University of New South Wales Law Research Series

TECHNOLOGY AND THE JUDICIAL ROLE

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Forthcoming in Gabrielle Appleby and Andrew Lynch (eds), *The Judge, the Judiciary and the Court: Individual, Collegial and Institutional Judicial Dynamics in Australia* (Cambridge University Press, 2020)
[2019] *UNSWLRS* 90

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Draft, accepted version, cite as: Monika Zalnieriute and Felicity Bell, 'Technology and Judicial Role' *forthcoming* in Gabrielle Appleby and Andrew Lynch (eds.), *The Judge, the Judiciary and the Court: Individual, Collegial and Institutional Judicial Dynamics in Australia*, Cambridge University Press, 2020.

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MONIKA ZALNIERIUTE AND FELICITY BELL*

> "The advent of machine learning tools and their integration with legal data offers a mechanism to detect in real time, and thereby remedy judicial behaviour that undermines the rule of law".[1] - Daniel L Chen, 2019.
>
> 'The law is not so ignorant or disdainful of human nature as to assume that judges or quasi-judicial decision-makers are automatons.'[2] – Justice Heerey, 1994.

I. INTRODUCTION

Technology is often seen as having transformational capacity to make societal institutions not only more efficient but also more democratic, accessible, accurate and fair. Ranging from welfare and criminal justice, to healthcare, national security and beyond, technology today is deployed not only to improve the efficiency of public services, but increasingly, to automate elements of, or even entirely replace, humans in decision-making processes.[3] The courts have not been an exception to this trend and have for a number of years invested in digital uplift projects. Beyond the routine use of technology, such as digital filing and discovery which is widely accepted and largely self-explanatory, many jurisdictions are considering the introduction of more sophisticated applications. Many are asking whether machine learning (ML) techniques and other artificial intelligence applications should play a role in assisting tribunals and judiciary in decision-making, and how that might correspondingly transform the role of judges.[4] In this Chapter, we ask how

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1 Daniel L Chen, 'Machine Learning and the Rule of Law' 2019, in M Livermore and D Rockmore (eds) *Computational Analysis of Law*, Santa Fe Institute Press, *Forthcoming,* available at SSRN: https://ssrn.com/abstract=3302507.

2 *Vietnam Veterans' Association of Australia (New South Wales Branch Inc) v Gallagher* [1994] FCA 489 (per Heerey J) (*'Vietnam Veterans'*).

3 This is not new: some of the earliest AI systems designed for law were as decision-support systems for government administrators: eg, Peter Hammond, 'Representation of DHSS Regulations as a Logic Program' (Conference presentation, Expert Systems '83, Churchill College, Cambridge, 14-16 December 1983).

4 See, eg, Tania Sourdin, 'Judge v. Robot: Artificial Intelligence and Judicial Decision-Making' (2018) 41(4) *University of New South Wales Law Journal* 1114; Jesse Beatson, 'AI-Supported Adjudicators: Should Artificial Intelligence Have a Role in Tribunal Adjudication?' (2018) 31(3) *Canadian Journal of Administrative Law & Practice* 307.

these new uses of technology might, in turn, impact judicial values and judges' own sense of themselves, and even transform the judicial role in contemporary societies.

The use of sophisticated technological tools by the judiciary is still in its 'infancy'[5] – and has often been met with resistance[6] – but there are indications that such tools will be increasingly deployed. Attempts to 'support' judicial decision-making through the use of structural aids have a long history; arguably, the increasing use of algorithmic risk assessments in the United States criminal justice system[7] marks the latest such attempt. Algorithmic methods are also infusing private dispute resolution, notably for minor online transactions. Unsurprisingly, there are suggestions that similar methods could be deployed in public settings.[8] A proposal for an 'automatic online conviction' process has been stalled in the United Kingdom Parliament since 2017.[9] Steps toward circumscribing the judicial role have also been taken, by removing judges from the determination of some disputes altogether: Estonia recently announced plans to create a 'robot judge' for small claims.[10] Thus far, these steps toward automation have focused on offences or private disputes where judges need not, in routine cases, exercise judicial discretion. That is, the UK proposal is focused on strict liability, summary offences which are not punishable by imprisonment, such as fare evasion and possession of unlicensed fishing equipment.[11] Estonia's plans form a part of its larger project of civic digitisation and the creation of dispute resolution mechanisms online.[12] Nevertheless, substantial claims are made about the capacity of artificially intelligent systems to mimic more complex human decision-making; or even to perform to a more accurate standard.

The increasing experimentation and proposals to automate judicial decision-making, or elements of it, with ML tools attract conflicting narratives. On the one hand, some see the technologisation of the judicial role as inevitable, and call for a speedy embrace of automation by the courts to better perform their public role.[13] On the other hand, concerns are raised that automation tools when used in *any* decision-making process may introduce bias and discrimination, thereby giving rise to individual and collective harms. Often such technological tools – which may be created by private companies and shielded behind trade secrets[14] – are not subject to the same accountability

5 Sourdin (n 4) 1115.
6 Danielle Kehl, Priscilla Guo, and Samuel Kessler, 'Algorithms in the Criminal Justice System: Assessing the Use of Risk Assessments in Sentencing. Responsive Communities Initiative' (2017) Berkman Klein Center for Internet & Society, Harvard Law School.
7 Ibid.
8 Dave Orr and Colin Rule, 'Artificial Intelligence and the Future of Online Dispute Resolution', New Handshake, http://www.newhandshake.org/SCU/ai.pdf
9 UK Ministry of Justice, *Transforming Our Justice System: Assisted Digital Strategy, Automatic Online Conviction and Statutory Standard Penalty, and Panel Composition in Tribunals* (Government Response Cm 9391, February 2017).
10 Sourdin (n 4) 1115. This is not a new idea: Anthony D'Amato, 'Can/Should Computers Replace Judges?' (1977) 11 *Georgia Law Review* 1277.
11 Ministry of Justice (n 9) 8 [16]; see also Jane Donoghue, 'Reforming the Role of Magistrates: Implications for Summary Justice in England and Wales' (2014) 77 *Modern Law Review* 92.
12 Nathan Heller, 'Estonia: The Digital Republic', *The New Yorker,* 11 December 2017, <https://www.newyorker.com/magazine/2017/12/18/estonia-the-digital-republic>.
13 See in particular Eugene Volokh, 'Chief Justice Robots' (2019) 68(6) *Duke Law Journal* 1135.
14 Rebecca Wexler, 'Life, Liberty, and Trade Secrets: Intellectual Property in the Criminal Justice System' (2018) 70(5) *Stanford Law Review* 1343.

or oversight mechanisms as other public actors in our legal systems, including, notably, judges. This raises questions about their compatibility with fundamental principles of justice. Scholars have focused on these harms in the context of administrative decision-making, which has been automated to a larger extent than other areas.[15] Different areas of decision-making, however, entail different effects. In terms of judicial decision-making, judges themselves must make both procedural and substantive decisions; decisions as to facts, and decisions as to law which may require different levels of discretion; decisions as to both past events and what might occur in the future. The automation of procedural steps, while it may still be significant, is quite different to automating a substantive decision, for instance. This demands a nuanced approach to the use of technology in judicial decision-making.[16]

This chapter does not provide an exhaustive analysis of the judicial role and technology. Rather, we sketch how technology is - or may soon be - used by the judiciary: from digitisation of court filing and administrative systems, to automation of decision-making in small claims litigation, to ML software in criminal sentencing. We then examine the judicial values affected by, in particular, the use of automated systems in judicial decision-making. This synthesis lays an analytical foundation for understanding where the technology might go in the future and the dangers it could bring for the judicial role, thereby informing the future use and regulation of such systems.

