, accumulation, and extraction.’ *Big Data & Society* 6.1 (2019): 2053951718820549.

100 S Zuboff, *Surveillance Capitalism* (2019) Profile Books Ltd, London.

101 N Srnicek, *Platform Capitalism*. (2017) John Wiley & Sons, London.

102 Kenney, Martin, and John Zysman. “The rise of the platform economy.” *Issues in Science and Technology* 32.3 (2016): 61.

103 For example, Mark Zuckerberg’s letter to potential investors in its 2009 \$5 Billion Initial Public Offering stated that “Facebook was not originally created to be a company. It was built to accomplish a social mission — to make the world more open and connected.” *Wired*, ‘Mark Zuckerberg’s Letter to Investors: ‘The Hacker Way’, 1 February 2012, Available at <https://www.wired.com/2012/02/zuck-letter/> (Accessed 30 Sept 2022).

104 Morozov, Evgeny. “The Rise of Data and the Death of Politics.” *The Guardian*, 20 July 2014. Available at <https://www.theguardian.com/technology/2014/jul/20/rise-of-data-death-of-politics-evgeny-morozov-algorithmic-regulation> (Accessed 4.11.22).

105 Morozov, Evgeny. “The tech ‘solutions’ for coronavirus take the surveillance state to the next level.” *The Guardian*, 15 April 2020. Available at <https://www.theguardian.com/commentisfree/2020/apr/15/tech-coronavirus-surveillance-state-digital-disrupt> (Accessed 4.11.22).

106 *Ibid.*

markets are expected to work together to ‘solve’ public problems via reliance on the logic of ‘responsibilisation’ (discussed more fully below).

Tempting as it may to credit technological solutionism as the ideological ground upon which NPA is rooted, it is better understood as neoliberalism’s handmaiden. As Nachtwey and Seidl argue, based on their qualitative analysis of documents by and about digital elites, solutionism in the form espoused by its leading advocates has a ‘techno-libertarian bend.’¹⁰⁷ In a similar vein, Morozov observes that:

Neoliberalism shrinks public budgets; solutionism shrinks public imagination. The solutionist mandate is to convince the public that the only legitimate use of digital technologies is to disrupt and revolutionise everything but the central institution of modern life – the market.¹⁰⁸

Both these critics regard techno-solutionism as a complement to neoliberalism, helping to sustain capitalism’s legitimacy by fostering a form of discourse that proceeds under the banner of ‘corporate social responsibility’ in response to a perceived crisis associated with the emptiness and loss of meaning and social purpose of shareholder-value capitalism.¹⁰⁹ By promising to harness the power of entrepreneurship, techno-solutionists characterise social problems as simply business opportunities through which the market forces incentivise technological innovations that serve the common good.¹¹⁰

3. IMPACT AND IMPLICATIONS

Having sketched the outlines of the New Public Analytics (NPA) as an analytical construct, in the following section, I consider its potential implications and impacts for the practice of statecraft, for relations between state and citizen, and for the distribution of public and private power in light of the growing reliance on private sector consultants to establish and maintain NPA projects and systems. My analysis proceeds on the basis that meaningful generalised claims can be made about the impact and implications of NPA, notwithstanding considerable variation in how it is implemented in specific domains, sites and contexts, provided that appropriate care is taken to account for contextual differences in legal frameworks, economic conditions, political contexts and administrative cultures. The following analysis draws from my tentative observations and impressions of how NPA is being embraced and implemented British public administration (with selective references to other constitutional democracies). Whether these observations apply to the take up of NPA elsewhere, particularly in Latin America, Asia or Africa I have not investigated, although the questions which animate and structure my observations may be a fruitful springboard for investigation of NPA in these and other locations and contexts.

3.1 THE PRACTICE AND (HIDDEN) POLITICS OF STATECRAFT IN A NETWORKED DIGITAL AGE

I have already indicated that, by focusing on process improvement, NPA appears devoid of grand substantive ambitions. Its goal of ‘process optimisation’ is portrayed as a universal and neutral objective to which all public sector operations should aspire (who could object to ‘better’ operational service?). But in these elegant and attractive political promises, what exactly ‘optimisation’ means in practice is not self-evident. In this section, I argue that the way in which public sector organisations actually deploy NPA in practice serves to generate benefits for the deploying organisations in ways that are often far from ‘optimal’ for others (including the recipients of public services). The practice of a digital statecraft emerging under NPA appears to be shaped by several traits or features, six of which I highlight below. Together these show how

¹⁰⁷ Nachtwey, Oliver, and Timo Seidl. “The solutionist ethic and the spirit of digital capitalism.” (2020): 1–51. Available at https://edoc.unibas.ch/76426/1/Nachtwey%2C%20Seidl_The%20Solutionist%20Ethic%20and%20the%20Spirit%20of%20Digital%20Capitalism.pdf (Accessed 4.11.22).

¹⁰⁸ Morozov, *supra* n 104.

¹⁰⁹ Fisher offers a slightly different reading of contemporary technological discourse in the legitimisation of capitalism, by emphasising its ability to mitigate individual alienation: see Fisher, Eran. “Contemporary technology discourse and the legitimisation of capitalism.” *European Journal of Social Theory* 13.2 (2010): 229–252.

¹¹⁰ Nachtwey and Seidl, *supra* n 107 at 31.

ostensibly ‘technical’ choices made in the course of designing and operationalising public sector digitisation projects entail contestable normative judgements that can have profound social and political consequences for how those services are delivered, accessed and experienced. While it may be acceptable for private sector services to be configured in a manner which serves the providers’ preferred set of values given that firms are, at least theoretically, constrained by competition, and individuals have a choice of whether or not to use their services, citizens have no choice but to interact with government, making these practices and pathologies of statecraft under NPA deeply problematic.

(1) Governments are uniquely positioned and empowered

The successful embrace of automation and networked digital tools in commercial contexts has been a key driver in motivating public sector organisations’ attempts to mimic their success. But commercial firms occupy a very different societal role to governments and are subject to quite different legal responsibilities, economic constraints and, most importantly, receive their authority and power from different sources. As I have already noted, the animating mission of private firms is the pursuit of profit to maximise shareholder value,¹¹¹ an objective which can be readily translated into more specific and quantifiable operational goals and metrics which their socio-technical systems may seek to optimise in the service of the firm’s overarching objective. For example, social media sites typically configure their automatic content distribution systems to maximise user time-on-site, thus increasing the volume of paid advertising served up to users.¹¹² Although the adoption of these technologies by private firms will be configured to serve the deploying firm’s interests in ways that may be adverse to consumers, at least in competitive contexts¹¹³ firms will be mindful of and constrained by the freedom of unhappy consumers to switch to rival providers. In practice this serves to limit the willingness of private firms to adopt practices and processes that fail to align with consumer interests.

In contrast, the aims and objectives of public sector organisations are far more elusive, and cannot be readily reduced to a single, overarching and readily quantifiable substantive goal. They occupy a unique position, often empowered to impose coercive demands on citizens (such as obligations to pay tax) which private firms cannot. Nor do they face the competitive discipline of markets as constraints on their operational conduct. Accordingly, how the ‘public interest’ and ‘good public administration’ are interpreted and configured in the design of NPA optimisation projects will be varied, contestable and may change over time. Absent constraints, the goal of process optimisation will be directed towards enhancing the benefits for the deploying public sector organisation (typically in the form of cost reduction, efficiency gains or responsiveness), in ways that may subordinate or even overlook legitimate citizen, user and public needs and expectations.¹¹⁴

(2) Techno-operational choices have political implications

Normative choices have always been made in the process of operationalising the pursuit of the public interest and ‘good administration’ in service delivery.¹¹⁵ Additional difficulties arise when digital machines are employed by governments because the techno-operational choices made in the course of configuring them are typically delegated to technical developers who may lack awareness or a proper understanding of their normative implications. As a result, trade-offs between competing values may be implicit, unexamined and unsupported by reason rather than explicitly and purposefully made. Even if those normative choices are made explicitly and intentionally, they are likely to be well-hidden from public view due to the technology’s opacity, complexity and the immaterial nature of software and the computational processes that it enables. Moreover, in the absence of effective and systematic oversight mechanisms

¹¹¹ Cf M Mazzucato (2018) *The Value of Everything*, Penguin Random House, Milton Keynes.

