

LAW IN THE AGE OF THE ALGORITHM

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- 1 We are living in the age of the algorithm.¹ Algorithms determine the results of our internet searches and what news stories are displayed in our social media feeds. They predict the weather and fix our loan rates. Described as the “*silent workhorses*”² of the 21st century they lie at the heart of the extraordinary technological innovation that we have experienced in the last quarter of a century. They are the creators of artificial intelligence. They are, as certain commentators have suggested, the organising principle of our era.³

- 2 It goes without saying that law is not and will not be immune from the influence of the algorithm. The challenge for the legal system in general and the legal profession in particular is, I am going to suggest, twofold. First, there is the question of how to keep up to date with new technologies. And secondly, there is the question of how best to use technology to serve our clients and further the administration of justice. This second point is fundamental to the efficient and effective administration of the legal system and is the focus of the observations which follow.

- 3 In making this second point, I wish to emphasise the central role you each, as legal practitioners, play in the administration of justice. To make that point, can I simply remind you of the oath you took at the time of your admission, that you will:

“truly and honestly conduct yourselves in the practice of a Lawyer of the Supreme Court of New South Wales and that you will faithfully serve as such

* I wish to express my thanks to my Researcher, Brigid McManus, for her research and assistance in the preparation of this paper.

¹ Miguel Milano, ‘The Age of the Algorithm’ (HuffPost UK, 24 February 2015).

² Navneet Alang, ‘Life in the Age of Algorithms’, *New Republic*, 13 May 2016.

³ Ibid.

in the administration of the laws and usages of this State according to the best of your knowledge skill and ability”.

The influence of the algorithm

- 4 The use and impact of technology in the legal system can be considered in five broad categories. The first is its influence on the structures and processes of the legal workplace. Related to this is the second category, the development of new mechanisms for providing legal advice and assistance. Programs which rely on artificial intelligence provide the seminal and probably most significant example of this. The third is the changing nature of court procedures, including pre-court processes. The fourth is the impact on the law and its development. And finally, the fifth is the human factor.
- 5 There are two further considerations which have relevance across these categories. The first is the cost of technological innovation. The second consideration is the question of who is to bear the cost. Although the aim of technological innovation is to reduce the cost of the delivery of legal services, including the cost of providing access to justice, the reality is that technologically provided legal services will mean that costs will move from the point of delivery to the upfront cost of development.
- 6 There is another significant matter. It is one thing if the development of technological change is directed to process. It is another if technological changes override the law and its development. The former can, to a large extent, be left in the hands of the technology experts. The latter, that which concerns the law and its development, requires the input of those with a deep knowledge of the law. As the generation of legal practitioners who are likely to be most impacted by these developments, your challenge will be to ensure that technological change supports the administration of justice and the rule of law and does not supplant it with concepts that are alien to our rich legal tradition.

- 7 There one final matter that needs to be mentioned by way of opening. Cost and efficiency of a system that is essentially technologically based cannot be considered without reference to the cost of malfunctions, which includes the cost of down time, the cost of maintenance and repair and the cost of ever increasing cyber security issues. A recent example is where a major international law firm was shut down for 11 days when its systems were hacked. The hacking originated in the Ukraine and Russia. Whether the law firm was collateral damage or was a specific target was not the immediate concern. Documents were lost and transactions were stalled. The financial impact on the firm and more particularly on clients was huge.

The changing legal workplace

- 8 The influence of technology on the legal workplace can be captured in two words: flexibility and connectivity. Technology brings about change, not only because it aids communication and legal research but also because it “*does not recognise borders*”,⁴ a point which has obvious ramifications. Technology has enabled globalised legal practice, connecting offices across the world in a way that was not envisaged a few decades ago. Clients require global services. The amalgamations that took place in 2011 and 2012 between Australian and London-based firms and the arrival of several English and American firms in Australia was underpinned by connective technology.⁵ This has not only impacted on the type of work undertaken in legal practice it has heightened competition for partnership and increased the expectations placed upon associates.⁶
- 9 One issue arising from the growth of global law firms, and global corporations more generally, has been the jurisdiction-specific nature of traditional legal practice. Australia has struggled with this in its attempts to develop a national profession. How do lawyers practise within global firms and address global

⁴ Margaret Thornton, ‘The Flexible Cyborg: Work-Life Balance in Legal Practice’ (2016) 38 *Sydney Law Review* 1, 2.

⁵ *Ibid* 2.

⁶ See Margaret Thornton, ‘Hypercompetitiveness or a Balanced Life? Gendered Discourses in the Globalisation of Australian Law Firms’ (2014) 17(2) *Legal Ethics* 153.

issues when their practising certificates are confined to a particular jurisdiction? One means of addressing this is found in the practise of certain New York firms with Sydney offices, which require their Sydney-based employees to be admitted at the New York bar although they largely practise Australian law.