The remainder of this chapter is divided into two main Parts. Part II begins with a discussion of the spectrum of technology used by Australian courts, before explaining the ways in which technologies could be used in the particular context of judicial decision-making. We argue that the context even of seemingly straightforward digital uplift is important, as the reification of technology as efficient, value-neutral and beneficial carries over into more value-laden applications such as those mentioned above. Accordingly, in Part III we consider the implications of such automation on foundational judicial values of transparency and accountability, judicial independence, impartiality, diversity, and efficiency. Finally, in Part IV, we conclude that the role of courts as institutions run by humans – not machines – is especially important now, as lower-level (yet significant) administrative decisions are increasingly automated with little (if any) human oversight. More than ever, a human judiciary is needed to safeguard individual rights and entitlements from the effects of automated decision-making by government and in the private sphere.

15 Cary Coglianese and David Lehr, 'Regulating by Robot: Administrative Decision Making in the Machine-Learning Era' (2017) 105(5) *Georgetown Law Journal* 1147.

16 Sourdin (n 4); Monika Zalnieriute, Lyria Bennett Moses, and George Williams, 'The Rule of Law and Automation of Government Decision-Making' (2019) 82(3) *The Modern Law Review* 425.

II. FROM DIGITISATION TO AUTOMATION: THE SPECTRUM OF TECHNOLOGIES USED BY COURTS

Technological tools used by the courts vary from simple digitisation of court registries to deployment of more complex technological systems designed to assist or even replace judicial officers in the decision-making process. Digitisation processes are critical for courts' efficient operation in the 21st century. While basic technological uplift may seem self-explanatory, these straightforward steps are a necessary precursor to more sophisticated uses. For example, the electronic data available to courts which implement e-filing could be used to train an ML program.[17] Moreover, even what might appear to outsiders to be 'simple' digital uplift, may be challenging for courts to implement, given issues of scale, the bureaucratic nature of large and complex organisations, and the hierarchical nature of courts. Courts have finite resources and must choose how best to deploy technology as one of many competing priorities along with personnel and physical environs. Here, we briefly introduce judicial use of technology with several examples before turning to discuss the legal implications of deploying such systems in Part III.

A. Digitisation

Traditionally, law and the legal system are associated with paper documents. The growth of corporate prosecutions and large-scale inquiries (such as Royal Commissions) in the 1980s and 90s are thought to have prompted the use of computers in managing the volume of documents through cataloguing.[18] Now, it is possible for trials to take place within courtrooms which are entirely digital, with documents electronically filed,[19] as well as other features such as 'digital court reporting, telephone conferencing, hearing loops, real time transcripts, desktop mirroring, multimedia evidence playback and video conferencing'.[20] The use of video-link can obviate the need for judges, lawyers or parties to be physically present in courtrooms. This is of especial benefit to children and other vulnerable witnesses in giving evidence while physically removed from the courtroom environs.[21] However, studies have also found the use of video-link problematic for its unreliable functionality (poor sound and image quality and transmission), communication (e.g., those appearing by video unable to effectively communicate with their lawyer or exchange documents) and difficulty in time-management (people on remand waiting hours in holding cells for their 'appearance').[22] Perhaps the most concerning implications of video-link are for procedural

17 James Allsop, 'Technology and the Future of the Courts' (Speech, TC Beirne School of Law, University of Queensland, 26 March 2019) 5.

18 Ros Macdonald and Anne Wallace, 'Review of the Extent of Courtroom Technology in Australia' (2004) 12(3) *Willian & Mary Bill of Rights Journal* 649; Peter Vickery, 'Managing the Paper: Taming the Leviathan' (2012) 22(2) *Journal of Judicial Administration* 51.

19 Allsop (n 17) 5–6; and see https://www.fedcourt.gov.au/online-services/elodgment>; Marilyn Warren, 'Embracing Technology: The Way Forward for the Courts' (2015) 24(4) *Journal of Judicial Administration* 227.

20 Robert McDougall, 'The Uses and Abuses of Technology in the Courtroom' (Keynote Address, Society of Construction Law, Australia Conference of 2013, 2 August 2013) 4, [7].

21 McDougall, 'The Uses and Abuses of Technology'.

22 Carolyn McKay, *The Pixelated Prisoner: Prison Video Links, Court 'Appearance' and the Justice Matrix* (Routledge, 2018) 156–71; Warren (n 19) 231–32.

justice in the criminal courts: as McKay concludes, '[t]he administration of justice is not necessarily well-served by substituting a screen for a living human presence'.[23]

In a 2019 speech titled 'Technology and the Future of the Courts', Chief Justice Allsop of the Federal Court of Australia referred to 'internal' and 'external' (or client-facing) digitisation processes.[24] The former describes standard developments, such as e-filing of documents, online databases or digital stamping. This is illustrated well by the Australian National Court Framework, implemented by the Federal Court in 2014.[25] The framework streamlined, synchronised and harmonised the operation of State registries and the functioning and use of individual judges' dockets, and involved a move to e-filing, which is offered in some form by most Australian courts.[26]

The Supreme Court of Queensland's efforts to enact a digital trial process are informative. Moving away from reams of paper, an electronic trial involves all documentary evidence being filed as searchable text.[27] This is sometimes referred to as an electronic courtbook.[28] The documents are viewed online, by parties, judge and jury, during the trial. Hyperlinks are used within the courtbook to link between referenced material, which increases the efficiency of searching, and documents may also be annotated electronically. Every document is labelled with a distinct identifier, which makes it easier to reference documents and to deliberate upon any objections to their filing.[29]

Many courts around the world are investigating, if not implementing, even more ambitious external and large scale digital modernisation projects.[30] In the Canadian province of British Colombia, people with a wide range of small claims disputes are directed first to an online portal.[31] If the parties cannot resolve the proceedings, they may be determined online by a Tribunal Member in lieu of a face-to-face hearing. Similarly, in 2018, the Victorian Civil and Administrative Tribunal (VCAT) implemented an online dispute resolution pilot. Through the pilot, VCAT 'heard 65 cases using the technology, with 71 parties participating in online hearings and 21 cases settled beforehand', and, according to VCAT, 'shows exciting potential benefits for the Victorian community'.[32] However, the pursuit of digitisation of the courts for cost-saving and efficiency may sometimes conflict with, rather than promote, access to justice – as noted with the use of video-

23 Ibid 175.
24 Allsop (n 17).
25 Australian National Court Framework, available at <https://www.fedcourt.gov.au/about/national-court-framework>, visited 15 October 2019.
26 This is variable – eg, in Tasmania, e-filing is achieved by sending an email attachment: Allsop (n 17) 6.
27 Sheryl Jackson, 'Court-provided Trial Technology: Efficiency and Fairness for Criminal Trials' (2010) 39(3) *Common Law World Review* 219, 223–24.
28 McDougall (n 20).
29 McDougall (n 28) [13] <http://www.supremecourt.justice.nsw.gov.au/Documents/Publications/Speeches/Pre-2015%20Speeches/McDougall/mcdougall_020813.pdf>.
30 Eg Donoghue (n 11) 1000-01; and Ministry of Justice, *Transforming Our Justice System* (2016).
31 Civil Resolution Tribunal [British Columbia] (Web Page).
32 See VCAT website, https://www.vcat.vic.gov.au/news/sharing-vcats-online-dispute-resolution-experience, accessed 30 October 2019 and Vivi Tan, 'Online Dispute Resolution for Small Civil Claims in Victoria: A New Paradigm in Civil Justice' (2019) 24(1) *Deakin Law Review*.

link. We discuss this tension and its implications for judges and the judicial role in Parts III and IV.