¹¹² V Luckerson ‘Here’s How Facebook’s News Feed Actually Works’ *Time Magazine*, 9 July 2015. Available at <https://time.com/collection-post/3950525/facebook-news-feed-algorithm/> (Accessed 4.11.22).

¹¹³ However, if firms enjoy some form of monopoly power, then the competitive pressures constraining their action are likely to be weaker, with concomitant adverse implications for the interests of consumers as a whole.

¹¹⁴ J Redden, J Brand, I Sander and H Warne ‘Automating Public Services: Learning from Cancelled Systems Case Studies (2022) *Carnegie UK*.

¹¹⁵ Mashaw, Jerry L. *Bureaucratic justice: Managing social security disability claims*. Yale University Press, 1983.

and institutional safeguards to ensure adequate transparency and accountability to users and to the public at large, these systems can be configured in ways that fail to serve or even contravene the agency's legal mandate, violating the legal rights and legitimate expectations of affected individuals and failing to discharge their legal duties.¹¹⁶

In other words, the embrace of NPA techniques provides considerable latitude for public sector organisations to promote their own internal organisational goals, enabling them to prioritise operational objectives and values that are poorly aligned with, or even directly contrary to, the interests of the public. Individuals from under-privileged and historically excluded groups or those who lack ready access to the internet and/or the competences and skills needed to navigate digital services are especially vulnerable.

(3) The outcomes NPA optimises for may not be universally beneficial

Identifying precisely what NPA systems are being optimised *for* in terms of the way in which the specific set of operational objectives are understood is strongly influenced by the way in which computer scientists undertake the task of 'problem framing'.¹¹⁷ As I have already noted, contemporary data science has hitherto been primarily oriented towards the development of useful technologies, often involving the development and use of prediction models, unlike more conventional statistics, which is directed towards generating valid and verifiable scientific knowledge. This, in and of itself, need not be problematic. But when technologies that rely on data science methods are introduced and implemented within the public sector, there may be a tendency to frame the relevant problem which data science methods are seeking to solve in narrow terms based on 'functional performance' rather than primarily guided by a set of broader substantive policy goals that animate the relevant application domain. For example, even if we assume that Covid Apps intended to facilitate automated contact tracing operated perfectly and without error, reliably and accurately identifying any and all Covid-positive individuals and automatically notifying the devices of individuals with whom they had come into contact during the period during which they were infectious, the successful 'functional performance' of such apps will *not* necessarily reduce Covid transmission. Yet policymakers who championed the importance of these apps in reducing Covid transmission overlooked the simple fact that the communication of accurate information to someone is no guarantee that the recipient will act in the desired manner: in this instance, to immediately self-isolate in order to reduce the risk passing the Covid virus to others.¹¹⁸

(4) Continuous experimentation obscures accountability

The embrace of agile design methods in the development and deployment of NPA systems through a continuous trial-and error approach collapses the distinction between policy and implementation into a single process of constant iteration and experimentation. While there are many reasons to value a dynamic, iterative approach to software development and production, this approach to public service delivery lies in uncomfortable and serious tension with conventional requirements of transparency, accountability and rule of law values which require stability, certainty and finality so that persons may 'know where they stand' vis-à-vis the state's demands.¹¹⁹ These tensions may be particularly acute given that technical developers enculturated into the logic and practices of agile development may be averse, or even hostile towards, demands for clear, transparent documentation to accompany each and every

¹¹⁶ Yeung, K and Harkens, A, 'How do 'technical' design choices made when building algorithmic decision-making tools for criminal justice authorities create constitutional dangers?' Parts I and II [2023] *Public Law*, forthcoming. Available via SSRN network.

¹¹⁷ Yeung and Harkens, *supra* n.65 section 2.2.

¹¹⁸ Melis Mevsimler 'How to improve contact tracing apps for future public health crises – Lessons learned from the UK's response to the COVID-19 pandemic'. Ada Lovelace Institute Blog, 19 April 2022. Available at : <https://www.adalovelaceinstitute.org/blog/contact-tracing-apps-uk/> (Accessed 4.11.22). She states 'It is not possible to measure the effectiveness of contact tracing apps without examining people's behaviours – e.g. knowing how many people stayed home after having been pinged.'

¹¹⁹ See for example M Costick (2013) 'Agile testing at the Home Office'. Available at <https://gds.blog.gov.uk/2013/11/26/agile-testing-at-the-home-office/> (Accessed on 16.10.22).

software revision.¹²⁰ For the hapless individual, however, whose access to services is mediated predominantly, if not exclusively, through an automated digital interface (either in the absence of a front line human officer, or a human officer who lacks adequate understanding about system design and how that impacts upon its operations) the resulting loss of traceability, accountability and responsibility may result in a Kafkaesque-like experience for which there may be no meaningful or practical opportunity for recourse. The technical developers of NPA systems, on the other hand, are free in effect to make public policy decisions ‘on the fly’ without fully appreciating their consequences in the absence of adequate legal, bureaucratic or democratic safeguards and oversight.¹²¹

(5) Data, once gathered, is open to abuse

Databases, particularly those containing personal information about individuals, invariably have multiple potential uses, which organisations may seek to harness to serve purposes not anticipated or contemplated at the time of their creation. Although this repurposing may well be unlawful for several reasons, including violation of the purpose-specification principle enshrined in European data protection law, in practice these violations may escape public notice. There is nothing new, of course, about the potential for governments to exploit and abuse the personal information of individuals in ways that exceed the bounds of their legal authority. However, the promiscuous nature of digital data, particularly when stored in networked digital databases accessible by the state, supplemented by the capacity for NPA systems to operate continuously and in real-time, may radically enhance these opportunities and dangers, particularly by enabling the geolocation tracking of individuals. These technological capacities offer public authorities particularly attractive opportunities for the clandestine tracking and monitoring of the actions and activities of individuals while rendering them concomitantly more threatening to individual liberty and freedom.