B. Decision-Support and Automation of Decision-Making

As Allsop CJ noted, without internal digitisation, external digitisation is not feasible.[33] Likewise, general digital uplift supports more sophisticated technologies, focused on the use of artificial intelligence in judicial decision-making. The degree of automation employed may vary along a trajectory starting with what is known as 'decision-support' to 'human-in-the-loop', to the total disappearance of humans from the decision-making process.[34] 'Decision-support' is an information system which supports organisational decision-making, and has a relatively long history.[35] Meanwhile, 'human-in-the-loop' is a system with more automation but which still requires human interaction.[36] These different systems are not separate categories but exist on a spectrum moving from fully human decision-making to systems that, while designed by humans, operate largely independent of them.

Decision-support and automation with a human-in-the-loop may involve different techniques, and sometimes combinations of them. We focus on two classic types. The first, sometimes described as the first wave of artificial intelligence ('AI') or expert systems, is a process that follows a series of pre-programmed rules to mirror responses of a human expert in a particular domain.[37] A number of early forays in the research field of AI and Law were designed as decision-support systems, such as that developed in the 80s by Sergot and Kowalski at Imperial College London to support decisions made by immigration officials.[38] A current example, EXPERTIUS, is a decision-support system used in Mexico to advise judges and clerks as to whether a plaintiff is eligible for a pension.[39] Generally, these systems function to guide decision making in situations where rules (such as legislative rules) lend themselves to step-by-step programming, do not have indeterminate concepts, and where facts are uncontroversial or agreed.

As well as pre-programmed systems like these, statistical analyses in judicial decision-making also has some history in, for example, the use of sentencing databases, such as the one created in the

33 Allsop (n 17).
34 See Iyad Rahwan, 'Society-in-the-loop: programming the algorithmic social contract' (2018) 20(1) *Ethics and Information Technology* 5; Sailik Sengupta, et al, 'RADAR—A Proactive Decision Support System for Human-in-the-Loop Planning' *2017 AAAI Fall Symposium Series*. 2017; Lorrie F Cranor, 'A framework for reasoning about the human in the loop' (2008) available at <https://www.usenix.org/legacy/event/upsec/tech/full_papers/cranor/cranor.pdf>
35 Eg, Giovanni Sartor and Karl Branting (eds) *Judicial Applications of Artificial Intelligence* (Kluwer Academic, 1998).
36 Cranor (n 34).
37 Richard E Susskind, *Expert Systems in Law: A Jurisprudential Inquiry* (Clarendon Press, 1987) 114–15.
38 Marek Sergot et al, 'The British Nationality Act as a logic program' (1988) 29(5) *Communications of the ACM* 370; c.f. P Leith, 'The Rise and Fall of the Legal Expert System' (2010) 1(1) *European Journal of Law and Technology*.
39 Davide Carneiro et al, 'Online Dispute Resolution: An Artificial Intelligence Perspective' (2014) 41 *Artificial Intelligence Review* 227–28.

NSW Sentencing Information System (later the Judicial Information Research System, 'JIRS'),[40] to support judges in criminal sentencing. While not involving ML, the purpose was to support judges by collating information about past sentences, enabling judges to discover the range of penalties imposed in the past for similar convictions. JIRS, which is accessible to lawyers as well as judges, thus represents a form of decision-support system, aimed at harmonising sentencing in pursuit of greater consistency.

The second category – or 'second wave' of AI – includes techniques such as supervised machine learning and deep learning.[41] These are systems that 'learn' from data (either collected or constructed) so as to draw inferences about new situations. These decisions may be classification (eg, that a document is relevant in discovery[42]) or predictive (eg, that an individual is likely to commit a crime in the future). A variety of data-driven techniques can be used so that a system will 'learn' patterns and correlations to generate predictions or reveal insights. Unlike standard statistical methods, ML is generally iterative (able to continually 'learn' from new information) and capable of identifying more complex patterns in data.

One area of judicial decision-making where second-wave automation tools have already been deployed in practice is the prediction of the likelihood of reoffending in the context of criminal sentencing decisions. For example, in some US jurisdictions, judges can (or may even be required to) use risk-assessment tools such as COMPAS ('Correctional Offender Management Profiling for Alternative Sanctions') that draw on historic data and use ML to infer which convicted defendants pose the highest risk of re-offending, particularly where there is a risk of violence, to make decisions about bail or sentence. Many scholars have expressed concerns that judicial use of such tools has been approved by the Conference of US Chief Justices[43] and by the Supreme Court of Wisconsin, as well as in various state statutes.[44] In a test case, *State of Wisconsin v Loomis*, use of the COMPAS system was held to be permissible on the condition that the decision was not fully

[40] See Judicial Commission of New South Wales, Judicial Information Research System (JIRS) <http://wwwjudcom.nsw.gov.au/research-and-sentencing/judicial-information-research-system-jirs>; Janet B L Chan, 'A Computerised Sentencing Information System for NSW Courts' (1991) 7(3) *Computer Law and Practice* 137, 147.

[41] Michael Haenlein and Andreas Kaplan, 'A Brief History of Artificial Intelligence: On the Past, Present, and Future of Artificial Intelligence' (2019) 61(4) *California Management Review* 5–14; J Launchbury, 'A DARPA Perspective on Artificial Intelligence' (DARPAtv, YouTube, 2017) at https://www.youtube.com/watch?v=-O01G3tSYpU (last accessed 20 August 2019).

[42] See, eg, Maura R Grossman and Gordon V Cormack, 'Technology-Assisted Review in E-Discovery Can be More Effective and More Efficient than Exhaustive Manual Review' (2011) 17(3) *Richmond Journal of Law & Technology* 1.

[43] CCJ/COSCA Criminal Justice Committee, 'In Support of the Guiding Principles on Using Risk and Needs Assessment Information in the Sentencing Process' (Resolution 7, adopted 3 August 2011) at http://ccj.ncsc.org/~/media/Microsites/Files/CCJ/Resolutions/08032011-Support-Guiding-Principles-Using-Risk-Needs-Assessment-Information-Sentencing-Process.ashx (last accessed 15 August 2018).

[44] See *State of Wisconsin v. Loomis*, 881 N.W.2d 749 (Wis. 2016). The United States Supreme Court denied certiorari on 26 June 2017: Kelly Hannah-Moffat, 'Algorithmic risk governance: Big data analytics, race and information activism in criminal justice debates' (2018) *Theoretical Criminology* 1362480618763582; Sharad Goel, et al, 'The Accuracy, Equity, and Jurisprudence of Criminal Risk Assessment', *Equity, and Jurisprudence of Criminal Risk Assessment* (December 26, 2018).

delegated to ML software and that the judge was notified of the tool's limitations.[45] Thus, a judge must still consider a defendant's arguments as to why other factors might impact the risk that he or she poses.[46] As judicial sentencing decisions affect the freedom and lives of individuals, the use of algorithms to automate elements of them is particularly controversial.

Finally, in contrast to the use of a tool to supplement decision-making, the Estonian Ministry of Justice automation project seeks to completely adjudicate (albeit with rights of appeal) small contract disputes.[47] The goal is primarily efficiency: both to clear a backlog, and to leave judges with more time to determine complex disputes. Reportedly, the project will 'adjudicate small claims disputes under €7,000 … In concept, the two parties will upload documents and other relevant information, and the AI will issue a decision that can be appealed to a human judge'.[48] European scholars have already noted, though, that subjecting people to automated decisions in this manner may breach the European Union's General Data Protection Regulation,[49] which came into force in May 2018, entitling individuals to not be subjected to entirely automated decisions.[50]

III. FOUNDATIONAL JUDICIAL VALUES AND TECHNOLOGY

There has been much scholarly analysis of judicial values, sometimes classified as core or traditional (eg, independence; impartiality) and emerging (eg, diversity;[51] efficiency[52]). Without ourselves engaging in such an in-depth analysis, in this Part we consider how technology, especially automated systems, might either support or undermine key judicial values. We note, too, the broader import of the judicial function, discussed by Joe McIntyre in this collection – the judiciary are not only dispute resolvers (framed in a particular, unique and historically dependent way) but also constitute a form of social governance.[53] Technology's impact on judicial values and on courts as institutions thus shapes not only the resolution of disputes, but also society more generally. While it may be possible to automate judging on a technical level, we doubt the capacity of technological systems to realise these broader goals.

45 881 N.W.2d 749 (Wis. 2016) ('*Loomis*').
46 Ibid [56].
47 Justice: Estonian Ministry of Justice wants AI-powered Robot Judge to clear backlog of small court disputes, <https://ai-everything.com/government-estonian-ministry-of-justice-wants-ai-powered-robot-judge-to-clear-backlog-of-small-court-disputes/>, accessed 12 October 2019.
48 David Cowan, 'Estonia: A Robotically Transformative Nation', *Robotics Law Journal*, 26 July 2019, <http://www.roboticslawjournal.com/global/estonia-a-robotically-transformative-nation-28728942>.
49 Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC [2016] OJ L119/1.
50 Wachter, Sandra, Brent Mittelstadt, and Chris Russell. "Counterfactual Explanations without Opening the Black Box: Automated Decisions and the GPDR." *Harv. JL & Tech.* 31 (2017): 841.
51 Brian Opeskin chapter.
52 Gabrielle Appleby and Heather Roberts 'The Chief Justice: Under relational and institutional pressure' in this collection.
53 Joe McIntyre chapter.

In analysing technology's impact on judicial role, we identify core judicial values which we consider are most impacted by technology: transparency and accountability; independence; impartiality (equal treatment or absence of bias in decision-making); diversity; and efficiency. This partially borrows from Richard Devlin and Adam Dodek's typology,[54] also applied by Appleby and Roberts in their chapter in this collection.[55] These values often overlap and interconnect in complex ways and we have grouped some in our analysis.

A. Open Justice: Transparency and Accountability

Considered to be 'the commitment to openness and candour', judicial transparency, often cited in conjunction with the principle of 'open justice', is one of the most widely accepted judicial values. It requires openness about the working and operations of the court.[56] Transparency is closely related to accountability of the courts by providing a form of oversight,[57] as beautifully encapsulated in Justice Louis Brandeis' famous quote, *'Sunlight is said to be the best of disinfectants'*.[58] In the judicial context accountability in often understood as 'the commitment to ensure that the values of independence and impartiality are appropriately deployed in the public interest, rather than the interest if the judges themselves'.[59] Both transparency and accountability are necessary for individuals to understand the reasons for decisions affecting them and learn how future decisions might affect them, as well as trust the courts more generally.

In line with these ideals of open justice, technology has provided the opportunity for the 'world to come into the courtroom'.[60] For example, as early as the 1990s, in a climate of intense critique of the High Court of Australia from Australian political leaders,[61] Chief Justice Brennan pursued a broad course of opening up the Court to enhance public confidence, including making 'its procedures more understandable and its decisions more easily available'[62] and allowing video recording to document the justices at work.[63]

Today, courts are, in many ways, more transparent and accountable due to technology. Most Australian courts now publish decisions online – either on their own websites or on public databases.[64] The High Court now publishes audio-visual recordings of its hearings on its website.[65]

54 Richard Devlin and Adam Dodek, 'Regulating Judges: Challenges, Controversies and Choices' in Richard Devlin and Adam Dodek (eds) *Regulating Judges: Beyond Independence and Accountability* (Edward Elgar, 2016) (discussing impartiality, independence, accountability, representativeness, transparency and efficiency).
55 Appleby and Roberts (n 52).
56 Devlin and Dodek, 'Regulating Judges' (n 54) 9.
57 Richard Devlin and Adam Dodek, 'Fighting Words': Regulating Judges in Canada' in Richard Devlin and Adam Dodek (eds), *Regulating Judges: Beyond Independence and Accountability* (Edward Elgar, 2016) 79.
58 Louis Brandeis, *Other People's Money and How the Bankers Use It* (National Home Library, 1933 reprint) 62.
59 Devlin and Dodek, 'Regulating Judges' (n 54) 9.
60 Warren (n 19) 235.
61 The Coalition Government (1996 – 2007) under Prime Minister John Howard.
62 High Court of Australia, *Annual Report 1997-1998* (Commonwealth, 1998) 6.
63 Darryl Dellora, *The Highest Court* (DVD). The Court also created the role of Public Information Officer: High Court of Australia, Annual Report 1999–2000 (Commonwealth, 2000) 5.
64 See, e.g, Australian Legal Information Institute <austlii.edu.au>.
65 High Court of Australia, <http://www.hcourt.gov.au/cases/recent-av-recordings> (cited 4 August 2019).

Criminal courts have featured 'Sentencing Webcasts' on their websites, as sentencing is the area in which the courts have historically received the most public criticism.[66] The Supreme Court of Victoria regularly posts on Facebook and tweets about recent decisions and developments in the law.[67] It also allows the media – but not the public – to post and tweet about on-going matters, arguably limiting the principle of 'open justice'.[68] Of course, limits on open justice, including suppression orders applying to the media, might be needed to preserve the principle of the fair trial, as was recently illustrated with the criminal trial of Cardinal George Pell.[69]

Therefore, different values of justice might sometimes be in tension with each other, and technology might fortify that tension further by facilitating communications online. Chief Justice of the Supreme Court of Victoria, Marilyn Warren, argues that technology provides the advantage of allowing courts to control the message conveyed to the community.[70] While this may ensure more accurate public understanding of the work of the courts, and temper unfair or factually incorrect media coverage, it may also diminish transparency and consequently accountability of the courts. On the other hand, as we discuss in the following section, technology also enables greater scrutiny of both courts and individual judges, including detailed or large-scale analysis of patterns of decision-making.

Moving from digitisation to technology decision-support and decision-making systems, in theory automated systems offer the potential to make transparent most, or all aspects of the judicial decision-making process, an impossibility in a human judge. For example, Susskind suggested that automated decision-making systems – if designed 'correctly' – could render transparent every step of the decision-making process.[71] However, we are not yet convinced that such tools are very easy to design 'correctly', and the struggles over early expert systems illustrate the seemingly insurmountable difficulties involved in programming a system to mimic (and explain) legal reasoning. In terms of ML systems, there are even more challenges when it comes to including explainability mechanisms. Wisser suggests that if algorithms usurp judges' decision-making power, then the developers or creators of automated systems should be responsible, similarly to a judge, for explaining their decisions 'in written, protracted, published opinions'.[72] Yet, sometimes those who create algorithmic or ML systems themselves struggle to understand and explain why their programs make a single, discrete decision.[73]

66 Appleby and Roberts (n 52) 25. The authors note that the ultimate decision to release footage lies with the Chief Justice.
67 Warren (n 19) 227.
68 Warren (n 19); Appleby and Roberts (n 52) 25.
69 See further Kirrily Schwarz, 'Secret's Out: The Storm Around Suppression Orders' [2019] 55 *Law Society Journal* 30.
70 Warren (n 19) 234.
71 R E Susskind, *Expert Systems in Law: A Jurisprudential Inquiry* (Oxford: Clarendon Press, 1987) 114–15.
72 Leah Wisser, 'Pandora's Algorithmic Black Box: The Challenges of Using Algorithmic Risk Assessments in Sentencing' (2019) 56(4) *American Criminal Law Review* 1811.
73 Ibid, 1815 fn 44.