These threats are likely to be acute for vulnerable individuals, particularly when combined with the dangers of ‘function creep’.¹²² This is vividly demonstrated in the way in which ‘QMM’ database and its linked administrative system, originally developed to help local German accommodation units to manage the provision of social services to refugees and asylum-seekers, including shelter, medical care, food, clothes and so forth, was clandestinely used by immigration authorities to forcibly apprehend migrants for deportation. Data generated by swipe-cards used by refugees to access accommodation units after periods of absence alerted authorities to their location.¹²³ This egregious, unauthorised repurposing of the QMM database, for which no official records were kept, immediately reminded me of James C Scott’s observations about the map produced in 1941 by Amsterdam’s City Office of Statistics during Nazi occupation which identified where Jews resided throughout the municipality, used to round up Amsterdam’s 65,000 Jews for transportation to the Nazi’s brutal and terrifyingly efficient deathcamps. Scott comments:

The Nazi authorities, of course, supplied the murderous purpose behind the exercise, but the legibility provided by the Dutch authorities supplied the means to its efficient implementation. That legibility, I should emphasise, merely amplifies the capacity of

¹²⁰ Universal Credit (2020) Report observed “There is dissonance between this agile “test and learn” approach and the openness of DWP in relation to Universal Credit... The department should also open source as much of the source code as possible. While there may be legitimate reasons for some of the code not being open (for example fraud detection systems), today, even the code used for the core Universal Credit calculation remains closed. The GOV.UK website points people looking to understand how it works to external ‘benefit calculators’ run by third sector organisations. As well as having an impact for those wanting to claim, the fact the calculation is closed makes it harder for campaigners, think-tanks and political parties to model changes to the welfare system” at 102–103. On the take-up of agile methods by the UK Government Digital Service, see J Tomlinson, *Justice in the Digital State* (2019) Policy Press, Bristol University Press, Chapter 4.

¹²¹ PT2 Ltd, *Universal Credit 2020*, at 79–80. Available at <https://digitalwelfare.report/responsibility-and-complexity> (Accessed 4 October 2022).

¹²² Koops, Bert-Jaap. “The concept of function creep.” *Law, Innovation and Technology* 13.1 (2021): 29–56.

¹²³ Martin et al (2022). Digitisation and sovereignty in humanitarian space: Technologies, territories and tensions. *Geopolitics*, 1–36 citing Cevivio QMM. Die software zur zentralen erfassung von flüchtlingen zur verwaltung von flüchtlingsunterkünften [Cevivio QMM. The software for central registration of refugees and management of refugee accommodation]. Product Information Leaflet of Cevivio. https://kipdf.com/die-software-zur-zentralen-erfassung-von-fluchtligen-zur-verwaltung-von-fluchtlin_5aaff76e1723dd379cc33e3e.html [Google Scholar].

(6) Data representation is not neutral

The way in which data is presented to decision-makers via digital interfaces, particularly in the form of data dashboards, to assist and inform organisational decisions necessarily requires choices to be made about which data to present, and how to present it.¹²⁵ Anthropologist Sharon Mattern describes urban data dashboards as ‘epistemological pastiches’ that render data as representable yet fail to help users make sense of it.¹²⁶ Instead, in their quest to design ‘seamless’, convenient interfaces, data visualisations may present very complex, messy and varied data in simplified form, distorting how the information may be understood while perpetuating a tendency to show data patterns without any accompanying explanation, let alone alerting the user to margins of error or incorporating commentary on data weaknesses that might encourage users to adopt a critical stance towards the data thereby presented.¹²⁷

In its public sector manifestation, NPA has taken from private sector technology firms the language of ‘optimisation’ and ‘process improvement’, referring to concepts which may seem mundane but are inherently normative and therefore contestable, and applied them to the provision of public services and functions. Yet the apparently ‘technical’ decisions through which digital transformation across government is taking place are far from neutral: they entail multiple and often far-reaching political decisions, often made by technical developers without citizen input, consent, scrutiny or meaningful opportunities to opt out. At the same time, governments are following the lead of tech companies such as Facebook and Google who are under increasing scrutiny for their data practices, assembling huge troves of data about citizens in ways that deepen existing asymmetries in power between state and citizen and which are ripe for abuse and overreach. The practice of statecraft under NPA embeds and conceals normative choices and trade-offs into public service design in a way that is presented as benign and unexceptional. As a result, significant and important political consequences for the relation between state and citizen are effected unilaterally by digital fiat under the guise of straightforward process improvements.

3.2 CITIZEN-STATE RELATIONS UNDER NPA

3.2.1 NPA and the logic of ‘responsibilisation’

We have seen how the embrace of NPA has direct and significant implications for the practice of public administration. These practices, and the techno-operational design choices they entail, directly affect the relations and interactions between state and citizen and, in turn, reflect shifting understandings of the nature of citizenship, including the way in which citizens are seen, understood and treated in their encounters with the state.¹²⁸ These shifts are partly a product of the way in which ‘techno-solutionist’ ideology¹²⁹ relies upon a logic of ‘responsibilisation’ through which the self-governing capabilities of individuals are brought into alignment with the political objectives of authorities. For example, the risks of illness, unemployment, poverty that were once considered the responsibility of the post-war welfare state are now regarded largely as matters for which the individual is responsible.¹³⁰ This shifting of responsibility through the take-up of NPA techniques onto the shoulders of individuals is evident in at least two ways.

¹²⁴ Scott, *supra* n.23 at p 79.

¹²⁵ For example, they may result in a tendency to prioritise data that is consistently captured and available over data that might be important but not easily captured or represented, encouraging some cognitive capacities (eg monitoring, comparison, pattern detection) while marginalising other more reflexive or dialogical approaches to a specific problem or a routine decision: Barnett and Tkacz, *supra* n.7 at 15–16.

¹²⁶ S Mattern (2015) ‘Mission Control: A History of the Urban Dashboard’, *Places*. Available at <https://placesjournal.org/article/mission-control-a-history-of-the-urban-dashboard/?cn-reloaded=1>.

¹²⁷ Barnett and Tkacz *supra* n.7 at 15–16.

¹²⁸ See H Broomfield and L Reutter (2022) ‘In search of the citizen in the datafication of public administration’, *Big Data & Society* 1–14 and literature cited therein.

¹²⁹ See discussion at section 2.5 above.

¹³⁰ Rose, Nikolas, and Peter Miller. ‘Political power beyond the state: Problematics of government.’ *British journal of sociology* (1992): 173–205; Dencik, Lina. ‘The datafied welfare state: a perspective from the UK’, In Andreas Hepp, Juliane Jarke & Leif Kramp (eds.) *New Perspectives in Critical Data Studies*. Palgrave Macmillan, Cham, 2022. 145–165 at 154.

Firstly, by seeking to address social problems arising from inadequate provision of public goods by utilizing digital information tools in order to elicit or ‘nudge’ individuals into changing their behaviour. This logic epitomised in the UK Home Office’s official support for a safety app that allows people to track their friends’ journeys home¹³¹ intended to help protect women in the wake of the abduction, rape and murder of 33 year-old Sarah Everard in 2021 by a London police officer as she walked home alone one evening in south London.¹³² Civil society organisations lambasted the Home Office endorsement as ‘yet another example’ of a ‘sticking plaster’ initiative that ‘puts the onus on women and their friends to be responsible for their own safety’ rather than ‘addressing harmful attitudes towards women and challenging rape culture which addresses the behaviour of violent men’.¹³³ The portrayal of these information-based interventions as convenient, simple responses to social problems, downplays the inescapable political nature of the attribution of responsibility for such problems on individuals rather than on society, shifting attention away from structural causes to public policy problems, let alone acknowledging that ‘supply side’ solutions are equally plausible if there was sufficient political will to pursue them.¹³⁴ Similarly, the unstated political endorsement of the status quo is reflected in the use of data-driven, risk-based approaches to the distribution of limited public resources which rely on identifying, scoring and ranking the severity of ‘risks’ posed, whether by individuals, organisations or locations, particularly in the face of austerity and shrinking public budgets.¹³⁵ Although Dencik claims that the logic of responsabilisation, at least in the context of social welfare, is ‘embedded in data-driven forms of governance’¹³⁶ I am not entirely convinced due to the ‘seeing is solving’ fallacy. Data analytics may be used to provide attractive data visualisations in the form of digital dashboards, enabling the identification of ‘hotspots’ where the highest ‘risks’ are estimated to lie, but they do not tell us *what*, substantively, we should do about them.¹³⁷