This connects to a much wider challenge that automation poses to transparency, convincingly summarised as three 'forms of opacity' of automation tools.[74] The first form – intentional secrecy – may prevent judicial transparency when automation tools are protected as trade or state secrets under intellectual property (IP) laws. For example, the owners of the COMPAS tool (used in risk assessments for sentencing and bail decisions) have not publicly disclosed the methods or datasets used in its training and development,. COMPAS's lack of transparency was the focus of one of the concurring judgments in *Loomis*,[75] where Abrahamson J described the 'court's lack of understanding' of the tool as a 'significant problem'.[76] Her Honour observed that:

> making a record, including a record explaining consideration of the evidence-based tools and the limitations and strengths thereof, is part of the long-standing, basic requirement that a circuit court explain its exercise of discretion at sentencing.[77]

Such transparency and analysis of the tool itself would also provide 'the public with a transparent and comprehensible explanation for the sentencing court's decision'.[78] However, the Wisconsin court held that there was no requirement that defense counsel be able to challenge the accuracy of the COMPAS algorithms which remain a trade secret.[79] Arguably, lack of transparency due to intentional secrecy seriously undermines judicial transparency and accountability.[80]

Additional forms of opacity of both expert systems and ML may pose further challenges to judicial transparency, because even if operational information is disclosed, that does not mean that a majority of the public will be able to extract useful knowledge from that information.[81] In this context, the significance of judicial reasoning is unparalleled, as it enables the judiciary 'to communicate evidence that their decision making is neutral'.[82] Automated systems generally do not (and possibly cannot) provide reasons for the decision they deliver, but reasons are crucial (and thus imperative[83]) for ensuring that the parties and the public understand the logic behind judicial decision-making. Language is a constitutive element of legal judgments, leading some to proclaim that it 'does not merely represent one of many forms the law can take but is the *only* form capable of realizing foundational rule of law principles'.[84] To illustrate this tension between

74 Jenna Burrell, 'How the machine 'thinks': Understanding opacity in machine learning algorithms' (2016) 3(1) *Big Data & Society*.
75 *Loomis,* 881 N.W.2d 749 (Wis. 2016).
76 *Loomis,* 881 N.W.2d 749 (Wis. 2016) at 774.
77 *ibid* at [133], [141].
78 *ibid* at [142].
79 *ibid* at [51]. See also Stanford Law School, Stanford Pretrial Risk Assessment Tools Factsheet Project, <https://law.stanford.edu/pretrial-risk-assessment-tools-factsheet-project/>.
80 See also Katherine Freeman, 'Algorithmic Injustice: How the Wisconsin Supreme Court Failed to Protect Due Process Rights in *State v. Loomis*' (2016) 18 *North Carolina Journal of Law and Technology Online* 75.
81 Burrell (n 74).
82 Tom R Tyler, 'Procedural Justice, Legitimacy, and the Effective Rule of Law' (2003) 30 *Crime and Justice* 283, 298.
83 *Wainohu v New South Wales* (2011) 243 CLR 181.
84 Frank Pasquale, 'A Rule of Persons, Not Machines: The Limits of Legal Automation' (2019) 87(1) *George Washington Law Review* 1.

language and technology, imagine that the technical code of COMPAS was made public. The code would not provide the reasons for the conclusions it reached – and how many of us would be able to read and understand it in the first place? Finally, Burrell has suggested that because humans reason differently to machines, they cannot always interpret the interactions among data and algorithms, even if suitably trained.[85] Thus, even if we could read the code, we may not be able to understand how the ML system generated its results, as it has gone through a recursive process of refining its results and adjusting the 'weight' accorded to a multitude of different variables. This suggests that transparency, which is crucial for other judicial values and overall accountability of the courts, may erode over time as ML systems become more complex.

B. Judicial Independence

Judicial independence is widely recognised as a fundamental judicial value,[86] having 'multiple dimensions' that cover the independence of the individual judge or decisional independence (the 'core' dimension), independence of the judiciary as an institution from interference or usurpation by the other branches of government under the theory of the separation of powers, as well as independence afforded by administrative and fiscal self-management.[87] The interplay between these three conceptions of independence, as Devlin and Dodek note, varies and manifests differently across different jurisdictions, but judicial independence factors highly, not only in constitutional theory but also in practice.[88]

Some have, however, regarded independence not as a value in itself but as the *institutional* safeguard of impartiality.[89] Irrespective of whether one agrees, independence of the individual judge, or 'decision independence' in Devlin and Dodek's typology, significantly overlaps with the value of *impartiality*, referring to 'decision making that is 'free from personal, social, cultural, economic or institutional bias, and which fairly assess the rights and interests of the parties involved'.[90]

As former Chief Justice of the High Court, Brennan CJ noted, '[t]he principle of judicial independence … is proclaimed in order to guarantee a fair and impartial hearing and an unswerving obedience to the rule of law'.[91] We discuss impartiality in the following section, focusing here on the institutional, administrative, and fiscal independence of the courts. These last are widely identified as key to ensuring the institutional independence of the judiciary. Interestingly, the judiciary has employed technology, especially communication through digital media, to bring wider public awareness about under-funding of courts and fiscal challenges more generally. For example, ahead of an appearance before a budgetary hearing, in an attempt to defend the fiscal independence

85 Burrell (n 74).
86 Appleby and Roberts (n 52) 15.
87 Devlin and Dodek (n 54) 1, 13; Appleby and Roberts (n 52) 15.
88 Devlin and Dodek (n 54) 13.
89 Abeline Dorothea Reiling, *Technology for justice How Information Technology can support Judicial Reform* (Thesis, Leiden University, 2009) 61
90 Devlin and Dodek (n 54) 9; Devlin and Dodek, 'Fighting words' (n 57), 78; McIntyre (n) 19–21.
91 Gerald Brennan, 'The State of the Judicature' (1998) 72(1) *The Australian Law Journal* 33, 34.

of the judiciary, Chief Justice Kourakis of the South Australian Supreme Court, released a media statement to ensure public awareness.[92]

Moreover, digital technologies, enabling widespread sharing of information, are an important tool in fighting against judicial corruption, which arguably undermines institutional independence as well as impartiality of the judiciary. Technologies such as electronic case allocation, randomly assigning cases ensures that judges are not 'cherry-picked' to hear particular cases, and electronic case management system can provide further oversight by identifying irregularities.[93] Therefore, digital technologies have the capacity to support judicial independence by helping to reduce corruption and increasing 'public trust by providing an effective means of communication between courts and their users and the general public'.[94]

However, moving from simple communication via digital technologies to the deployment of automation tools in the judicial decision-making process itself, the independence of the judiciary could be undermined. This could happen, for instance, because (as explained in the preceding sections) the tool that is relied to assist judges may use proprietary software, developed by a private company operating for profit. Where such systems are not open source and are protected by IP laws, it is impossible to understand precisely how their outputs have been generated.[95] This impacts both institutional independence and judicial impartiality, discussed below. For instance, COMPAS employs such proprietary software, and the judges do not know how it operates. Yet there are known examples where sentencing judges have overturned plea deals and imposed longer sentences on the convicted person because COMPAS produced very high potential recidivism scores.[96] Judges may be *required* to consider machine-generated risk scores in decision-making.[97] Whether or not the tool itself is accurate, judges must take its projections on face value, and cannot interrogate its processes or question its methods. Reliance on – or even a delegation of a decision to – a secretive tool is in tension with the value of judicial independence, which requires that judges are able to independently verify and understand an expert's evidence. The fact that judges do not

92 A Statement from the Honourable Chris Kourakis, Chief Justice of South Australia, 18 June 2019, <http://www.courts.sa.gov.au/ForMedia/Pages/Media-Releases.aspx (accessed 15 October 2019).

93 Transparency International, Fighting Judicial Corruption Topic Guide, 2014, https://knowledgehub.transparency.org/assets/uploads/kproducts/Topic_guide_on_judicial_corruption_.pdf, accessed 14th October 2019.

94 Reiling (n 89) 254.

95 Melissa Perry, 'iDecide: Administrative Decision-Making in the Digital World' (2017) 91(1) *Australian Law Journal* 29

96 Alyssa M Carlson, 'The Need for Transparency in the Age of Predictive Sentencing Algorithms' (2017) 103 *Iowa Law Review* 303.

97 Partnership on AI, *Report on Algorithmic Risk Assessment Tools in the US Criminal Justice System* (26 April 2019), <https://www.partnershiponai.org/report-on-machine-learning-in-risk-assessment-tools-in-the-u-s-criminal-justice-system/>

have (and are unable to acquire) knowledge about the operation of an automated tool arguably has a significant impact on judges themselves and their understanding of judicial role.

C. Impartiality / Equality Before the Law

Impartiality, meaning the quality of not favouring one side or party more than another, is the hallmark of the judge in an adversarial system. It encapsulates an absence of bias or prejudice on the part of the decision-maker. This is important both for individual determinations and in order to retain public confidence in the system of justice. In this sense impartiality it is also a facet of equality or the dispensing of equitable justice, in that like cases are treated alike.[98] This concept of equal treatment is key to a consideration of the impact of technology on the judicial role.

In relation to absence of bias, new forms of communication technology – notably the rise of social networking and social media platforms – have challenged conceptions of how judges ought permissibly to interact with lawyers and others. For example, with increasing Facebook use came questions about whether it was appropriate for judges to be 'Facebook friends' with lawyers or even parties appearing before them.[99] In the US, judges have been 'reprimanded' for their use of social media (including for posting comments about, and 'researching' those appearing before them).[100] It is now common for courts to have guidelines on how judges are to use social media, which generally require judges to consider how their use of social media affects their actual or perceived impartiality.[101]

A more substantive role for technology in buttressing impartiality is in support of judges. For example, decision-support systems might be designed to ensure that decision-makers consider relevant considerations and disregard irrelevant considerations; and that criteria are applied in standardised ways, improving consistency of decision-making. For instance, the earlier mentioned NSW sentencing database was created to reduce inconsistency in sentences, as 'it was felt that if judges had easier access to historical sentencing patterns, inconsistency in sentencing outcomes might be reduced'.[102] Some claim that properly designed and tested automated systems allow for human biases to be controlled for or removed from the decision-making process.[103] In most instances, however, such systems are designed for use in administrative or government, rather than

98 See Zalnieriute et al (n 16).

99 Samuel Vincent Jones, 'Judges, friends, and Facebook: the ethics of prohibition' (2011) 24(2) *Georgetown Journal of Legal Ethics* 281; Benjamin P Cooper, 'USA: Saving Face – Ethical Considerations for American Judges Using Facebook' (2014) 17(1) *Legal Ethics* 148-152; Steven Rares, 'Social Media - Challenges for Lawyers and the Courts' (Speech, Australian Young Lawyers' Conference, 20 October 2017) [30] <https://www.fedcourt.gov.au/digital-law-library/judges-speeches/justice-rares/rares-j-20171020>.

100 Cooper (n 99).

101 Rares (n 99); Singh (n 99) 158–71; see, eg, Australasian Institute of Judicial Adminstration, *Guide to Judicial Conduct* (3rd ed, 2017) 43–45.

102 Lyria Bennett Moses and Janet Chan, 'Using big data for legal and law enforcement decisions: Testing the new tools' (2014) 37 *University of New South Wales Law Journal* 643, 660.

103 Jay Thornton, 'Cost, Accuracy, and Subjective Fairness in Legal Information Technology: A Response to Technological Due Process Critics' (2016) 91(6) *New York University Law Review* 1821, 1840, 1849; Nigel Stobbs, Dan Hunter and Mirko Bagaric, 'Can Sentencing Be Enhanced by the Use of Artificial Intelligence' (2017) 41 *Criminal Law Journal* 261.

judicial, decision-making. Justice Perry of the Federal Court has noted that automated systems are not useful in discretionary decision-making.[104] It is also arguably not permissible to direct a judge as to how he or she ought make a decision, which may compromise judicial independence, as noted in the previous section.

Another way that technology – specifically statistical or ML analysis of judicial decision-making – might be used is to illustrate or bring to light the existence of anomalous decisions or patterns of decision-making among the judiciary. An example is the work of researchers at Macquarie University who have built a ML program to analyse patterns of judicial decision-making in migration cases heard in the Federal Circuit Court.[105] As well as highlighting patterns, there are ML systems which can, with sufficient data, predict with good accuracy how judges will determine cases. Thus in certain areas of law automated systems are able to predict the likely outcome of decisions.[106]

These different uses – highlighting possible patterns of differential treatment, perhaps ensuring consistent treatment, and the use of predictive analytics – have ramifications for judicial impartiality. Impartiality mandates that judges operate both without actual bias – essentially, pre-judgment of the case at hand – and apprehended bias, where 'a fair minded lay observer' could reasonably consider that a judge might not bring an impartial mind to the decision to be made.[107] Generally speaking, attempts to show that an individual judge has acted in a biased manner in a particular case, based solely on statistical analysis of decisions, have not succeeded in Australia, though statistics have been used to publicly critique judges.[108] In the case law, such evidence has been rejected as lacking probative value; and held not to demonstrate apprehended or actual bias (which is a stringent test).[109] In a 1994 decision, Justice Heerey decoupled a pattern of past decision-making from the making of future decisions, saying that a past record of decisions could only suggest a likelihood that future decisions would be decided similarly, which is insufficient to demonstrate bias.[110] In another case, the Full Court of the Federal Court emphasised the importance of context:

104 Perry (n 95).
105 Hagar Cohen, 'Who watches over our judges?', Background Briefing, ABC Radio National, 8 September 2019 (Keyvan Dorostkar and Dr Daniel Ghezelbash).
106 See, eg, Daniel Martin Katz, Michael J Bommarito II and Josh Blackman, 'A general approach for predicting the behavior of the Supreme Court of the United States' (2017) 12(4) *PLoS ONE* e0174698; Mihai Surdeanu et al, 'Risk Analysis for Intellectual Property Litigation' in Proceedings of the 13th International Conference on Artificial Intelligence and Law (2011) 116.
107 Margaret Beazley and Chris Frommer, 'The Distinctive Role of the Judge: "The Least Dangerous Branch of Government"' in Michael Legg (ed) *Resolving Civil Disputes* (LexisNexis Butterworths, 2016) 3, 10–1; quoting *Ebner v Official Trustee in Bankruptcy* (2000) 205 CLR 337, [6]; and see also Matthew Groves.
108 *Vietnam Veterans* (n 2) [26] and [33] (rejecting as irrelevant statistical evidence which purported to show that a particular decision-maker was more likely to decide against applicants than other decision-makers); *ALA15 v Minister for Immigration and Border Protection* [2016] FCAFC 30 (*'ALA15'*); *BDS17 v Minister for Immigration and Border Protection* [2018] FCA 1683 ('*BDS17*').
109 *BDS17* (n 108).
110 *Vietnam Veterans* (n 2).