The shifting of responsibility for social problems from the state, as collective risk-bearer, onto individuals, is also reflected in the configuration of defaults within automated systems when an individual’s application is incomplete and/or if their circumstances do not comprehensively and perfectly map to the standardised norm for whom a digital service has been designed. For example, in the introduction to *Automating Inequality*, Virginia Eubanks recounts her own personal experience of the intensely stressful, exhausting and drawn-out process she endured after being ‘red-flagged’ by her insurance company and informed that she and her partner were not covered by health insurance, resulting in the denial of access to medicines and reimbursement for the costs of surgery despite having been issued with insurance cards confirming their coverage a month earlier.¹³⁸ She eventually traced the origins of this denial to the lack of a coverage start-date on her insurer’s digital record, presumably due to an erroneous omission in data entry by an employee when Eubanks’ policy was approved and the policy details were entered into its database. Her experience testifies to the ease with which digital ‘defaults’ can be configured in a manner deliberately intended to protect organisational interests, while the burden of error is shifted onto the individual in the case of missing data or incorrect digital records and who must then bear the burden of proving the

¹³¹ The free, not-for-profit app called Path Community provides users with a monitored walking route on their phone so that if the user strays more than 40 metres from the designated route, or stops for more than three minutes, the application asks them if they are OK and if no reply is registered, automatically notifies the user’s chosen guardians. See <https://www.theguardian.com/uk-news/2022/jan/10/womens-safety-app-backed-by-home-office-is-insulting-experts-say>.

¹³² See V Dodd and H Siddique, ‘Sarah Everard murder: Wayne Couzens given whole-life sentence’, *The Guardian*, 30 September 2021. Available at <https://www.theguardian.com/uk-news/2021/sep/30/sarah-everard-murder-wayne-couzens-whole-life-sentence> In Britain, only 1.5% of reported rape cases currently result in a prosecution: see <https://victimscommissioner.org.uk/news/home-office-rape-figures>.

¹³³ Dencik, *supra* n.130 at 153–157.

¹³⁴ Denick, *ibid.* Morozov 2020 *supra* n.111. Redden, Joanna, Lina Dencik, and Harry Warne. ‘Datafied child welfare services: unpacking politics, economics and power.’ *Policy Studies* 41.5 (2020): 507–526.

¹³⁵ On algorithmic regulation and the logic of risk-based regulation, see Yeung, *supra* n.49 at 511.

¹³⁶ Dencik, *supra* n.133 at 154.

¹³⁷ Karen Yeung (2023) ‘How can constitutional principles redress public authorities’ reliance on machine learning decision-tools to avoid their duty to justify preventive interventions?’ in Sullivan, Johns and Van den Meerssche (eds) *Global Governance via Infrastructures of Algorithmic Rule*, Cambridge University Press, 2023 forthcoming.

¹³⁸ Eubanks, *supra* n.91.

validity of their claim and entitlement, even though the error may have been entirely due to the fault of the provider organisation. The way in which digital defaults can ‘scale injustice’ is powerfully illustrated by the failure and fallout produced by real-world automated decision-making systems in which default settings were purposefully configured to favour the public sector organisation, so that applicants were compelled to bear the burden of error in the cases I referred to in the introduction to my lecture, notably the Australian ‘robo-debt’ scandal,¹³⁹ the Dutch child-benefits scandal and the operation of the automated system used in the USA by the Arkansas Department of Human Services to evaluate the benefit entitlements of physically disabled Medicaid recipients.¹⁴⁰

These automated systems were configured so that default responsibility for mistakes was placed on the individual claimant who bore the onus of establishing that an error had been made and to persuade a public official to correct it. No doubt these design choices were made in the name of ‘optimising’ organisational processes from the perspective of the sponsoring public sector organisation while automatically off-loading the financial, emotional and health consequences onto affected individuals, typically without explanation, resulting in the systematic dehumanisation and stigmatisation of individuals, who are by default treated without compassion nor empathy,¹⁴¹ yet whose very vulnerability has led them to seek state assistance in the first place. Small wonder that former UN Special Rapporteur on Extreme Poverty, Philip Alston, warns that ‘as humankind moves, perhaps inexorably, towards the digital welfare future it needs to alter course significantly and rapidly to avoid stumbling zombie-like into a digital welfare dystopia.’¹⁴² These default settings are not accidental: they reflect political choices implemented by system designers and technicians, presumably under the direction of their public sector clients, under the guise of ‘optimising’ system operations. Similarly, because the extent to which meaningful, practical opportunities for contestation and appeal against automated decisions are matters of political judgement, the state may deliberately utilise technological obstacles to limit contestation and appeals, albeit in a manner that may well be unlawful. For example, UK’s Universal Credit system was intentionally designed to be ‘digital by default’ so that ‘claims will normally be made online, with an online account being the primary channel to interact with the claimant’¹⁴³ the system was intentionally designed so that appeals against benefit decisions could *not* be made online: they could only be submitted manually during which claimants must live with reduced payments.¹⁴⁴

The intentional, political nature of these apparently ‘technical’ design choices is at least partially a product of the epistemological foundations upon which NPA technologies rest. Although ‘knowledge’ produced from the traces of individuals’ digital footprint may display a high level of granularity, portrayed as offering a ‘360 degree view’ of individual persons,¹⁴⁵ the way in which people are ‘seen’ is both partial and political. Lina Dencik and her colleagues argue that data scores produced by these systems shape the contours of citizenship, including the basis upon which individuals are classified and ‘risky citizens’ are constructed, and thus the terms upon which access to and participation in society might occur.¹⁴⁶ Dencik comments that

¹³⁹ J Redden, J Brand, I Sander and H Warnes, *Automating Public Services: Learning from Cancelled Systems* (2022), Carnegie UK, Fife. Available at <https://www.carnegieuktrust.org.uk/publications/automating-public-services-learning-from-cancelled-systems/> (Accessed 4.11.22). P Henman ‘Digital Technologies and Artificial Intelligence in Social Welfare Research: A Computer Science Perspective’ in M Adler (ed) (2022) *A Research Agenda for Social Welfare Law, Policy, Practice and Impact*, Edward Elgar.

¹⁴⁰ Discussed in D K Citron and R Calo, ‘The Automated Administrative State: A Crisis of Legitimacy’ (2021) *Emory Law Journal* 70: 797–845 at 823–825. For other examples, see Redden et al *ibid*.

¹⁴¹ S Ranchordas ‘Empathy in the Digital State’ (2021) *Duke Law Journal*, 1231.

¹⁴² P Alston, Report of the Special Rapporteur on Extreme Poverty and Human Rights (2019). UN General Assembly, Seventy-fourth session, Report A/74/48037 at para 72.

¹⁴³ Explanatory Notes accompanying the Universal Credit Regulations 2013.

¹⁴⁴ Universal Credit report 2020 p 66.

¹⁴⁵ Eg <https://www.qubole.com/blog/360-degree-customer-view>.

¹⁴⁶ Dencik, L., Redden, J., Hintz, A., & Warne, H. (2019). The ‘golden view’: data-driven governance in the scoring society. *Internet Policy Review*, 8(2), 1–24 at 19.

despite the logic of representationalism between data and people that permeates the datafication paradigm, automated categorization is threatened by a dislocation between citizens' lived experience and their perceived data double.¹⁴⁷

Her observations remind us that datafied, machine-readable profiles are distinct political abstractions which fail to account for the messy, lived reality of human experience. In other words, NPA systems do not see citizen-subjects as thinking, feeling, embodied individuals with lives of their own who are entitled to be treated as moral agents with dignity and respect.¹⁴⁸ Instead the datafied citizen-subject is comprised of a set of data points, often 'interpreted' through the lens of algorithmically generated predictions created primarily to optimise public sector operations. Dencik and her collaborators note that the extent to which digitised systems tend to reductionism, prioritising that which is digitally 'knowable' while hiding complexity and appearing objective and neutral is a repeated finding across research investigating the 'modernization' of public services.¹⁴⁹ This is not to suggest that these digital, datafied constructions are meaningless or devoid of value or utility in public service provision, but merely to highlight how those subject to automated decision-making based on an understanding of persons gleaned predominantly from their on-line digital traces creates serious risks that they will be seen and treated in a manner that departs substantially from the principle of 'individualised justice' regarded as essential in the lawful adjudication of rights and claims, referring to the notion that each case must be assessed on its own merits, without comparison to, or generalization from, previous cases.¹⁵⁰ Despite impressive advances in the capacity of machines to automate the performance of tasks, perception, planning and adaptation through the algorithmic identification of data patterns, machine intelligence remains decidedly 'dumb', unable to ascribe human meaning and significance to the patterns thereby identified, let alone interpret and properly grasp the meaning and significance of 'missing' or erroneous data, and what should be done about it, based on the untidy reality of real human lives.¹⁵¹

3.2.2 NPA and 'personalised' public service delivery

The ability to deliver public services to citizens on a 'personalised' basis is invoked by NPA advocates as a significant improvement to one-size-fits all service provision, evoking comparisons with the success of data-driven content personalisation by digital platforms.¹⁵² Whether intentional or not, this appeal to 'personalised' public services builds on a dominant narrative in English public service delivery that dates back to New Labour's final term in office and David Cameron's vision of a 'post-bureaucratic' age,¹⁵³ which emphasised expanding the range of choices available to service users and enhancing their capacity for self-direction in selecting the appropriate package of support.¹⁵⁴ Yet this early millenium assumption that individualised provision is necessarily superior to universal provision is contestable and overlooks the value of social solidarity and political equality associated with universal treatment.¹⁵⁵

¹⁴⁷ Dencik, Lina. 'Situating practices in datafication—from above and below.' In Nick Couldry, Hilde Stephansen & Emiliano Treré (eds). *Citizen Media and Practice*. Routledge, 2019. 243–255.

¹⁴⁸ Broomfield and Reutter's empirical study of how 'user' needs are identified in the development of Norwegian digital services in public administration found that, in practice, those needs tended to arise from a 'kind of brainstorming' by tech developers rather than via direct engagement with citizens: Broomfield, Heather, and Lisa Reutter. "In search of the citizen in the datafication of public administration." *Big Data & Society* 9.1 (2022): 20539517221089302.

¹⁴⁹ Dencik et al *supra* n.147 at 18.

¹⁵⁰ R Binns, 'Human Judgement in Algorithmic Loops' 16 (2022) *Regulation & Governance* 197–221.

¹⁵¹ Shannon Vallor, 'The Thoughts the Civilised Keep', *Noema Magazine*, 2 February 2021. Available at <https://www.noemamag.com/the-thoughts-the-civilized-keep/> (Accessed 4.11.22).

¹⁵² H Margetts and C Dorobantu, 'Rethink government with AI' (2019) *Nature* 568:163–165; cf K Yeung, Five fears about mass predictive personalization in an age of surveillance capitalism, *International Data Privacy Law*, Volume 8, Issue 3, August 2018, Pages 258–269, <https://doi.org/10.1093/idpl/ipy020>.

¹⁵³ Conservative Party (2010), *Invitation to Join the Government of Britain: the Conservative manifesto 2010*, London: Conservative Party.

¹⁵⁴ D Birrell and A Marie Gray, *Delivering Social Welfare* (2017) Polity Press, Bristol at 198–200; Needham, C. (2011), 'Personalization: From Story-line to Practice'. *Social Policy & Administration*, 45: 54–68. <https://doi.org/10.1111/j.1467-9515.2010.00753.x>.

¹⁵⁵ Yeung, *supra* n 152.

Ambiguity in understandings of what ‘personalised’ public services means appears to have continued with the take-up of NPA at least in its contemporary British incarnation. Although the benefits of data-driven personalisation are typically portrayed as accruing to citizens and users, personalisation has also been interpreted as a means through which the state can expand its capacity to extend fine-grained control over citizens in the form of digitally enforced conditionality. For example, a report authored by Richard Pope, a former member of the founding team at the UK Government Digital Service responsible for setting up the UK’s Universal Credit system, claims that, from the outset, Universal Credit was designed with the aim of enabling policymakers to reward or punish detailed combinations of circumstances and behaviours, remarking that:

Personalisation in Universal Credit is more about giving government the ability to personalise the demands placed on the public than allowing claimants to take responsibility and personalise their interactions with the government in a way that works for them....Rather than offering all claimants opportunities to make these choices, Universal Credit remains optimised for choices the government wants to make for them based on an idea of what ‘normal’ looks like.¹⁵⁶

In other words, personalisation was understood in the design and delivery of the Universal Credit system as a vehicle for deepening and reinforcing the ‘responsibilisation’ of individual benefit claimants by conditioning the entitlement to state protection and welfare benefits on certain kinds of behaviour which the government sought to encourage.¹⁵⁷

3.3 PUBLIC SECTOR OUTSOURCING AND THE DISTRIBUTION OF PUBLIC AND PRIVATE POWER

I have already referred to global tech consultants as important agents of change, championing the take-up of NPA in which government digital transformation is sometimes portrayed as a moral imperative.¹⁵⁸ In so doing, they hope to secure highly lucrative government contracts to implement digital transformation projects.¹⁵⁹ In Britain, the turn to private tech consultants continues the wholesale shift in favour of public sector outsourcing that took place under NPM at a staggering scale. While no significant outsourcing occurred in the 1970s, by 2014–15, UK government spending on contracts with external suppliers amounted to £242 billion, constituting 31% of total public sector expenditure, greater than the amount spent providing services itself.¹⁶⁰ Although my account of NPA does not depend upon whether the digitisation and datafication projects are undertaken in-house or outsourced to private providers, early British experience with NPA reveals considerable reliance on the latter. This may be in part due to the acute difficulties faced by governments in recruiting and retaining in-house data scientists and IT professionals.¹⁶¹ The rise of cloud computing and ‘servitisation’ models,

¹⁵⁶ PT2 Ltd, Universal Credit 2020, at 79–80. Available at <https://digitalwelfare.report/responsibility-and-complexity> (Accessed 4 October 2022).

¹⁵⁷ See König, Pascal D. “The place of conditionality and individual responsibility in a “data-driven economy.”” *Big Data & Society* 4.2 (2017): 2053951717742419.

¹⁵⁸ For example, the EU’s digital agenda and the EU Commission’s *Coordinated Plan on AI of 2021* explicitly seeks to ‘make the public sector a trailblazer for using AI’ per European Commission, ‘Coordinated Plan on Artificial Intelligence: 2021 Review – Fostering a European Approach to Artificial Intelligence’ (2021) Annex to the Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions COM(2021) 205 Final 46. See also Tangi et al supra n.16 which claims that ‘[n]ot using AI technologies to improve the functioning of public administrations could also be considered a risk, because resource constraints, time delays or the lack of personal care may also cause risks to citizens’ at 58.