> [F]or such raw statistical material to be attributed to the hypothetical observer, it normally would need to be accompanied by a relevant analysis of the individual immigration judgments determined by the primary judge in order that the statistics were placed in a proper context. Absent such analysis, the hypothetical observer would not be able to make an informed assessment of the significance of the raw statistics.[111]

While they may not meet the legal test for apprehended bias, such analyses may still undermine broader concepts of judicial impartiality by appearing to demonstrate tendencies among judges to rule in particular ways. Presentation of such information may fuel public criticism of judges and lead to distrust or disrespect. It may also, especially in commercial contexts, shape the nature of cases which proceed to judicial determination; or, if lawyers use data to 'craft' arguments for certain judges, become something of an echo chamber, as each successful application of the data generates confirmatory data.[112] As with any application of big data analyses to individuals, there is the risk that individual differences or nuances of a case are overlooked in pursuit of machine-generated patterns.

D. Diversity / Representation

The concept of diversity is a more recent addition to the compendium of judicial values. It is itself a broad notion encompassing differences in geographic location, race, ethnicity, gender, culture, age, education, disability, faith and sexuality.[113] In the judicial context, diversity might include professional background and education. Of course, personal traits especially those which are immutable, are only aspects of individuals. People may identify with multiple groups, and particular views or attitudes based on identity should not be assumed.[114] Brian Opeskin summarises why a diverse judiciary is beneficial and valuable: it will increase equality of opportunity; quality (diversity will improve decision-making); utility (more meritorious appointments); and legitimacy (public perceptions of representativeness).[115]

The Australian judiciary is not at all diverse in terms of the population it serves, especially with regards characteristics such as country of birth, gender and disability.[116] The use of automated systems in employment context has, in some circumstances, increased diversity in private organisations. For example, multinational company Unilever found that using an ML system to evaluate candidates' applications and video interviews significantly increased diversity in hiring.[117]

111 *ALA15* (n 108) [38].
112 Frank Pasquale and Glyn Cashwell, 'Prediction, Persuasion, and the Jurisprudence of Behaviourism' (2018) 68 Suppl *University of Toronto Law Journal* 63.
113 Leslie J Moran, 'Judicial Diversity and the Challenge of Sexuality. Some Preliminary Findings' (2006) 28 *Sydney Law Review* 565, 566. Note also that diversity is distinct from 'inclusiveness'.
114 Melissa L Breger, 'Making the Invisible Visible: Exploring Implicit Bias, Judicial Diversity, and the Bench Trial' (2019) 53(4) *University of Richmond Law Review* 1039, 1077–78.
115 Brian Opeskin, 'Dismantling the Diversity Deficit'.
116 Opeskin (n 115).
117 Bernard Marr, 'The Amazing Ways How Unilever Uses Artificial Intelligence to Recruit & Train Thousands of Employees', Forbes Dec 14, 2018.

Hiring of non-white applicants increased by ten per cent, and the number of different universities represented among those hired tripled.[118] A number of more basic steps, such as reintroducing merit based selection procedures, could be taken to address the 'diversity deficit' in the Australian judiciary,[119] however, before invoking a system as sophisticated as that of Unilever.

The possible effect of the judges' own personal qualities on decision-making is called up by the use of ML analytics discussed in the previous section in relation to impartiality.[120] Some work in empirical legal studies has, for example, attempted to connect the personal attributes of judges, such as race or gender, to tendencies to rule in certain ways.[121] Such usage has been recently prohibited in France, preventing the use of ML analytics in relation to individual judges – a change which appears to be primarily protective of the judiciary.[122] On a wider scale, the use of analytics may or may not be useful to the diversity project – it may illustrate patterns, but ultimately cannot inform on the quality of judging.

E. Efficiency

Finally, efficiency is also a newer addition to the stable of judicial values, though highly relevant to technology. The most common use of the term 'efficiency' is to denote both efficacy and timeliness. This contrasts with how the term is used in economics, which traditionally invokes the concept of maximizing society's wellbeing,[123] although clearly similar considerations are also relevant for the purposes of efficiency in the judicial setting.

As discussed in Part II, most technology projects within courts are aimed at increasing efficiency – usually by saving costs and time. However, the judiciary have a complex relationship with notions of efficiency – obligations to enhance the speed and reduce the cost of proceedings must not come at the expense of justice.[124] At the same time, efficiency is seen to form part of individual justice ("justice delayed is justice denied"), so the discretion of judges should be exercised with these requirements in mind.[125] This is especially so given that delay may also increase the damage allegedly caused. Yet procedural fairness, an element of justice, necessarily entails cost and delay – hence, the tension between justice and efficiency has traditionally been a difficult one.[126] For example, the use of video-links can reduce costs and time associated with bringing persons to

118 Ibid.
119 Ibid; Elizabeth Handsley and Andrew Lynch, 'Facing up to Diversity? Transparency and the Reform of Commonwealth Judicial Appointments 2008-13' (2015) 37 *Sydney Law Review* 187, 195–9.
120 Rosemary Hunter, 'More than Just a Different Face? Judicial Diversity and Decision-Making' (2015) 68 *Current Legal Problems* 119, 124.
121 Eg, Carolyn Shapiro.
122 Article 33 <https://www.legifrance.gouv.fr/eli/loi/2019/3/23/2019-222/jo/article_33> of the Justice Reform Act; Artificial Lawyer, 'France Bans Judge Analytics, 5 Years in Prison for Rule Breakers', 4 June 2019, <https://www.artificiallawyer.com/2019/06/04/france-bans-judge-analytics-5-years-in-prison-for-rule-breakers/>.
123 Jeff Borland, *Microeconomics: Case Studies and Applications* (Cengage Learning, 3rd ed, 2016) 96.
124 See, eg, *Civil Procedure Act 2005* (NSW) ss 56–60; Michael Legg, 'Reconciling the goals of minimising cost and delay with the principle of a fair trial in the Australian civil justice system' (2014) 33(2) *Civil Justice Quarterly* 157, 170.
125 *Aon Risk Services Australia Ltd v Australian National University* (2009) 239 CLR 157 (Gummow, Hayne, Crennan, Kiefel and Bell JJ).
126 Legg (n 124) 170.

court. It may also enable a person 'to adduce evidence that might not otherwise have been available'[127] and protect vulnerable witnesses. On the other hand, use of video-link is a distinct change to the historical importance accorded to parties and witnesses in court proceedings, and judiciary, 'seeing' one another in person, and may negatively impact on a person's ability to be heard.[128]

Communication technologies are among the most important for judicial work, and – with the exception of video-link – largely uncontroversial. Improving document retrieval,[129] minimising paper usage, and having access to real time transcripts of proceedings,[130] all carry efficiency benefits. The goal of efficiency is, however, also the primary argument made for the use of a number of more controversially applied technologies: automation of small claims or minor offences; and use of risk assessments and predictive analytics to 'prioritise' or triage certain cases, or as a means to compel settlement and avoid the use of judicial resources altogether.[131]