¹⁵⁹ For example, see Deloitte, Center for Government Insights, *Government Trends 2022 – Building resilient, connected, and equitable government of the future*. Available at https://www2.deloitte.com/content/dam/insights/articles/us164671_government-trends-2022/DI_Govt-trends-2022.pdf (Accessed 4.11.22).

¹⁶⁰ National Audit Office (2016) Commercial and Contract Management: Insights and Emerging Best Practices. Available at <https://www.nao.org.uk/wp-content/uploads/2016/11/Commercial-and-contract-management-insights-and-emerging-best-practice.pdf> (Accessed 14.11.22).

¹⁶¹ However, the UK’s Government Digital Service (GDS) formed in 2011 as a new Cabinet Office Unit in charge of driving digital transformation was once regarded as world-leading: UN E-Government Survey 2016. Available at <https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2016> (Accessed 6 October 2022). Matt Ross, ‘The Rise and Fall of GDS: lessons for digital government’, Global Government Forum, 9 July 2016 Available at <https://www.globalgovernmentforum.com/the-rise-and-fall-of-gds-lessons-for-digital-government/> (Accessed 6.10.22). Mazzucato et al (2022) *Governing Artificial Intelligence in the Public Interest*, IIP-Stanford Working Paper.

whereby data analysis software is provided for monthly subscriptions fees rather than requiring large upfront investment, has also encouraged outsourcing by reducing costs and lowering barriers to outsourcing.

3.3.1 Is public sector outsourcing compatible with constitutional principles and safeguards?

There has been a long running debate about the appropriate role of the private sector in the provision of public services. While economists have tended to emphasise the incentives faced by private providers to deliver services more efficiently due to market pressures, public lawyers have misgivings that private firms' incentive to maximize profit will crowd out respect for public goods and values, including constitutional norms of transparency, accountability, due process and democratic participation. In response to these fears, advocates of outsourcing argue that these norms can be explicitly protected in the outsourcing contract, thereby protecting important public interests that might be overlooked by private service providers.

From the perspective of institutional economics, the nature of the relationship between the client (in this case, the government) and service-provider can be understood as one of principal-agent, a relationship which arises when some actor (or group of actors) called a principal, engages another actor (or group of actors) called an agent, to undertake some action on the principal's behalf (because, for example, the agent possesses resources, such as time, information and expertise which the principal lacks). A principal-agent problem arises because the principal does not have entire control over the agent's ability to act in accordance with the principal's interests. Indeed because the interests of the agent may diverge from that of the principal, the agent can rationally be expected to act in pursuit of self-interest rather than serving those of the principal, generating what is known as 'agency costs'. The principal can, however, reduce these costs by adopting measures aimed at bringing the agent's interests into alignment with the principal's, primarily by specifying in advance the terms upon which the agent must provide the service, and then monitoring the agent's adherence to evaluate conformity with the contract terms to prevent the agent from 'shirking'.

Harvard legal scholar Jody Freeman argues that public law norms of accountability, due process, equality, rationality and so on can be understood as 'quality' considerations which could, at least in theory, be imposed on the provider via contract to address the constitutional and democratic accountability deficits that may otherwise arise when the state is a principal outsourcing the task of public service provision to an agent.^{162,163} However, specifying quality of service requirements may be especially difficult due to the value-laden, politically contentious and complex nature of public services (for example quality of education, prisons). Vague quality specifications in outsourcing contracts leave providers with considerable flexibility to make policy judgements and trade-offs, tasks which public lawyers believe should be entrusted to government and thus subject to constitutional duties to make these decisions in a transparent, consultative and accountable manner rather than leaving contractors free to implement policy choices of their own choosing. In these circumstances, contractors will invariably exploit interpretive gaps to promote their self-interest at the expense of the public interest.

Studies of the experience of public sector outsourcing in specific contexts suggest that public lawyers' anxieties are well-founded. For example, Jane Andrew's study of prison outsourcing in Australia demonstrates how attempts to define service quality via contractual terms eludes detailed specification, with providers demonstrating compliance through reliance on that which is easily counted rather than offering an adequate reflection of service quality (particularly from

¹⁶² Jody Freeman, 'Extending public accountability through privatization from public law to publicization' in M Dowdle (ed.) *Public Accountability* (2006), Cambridge University Press at 83–114.

¹⁶³ Economists also recognise that outsourcing may not be preferable to in-house provision owing to the costs involved. This is famously referred to as the 'make or buy' decision theories by economist Oliver Williamson, who argued two types of costs that arise and must be considered in seeing to identifying which course of action is rationally preferred: transaction costs associated with making in-house vs agency costs associated with buying from external providers. These agency costs arise from the gap between the agent's self-interest and that of the principal: thus, the principal must incur monitoring costs to bring the agent's interests in alignment: by specifying quality of performance and monitoring accordingly: Williamson, Oliver E. "Markets and hierarchies: some elementary considerations." *The American Economic Review* 63.2 (1973): 316–325.

an ethical or moral perspective).¹⁶⁴ She claims that private contractors face large incentives to *appear* to be performing well while performance monitoring is often a superficial, tick-box exercise. Private providers may offer sub-standard services yet fall short of a technical breach of contract, often invoking claims of ‘commercial-in-confidence’ to obstruct the public’s access to quality information about the terms of the contract or the adequacy of the provider’s performance. Andrew also cites examples of governments failing to step in when a breach of contract has occurred.

In recognition of these and other dangers, Freeman identifies three variables that help identify when the dangers of out-sourcing may be especially great. First, where the quality of service is difficult to specify because it is value-laden, politically contentious and complex so that providers are left with considerable discretion to make policy judgements and trade-offs in the course of service-provision; second, if consumers of the service are vulnerable, either due to lack resources, political clout or because they have few exit options; and third, where outsourcing appears motivated by ideological rather than pragmatic factors, indicating possible government capture or corruption.¹⁶⁵

3.3.2 Outsourcing NPA projects: privatising gains while socialising risks

How do these insights help us anticipate the likely implications of outsourcing NPA projects and service outsourcing for the public interest? The UK’s early experience is alarming: not only has the British government made little attempt to consider the variables which Freeman suggests should alert governments to the risks of outsourcing, but it has wholly failed to put in place special measures to ensure that public law norms are adhered to by private tech consultants who design, implement and maintain NPA systems. Instead, it has actively *thwarted* attempts by activists to compel greater transparency, accountability and consultation in both the award of these contracts and the terms upon which they are granted.

Its current approach is exemplified in the provision of data and analytics services for NHS England shortly after the Covid-19 pandemic broke-out across Europe. In late March 2020, it announced its intention to establish a Covid-19 datastore with the involvement of private tech providers without publishing any further details. This prompted Foxglove (a public interest law firm) and openDemocracy to launch a petition (signed by over 10,000 members of the public) calling for disclosure of the proposed contracts while notifying the government of their intention to mount a judicial review challenge.¹⁶⁶ The government refused disclosure, claiming that the commercial interests of the tech firms involved outweighed the public interest in transparency, but eventually did so, in heavily redacted form, just hours before court proceedings were due to commence.¹⁶⁷ Their publication revealed that the firms involved (including Palantir, the global analytics company founded by Silicon Valley tycoon and ardent Donald Trump supporter Peter Thiel¹⁶⁸) were originally granted access to NHS data including IP rights to train their machine learning models for profitable use.¹⁶⁹

The economic value of outsourcing contracts of this kind is apparent from the escalating value of Palantir’s contracts as the NHS’s dependence on its services has grown over time. Although Palantir’s initial four-month contract, awarded in March 2020 to help develop the NHS Covid-19

¹⁶⁴ Andrew, Jane. “Prisons, the profit motive and other challenges to accountability.” *Critical Perspectives on Accounting* 18.8 (2007): 877–904.