One limitation of automated tools applied in the legal domain is their current inability to determine factual disputes. Automation of small claims or family disputes, for example, relies on facts being agreed or admitted.[132] In an area such as sentencing, by contrast, the facts have already been determined – leading some commentators to argue that this is an ideal area for the application of automated systems.[133] However, the irony of the use of algorithmic risk assessments as only one factor in judicial decision making is that this is not an especially efficient development, at least as far as judges are concerned. It cannot be saving of judicial time, as the judge must still consider all the other factors and arguments raised. Indeed, adding another factor into the mix (especially given the issues of opacity and bias discussed above) may only increase the complexity of decision-making. Such tools might, of course, increase efficiency if used in plea-bargaining. In other words, the efficiency dividends of most predictive tools lie in preventing matters from coming to court in the first place, rather than in making the process of judging itself more efficient. In turn, this will only be effective and appropriate if, firstly, they actually do prevent matters from coming to court, rather than just becoming a first step in the process; and secondly, if other important elements around accountability, transparency and impartiality, are not compromised.[134]

127 McDougall (n 20).
128 McKay (n 22).
129 Jackson (n 27) 236–37.
130 McDougall (n 20).
131 Nikolaos Aletras et al, 'Predicting judicial decisions of the European Court of Human Rights: A Natural Language Processing perspective' (2016) 2 *PeerJ Computer Science* e93 https://doi.org/10.7717/peerj-cs.93; Felicity Bell, 'Family Law, Access to Justice, and Automation' (2019) 19 *Macquarie Law Journal* 103.
132 Bell (n 131).
133 Stobbs, Hunter and Bagaric (n 103).
134 Bell (n 131).

IV. CONCLUSION: ROLE OF THE COURTS AS HUMAN INSTITUTIONS

In this Chapter, we have examined the interaction and underlying normative tension between judicial values and increasing reliance on technological tools by the courts. Many applications of technology are beneficial, and indeed may enhance judicial values of openness, efficiency and diversity. As we discussed, judicial uplift projects, including digital filing and discovery, have increased not only the efficiency of everyday operations of the courts, but also judicial transparency and accountability by opening them up to the world in different ways. We also noted that technology, and especially ML analytics, can be used to promote the diversity of judiciary.

Yet other uses of technology demand far more circumspection, especially where their deployment imposes constraints on how judging is accessed or conducted. The judicial value of transparency is undermined whenever the courts are relying on tools that themselves lack transparency. The use of privately developed software in criminal sentencing is perhaps the greatest cause for concern. As Bradley Wendel has argued, it is the moral requirement of accountability which is imperative in legal decision making.[135] Judges – however full of human biases or inclinations for corruption they may be – gain the accountability for their judicial role via the mechanisms of a public legal system. In contrast, those designing technological systems, who may be private companies, are not bound by accountability to the public. Nor are technological systems themselves able to accommodate the need for accountability, including the giving of reasons.

Our analysis further demonstrates that technology, especially software employing automation or ML, presents challenges for judicial independence and impartiality. Lack of transparency in how such tools operate, often cemented through 'trade secrecy' doctrines, is not compatible with judicial independence. If technology is to assist judges, open source software should be used. Judges would not accept or tolerate relying on expert evidence where the expert need provide no qualifications or demonstrable expertise, no explanation of reasoning or methodology and no assurance of the reliability of their evidence. Lack of transparency also undermines judicial impartiality, and if software is trained on data which itself reflects bias and discrimination against certain groups, programs may continue to replicate those biases, as will judges when using it.

More fundamentally, our analysis has questioned the capacity of technology to uniformly enhance judicial values past simple digitisation, such as court filing and discovery. Even relatively simple tools such as video-link may detract from some aspects of judicial and procedural justice, and more empirical social and psychological research is needed to understand how it transforms the interactions between the parties and the judiciary.

Similarly, we found that the use of automated systems to increase judicial diversity is of limited value – it may illustrate patterns, but ultimately cannot inform on the quality of judging. Likewise, on a decision-making level, we are not convinced that automated systems can enhance judicial efficiency – the value seen as most enhanced by technology – let alone operate in compliance with

[135] Wendel (n 138) 42.

or promote the other judicial values we have discussed in this Chapter. We have several reasons for this position. First, the use of automated systems should be limited to decisions of the lowest level and impact, such as impositions of fines for traffic violations. Second, as discussed in Part III, automated systems are unable determine disputed facts, which are key to many legal disputes. Therefore, it is hard to see how technology can improve judicial decision-making in cases where establishing the facts is of fundamental importance in resolving a dispute. Finally, while facts have already been established in some areas of judicial decision-making, such as criminal sentencing, we consider that automation is nevertheless not suitable in the context of criminal law where decision-making involves (inter alia) constraints on individual liberty.[136] Such judicial decision-making, we believe, should remain with humans.

The spread of automation tools to judicial decision-making is part of the broader political economy of technology – a process by which the law is broken down into quantifiable metrics, which are measured by the tools developed by private actors. Such an approach is dangerous for promoting the ideas that societal problems should be increasingly solved not via human institutions but via technological tools. Allsop CJ has recently described the problems inherent in characterising 'the exercise of judicial power … in terms of quantitative production'.[137] Fundamentally, we echo the view that judging is a uniquely human process which ought be retained by humans.[138] For an increasing judicial reliance on information technologies to truly respect and promote judicial values, we agree with Frank Pasquale that a commitment to a "rule of persons, not machines" is needed.[139] A real-world reluctance to accord the status of decision maker to a non-human is illustrated in a recent decision of the Federal Court, which held that an automatically-generated letter from the Australian Taxation Office advising an individual about his tax debt did not constitute a 'decision' under the tax legislation.[140] The court held that to be a legally effective decision, a 'mental process' must have been involved – implying the input of a person.[141] Arguably the same logic should apply to judicial decision-making for to make it compatible with the judicial values of transparency, accountability, independence, impartiality, diversity and efficiency.

Future research on technology and courts should examine the impact various technologies have on the judges' own sense of self, keeping these judicial values in mind. Recasting Justice Heerey's remark, 'law is not so ignorant or disdainful of human nature as to assume that judges or quasi-judicial decision-makers [*should be*] automatons,'[142] – which should guide this agenda. Heerey J's remark is particularly relevant now, as we embark on the journey where lower-level (yet significant) administrative decisions are automated with little (if any) human oversight. The rise of automated

136 See Zalnieriute et al, n 16.
137 James Allsop, 'Courts as (Living) Institutions and Workplaces', Presentation to Joint Federal and Supreme Court Conference (Hobart, 23 January 2019) 5.
138 See, eg, W Bradley Wendel, 'The Promise and Limitations of Artificial Intelligence in the Practice of Law' (2019) 72(1) *Oklahoma Law Review* 21.
139 See Frank Pasquale, 'A Rule of Persons, Not Machines: The Limits of Legal Automation', *Not Machines: The Limits of Legal Automation (March 6, 2018)* 87 (2018): 20018-08.
140 *Pintarich v Federal Commissioner of Taxation*; 'Legal Issues for Algorithms in Govt Decision Making'
141 *Pintarich v Federal Commissioner of Taxation* (Note the dissent of Kerr J).
142 *Vietnam Veterans* (n 2).

decision-making in many areas of life means that a human judiciary is particularly needed now to protect individual rights and entitlements, as it has done for centuries.