¹⁶⁵ Freeman, *supra* n.178.

¹⁶⁶ Foxglove, Why is the UK government hiding its NHS data deals with private companies? 11 May 2020. Available at <https://www.foxglove.org.uk/2020/05/11/why-is-the-uk-government-hiding-its-nhs-data-deals-with-private-companies/> (Accessed 4.11.22).

¹⁶⁷ Some months later, in February 2021, the High Court ruled that Health Minister Matt Hancock found to have broken the law by failing to publish details of Covid related contracts within the 30 day timeframe required under the relevant legislation: D Conn, ‘Matt Hancock acted unlawfully by failing to publish Covid contracts’, *The Guardian*, 19 February 2021. Available at <https://www.theguardian.com/society/2021/feb/19/matt-hancock-acted-unlawfully-failing-publish-covid-contracts-high-court> (Accessed 4.11.22).

¹⁶⁸ Other firms involved including Google, Amazon, Microsoft and ‘Faculty’, an AI company with links to then Prime Minister Boris Johnson’s former senior aide Dominic Cummings who had worked closely with him on the Vote Leave campaign. Faculty was contracted in early 2020 for work on the NHSX AI Lab but was redirected to help run the NHS Covid-19 Data Store shortly after.

¹⁶⁹ Government lawyers claimed that a subsequent (undisclosed) amendment to the contract with Faculty, made after Foxglove’s initial FOI request, has “cured this problem”. Foxglove and openDemocracy have demanded immediate release of the amended contract.

datastore was provided in return for payment of the princely sum of £1, it was extended by a further four months at a cost of £1 mil in June 2020, and again in December 2020 for a further two years for £23 mil. In the meantime, NHS England announced plans in April 2022 to procure development of a 'Federated Data Platform' which will centralise NHS patient health data in a single platform. As the incumbent provider of the NHS Covid-19 Datastore, Palantir is considered most likely to win this contract, which is reportedly worth £240 mil, rising to £360 mil if the contract period is extended. Despite the constitutional and public significance of the creation of a centralised platform of the English population's health information, including patient care records, and its provision by a tech firm which specialises in military technology, the Minister for State Care and Mental Health has informed Parliament that the NHS was not proposing to conduct a public consultation on the nature or remit of the proposed platform, in an apparent violation of its undertaking to Foxglove and openDemocracy (following a further judicial review challenge) that it would not offer Palantir a long-term role in the NHS without public consultation and undertaking a data protection impact assessment.¹⁷⁰

The British government's approach to outsourcing the creation of a centralised data collection, storage and analytics system for the English population's most sensitive data to a Silicon-valley-based tech firm is the antithesis of that of a custodian acting for and on behalf of the community. It suggests that the British executive cannot be relied upon to act as a faithful servant, loyally serving the interests and upholding the fundamental rights of the British public. How might this be explained?

Freeman's account proceeds on the optimistic assumption that the government will proactively seek to safeguard the interests of the general public whom it is expected to serve. Yet this assumption appears out of step with contemporary political and administrative reality, through which the executive is largely responsible for outsourcing decisions with minimal oversight by the legislature, so that the general public is the relevant principal, reliant on the Executive (as agent) to act on its behalf when delivering public services, whether directly or by outsourcing to an external provider. However, because the general public has few direct mechanisms through which it can hold the Executive to account (other than the threat of being voted out at the next election), this makes the public especially vulnerable to shirking and exploitation. This has enabled the UK government to conceal the terms and detail of its outsourcing contracts from the British public while routinely avoiding public consultation prior to awarding an outsourcing contract to a private provider, even in the face of judicial review, let alone taking active steps to require private contractors to abide by public law principles in the delivery and operation of NPA systems.

In short, in the absence of effective monitoring mechanisms and strong transparency rights, misalignment between the interests of the general public and those of the Executive has enabled the agent, acting as intermediary between the general public and the private sector provider, to exploit the former while conferring lavish benefits on the latter. As the state becomes increasingly dependent on a private sector service provider through technological 'lock in' to the contractor's software, technical standards and system protocols, the contractor's power over the state deepens and its leverage to demand higher payments increases.¹⁷¹ In this way, the private provider shores up its coveted economic status as 'rentier' by virtue of its monopoly control and successful exploitation of its contract to develop and maintain NPA services for its

¹⁷⁰ Foxglove and openDemocracy, 'Success! UK government concedes lawsuit over £23m NHS 'data deal' with controversial US tech corporation Palantir', 1 April 2021. Press Release. Available at <https://www.foxglove.org.uk/2021/04/01/success-uk-government-concedes-lawsuit-over-23m-nhs-data-deal-with-controversial-us-tech-corporation-palantir/> (Accessed 4.11.22).

¹⁷¹ Critics of commercial software for public sector use complain about large fees, the need to rely on external expertise, slow implementation and a general lack of control. In contrast, if developed in-house, software services can be more flexible and more tailored to organisational needs, easier to update and modify and cheaper to test and implement: Barlett and Tkacz *supra* n.23 at 22. See in particular R. Collington. "Disrupting the welfare state? Digitalisation and the retrenchment of public sector capacity." *New Political Economy* 27.2 (2022): 312–328.

public sector client, expanding the interests and power of digital capitalists in the face of an increasingly weakened state.¹⁷²

What is less clear is *why* the British executive has been so willing to contract out NPA services to private tech consultants on such favourable terms, while making little effort to protect the rights and interests of the British public. At least two explanations are plausible. Firstly, principal-agent theory may suggest that the executive expects to benefit, either in the form of tangible political or economic benefits or perhaps both, from shirking its duties to uphold the constitutional rights and interest of the British public, either due to political capture by the tech industry or even corruption. Alternatively, the British state may simply lack sufficient expertise and competence to develop NPA systems in-house, so that it has no practical alternative to outsourcing service provision to private IT providers, while lacking the expertise to exercise meaningful oversight and ensure quality provision and value for money for British taxpayers.¹⁷³ Either way, if the private provider fails or cannot otherwise deliver an adequate service, the taxpayer retains residual risk throughout, resulting in the ‘privatisation of profit and the socialisation of risk’.¹⁷⁴ As experienced public sector outsourcing consultant Graeme Scott observes, referring to the celebrated work of economist Oliver Williamson in his comparative analysis of hierarchies and markets for managers confronting the ‘make or buy’ dilemma, some public services are simply unsuitable for outsourcing.¹⁷⁵

‘Buying is not always a better idea than making. In some areas, following Williamson, the transaction costs of writing and monitoring the contract and the risks to the quality of service are such that vertical integration is a superior form of governance. A policy direction to contract out in this case will only lead to trouble.’

4. CONCLUSION

The ‘New Public Analytics’ is a shorthand expression I have used to describe the increasing take-up of digital automation and data-driven technologies in public administration across many countries. NPA also serves as analytical construct, comprised of an amalgam of related ideas associated with specific properties, beliefs and practices associated with networked digital technologies. I have argued that the take up of NPA represents an emergent yet paradigmatic shift that may be understood as conceptual and ideological successor to its most well-known predecessor, the ‘New Public Management’.¹⁷⁶ Although its contours remain fluid and unsettled, my hope is that this analytical construct will offer researchers a helpful vehicle for investigation, reflection and critical comparison across the rich variety of policy domains, sites and locations in which NPA is being taken up, and continue to add conceptual flesh to the skeleton outline offered here. A particular challenge for scholars of NPA is to draw on the rich insights from critical studies of data, algorithms and software, and from a variety of analytical lenses and disciplinary perspectives including data justice,¹⁷⁷ the digital welfare state,¹⁷⁸ algorithmic governance, STS, media studies, surveillance studies, anthropology, law,

¹⁷² I am adopting the definition of ‘rentiership’ proposed by Brett Christopher in which rent-bearing assets are those characterised by monopoly ownership or control and the capacity of the rentier to successfully exploit that asset on the market. He refers to firms with public outsourcing contracts as prime examples of assets that confer the status of rentier on the contractor due to the scarcity of the contract (in that each contract is unique and, by their nature, limited in number. Proprietary software is also a source of major competitive advantage via monopoly control of an asset, referring to the information and communications sector as ‘renowned rentier territory’ in which IP is ‘utterly fundamental to computer programming and consultancy, referring to Microsoft as ‘probably the most prolific rentier in capitalist history’: Christophers, B. (2019). *The rentierization of the United Kingdom economy. Environment and Planning A: Economy and Space*. B Christophers. *Rentier capitalism: Who owns the economy, and who pays for it?*. Verso Books, 2022. Also Dencik *supra* n.31.

¹⁷³ See NAO 2021, *The National Enforcement Data Programme*. Mazzucato et al (2022) *Governing Artificial Intelligence in the Public Interest*, IIIP-Stanford Working Paper.

¹⁷⁴ G Scott, ‘The use of contracting in the public sector’ (1996) 55 *Australian Journal of Public Administration* 97–104.

¹⁷⁵ Williamson, Oliver E. “Markets and hierarchies: some elementary considerations.” *The American economic review* 63.2 (1973): 316–325.

¹⁷⁶ Yeung, *supra* n.37.

¹⁷⁷ Eg Taylor, Linnet. “What is data justice? The case for connecting digital rights and freedoms globally.” *Big Data & Society* 4.2 (2017): 2053951717736335.

¹⁷⁸ Eg Dencik, Lina, and Anne Kaun. “Datafication and the welfare state.” *Global Perspectives* 1.1 (2020).

public administration, organisational studies and computer science. In particular, critiques of the 'algorithmic turn' within organisations and across institutions have highlighted how the 'big data revolution' precipitated by the emergence of the internet as a global data infrastructure relies on new forms of knowledge, expertise and ways of seeing the world that introduce new biases, practices and pathologies, while redistributing power, authority, risks and resources. Accordingly, there are rich and ample opportunities for critical investigations into how those insights play out in specific public sector contexts through situated investigation as well as more general, 'middle-level' theorising of the kind I have offered here.

I have also attempted to reflect critically on some of NPA's implications, drawing primarily and selectively from UK experience, focusing on what NPA portends for the provision of public services and the practice of statecraft, for state-citizen relations, and for the relationship between public and private power as networked digital service provision is increasingly outsourced to private providers. Despite NPA's portrayal as a tool for process improvement and optimisation via technological means, devoid of grand political aspirations, the configuration and implementation of NPA technologies and systems necessitate numerous 'techno-operational' choices that entail the making of normative and political judgements. Invariably, these choices are intentionally configured to produce favourable outcomes that best serve the needs and interests of the client (in this case, the public sector organisation) as system controller, often to the detriment of affected individuals while the political character of those choices is hidden deep within the bowels of the complex socio-technical systems into which they are embedded. Nevertheless, the impacts and consequences of many of these political choices surface in the ways in which individuals are seen, understood and acted upon by NPA systems in concrete settings and contexts.

From my selective examination of the UK experience of NPA, there is reason to believe that the turn to digitisation and datafication has provided the British state with a unique opportunity to embark on a wholesale project through which individuals are rendered increasingly legible, responsible and biddable under the mundane rubric of process optimisation and modernisation. Accelerated by the relentless pursuit of economic austerity, British NPA projects and systems shrink state support and assistance, shifting the responsibilities formerly provided by the post-war welfare state onto individuals who are expected to access and navigate 'self-service' digital environments, bearing default responsibility for correcting any errors, or omissions yet are typically beyond the individuals' control or even awareness. For those in positions of vulnerability who lack the skills, competences and ready internet access, and whose encounters with the state are now mediated primarily via digital systems rather than frontline human officers, their experience of the state has become increasingly and shamefully Kafkaesque, dehumanising and unjust. However, the capacity of these systems to function automatically and at scale enables the collective violation of the rights of affected individuals, including the presumption of innocence, producing serious injustice at scale.

I have also considered the potential implications of the state's reliance on private tech consultants to develop, build and maintain NPA systems on the state's behalf in the absence of significant in-house expertise, competence and computing infrastructure. Although in theory the state, acting as intermediary between citizens on the one hand and private sector consultants on the other, could insist on contractual protections through which the legal and democratic protections that would otherwise apply if the state provided these services in-house, the British state has shown little inclination to do so.¹⁷⁹ In short, the substantive poverty of NPA techniques enables them to be deployed by self-described democratic governments in the service of a wide range of normative values and goals, disguising the pursuit of deeply political projects that are anti-democratic in their effects and consequences, even if not their explicit intention.

In the UK, the state's growing dependency on private tech consultants enables these systems, and the contestable political choices that they embody, to evade constitutional safeguards and meaningful public oversight. But for the tech industry and particularly for global tech consultants, securing a public sector outsourcing contract to design, deliver and maintain an NPA system is akin to the acquisition of a self-replenishing oil-field: extracting value from both state and

¹⁷⁹ Perhaps one might characterise shift in role of state vis-à-vis citizen from the welfare state, to the 'regulatory state' and, thence to the 'digital platform' state?

citizens, whether in the form of cash payments or access to troves of citizens' personal data, while deepening and entrenching their power without any serious concomitant responsibility. If the approach to NPA implementation in Britain which I have described continues, it is likely to result in the sweeping privatisation of gains and the socialisation of risks in which vulnerable communities and individuals are forced to bear a disproportionate share of the burden, while the British public become increasingly disenfranchised with few meaningful and practical opportunities for democratic participation or dissent. In this lecture, I have shown how the turn to digital machines is transforming the way in which public power and authority is exercised, by whom, while highlighting ways in which these machines are prone to failure and abuse. This account suggests that there is an urgent and serious need for lawyers and legal scholars to work with policy-makers and technical experts in order to ensure that systematic, practical and effective constitutional safeguards are in place, to ensure that our digital machines are our servants and not our masters, let alone vehicles of serious injustice.

AUTHOR NOTED

This paper was delivered in the form of the 2022 Annual Montesquieu Lecture at Tilburg Law School on 18 October 2022 at Tilburg University, although it refers to ideas formulated earlier and delivered at a plenary address at the Hong Kong Law School's 50th Anniversary Celebration and ICON-S Annual Conference, Hong Kong University on 27 June 2018 and also presented to participants at the 'Think Big' AI Workshop, Cumberland Lodge Windsor, UK, 25 June 2018. I am indebted to Sofia Ranchordas and Nathalie Smuha for comments on earlier drafts. All errors remain my own.


FUNDING INFORMATION

The author gratefully acknowledges funding support from VW Stiftung, Grant No. 19-0087, *Deciding about, by, and together with algorithmic decision-making systems*.

COMPETING INTERESTS

The author has no competing interests to declare.

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TO CITE THIS ARTICLE:

Karen Yeung, 'The New Public Analytics as an Emerging Paradigm in Public Sector Administration' (2022) 27(2) *Tilburg Law Review* pp. 1–32. DOI: <https://doi.org/10.5334/tlir.303>

Published: 28 February 2023

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