- 10 Another means of addressing this issue is found in the development of the special status of Foreign Legal Consultant. This is a function of the World Trade Organisation's General Agreement on Trade in Services treaty, which allows any lawyer admitted to practice in a WTO member state to obtain Foreign Legal Consultant status in order to advise on issues related to the lawyer's home country laws in any other WTO member state.⁷ However, the effectiveness of this system in practice is limited by the fact that many jurisdictions, for example the European Union, place further restrictions on inter-jurisdictional practice.⁸
- 11 A more recent approach to resolving such difficulties has been the proposed development of a global admissions system, which would provide legal professionals with accreditation that allowed them to practice across the international stage.
- 12 The issues surrounding jurisdiction-specific legal practice are particularly pertinent for in-house lawyers, who in many legal systems are not regulated by a professional association and may not even be admitted to practice, creating issues surrounding the transferability of their skills to foreign jurisdictions.⁹ In the United States, these issues have resulted in a number of states developing specific rules allowing for cross-border movement of in-house counsel.¹⁰

⁷ Matthew S Frank, 'Making Mistakes Abroad: How the Global Delivery of Legal Services Created a Need for a Uniform Ethics Code' (2013) 21 *Michigan State International Law Review* 493, 509.

⁸ *Ibid* 509.

⁹ Melissa Maleske, 'Why GCs Are Fighting to Break Barriers for Foreign Lawyers' (28 July 2015, Law360 blog).

¹⁰ *Ibid*.

- 13 Another, and indeed early impact of technology on the legal workplace is its neutral geographical and time location. Work can be done at any time and anywhere provided there is mobile phone access. So a country property near Pheasant's Nest on the Princes Highway going south is a good place for pheasants and a bad place for the on-demand lawyer.¹¹ However, as lawyers we are always up for a challenge and not easily defeated.
- 14 There is the story (absolutely true – if there are gradations of truth) of a lawyer on a family holiday on a yacht in the British Virgin Islands precariously clinging to the mast to gain enough reception to send a final message to the firm back home. It is reputed that there are competitions where lawyers compete for the most exotic place from which to clock up billable hours – the base camp of Kilimanjaro being one particularly notable entry!
- 15 The French have dealt with the phenomenon of out of workplace work by legislating to prevent employer contact out of work hours. It is not a workplace reform likely to find traction in Australia – and would be likely to have a not-insignificant impact on the Australian economy.
- 16 Interesting and sometimes amusing though these developments are, the impact on lawyers' wellbeing of this constant pressure cannot be ignored. Is this the legal workplace and culture in which lawyers, legal services and the law will thrive? Having raised the question, there is no doubt that technology has beneficially aided connectivity and flexibility in the workplace. According to a 2014 poll, 89% of Australian firms offer flexible work arrangements¹² which accommodates those with family commitments whilst permitting the continuation of careers.
- 17 However, the rhetoric does not always match the reality. There is a perception that working from home is not as “*real*” or “*legitimate*” as work

¹¹ The mobile reception travelling south on the Princes Highway is known for being patchy.

¹² John MacLean, ‘Closing the Gender Gap’, *Lawyers Weekly* (online), 17 October 2014 <<http://www.lawyersweekly.com.au/careers/closing-the-gender-gap>>.

undertaken in the office.¹³ If this becomes the accepted perception, it will affect the significant advances that have been made in Australia towards creating more equal and diverse workplaces.

New mechanisms for legal advice

18 Technology has also enabled the development of new mechanisms for undertaking legal work and the provision of legal advice. The current buzz word – if not the death adder leaning over the lawyer's shoulder – is artificial intelligence, powered by the algorithm. This will have an effect on jobs and the type of work that will be done by lawyers. In September 2017, the Shadow Minister for the Digital Economy announced that 3.5 million Australian jobs stand to be affected by automation.¹⁴ Whilst the “*grad*” won't become obsolete, the day-to-day activities of graduate lawyers will undergo a significant shift as many of their tasks become automated.

19 It is difficult to predict exactly what that impact will be but in the very least it will require deep analytical skills applied differently to the way they are done currently over reams of paper. One area of development in this respect is the use of “*smart contracts*” – automated contingency contracts based on “*if-then*” statements. Programs have also been developed which automate much of the due diligence process associated with property sales and mergers and acquisitions. Allens Linklaters was recently awarded the International Legal Technology Association's Innovative Project of the Year award for its development of an app which streamlines the due diligence process for real estate leases using artificial intelligence.¹⁵

20 However, not all things are, or need to be, as sophisticated. A 19-year-old student has developed a program to help drivers challenge parking fines in

¹³ See, eg, Thornton, 'The Flexible Cyborg', above n 4, 13.

¹⁴ Aaron Patrick and Phillip Coorey, 'Innovation Czar Bill Ferris Warns of Innovation Irrelevance', *Australian Financial Review* (online), 18 September 2017 <<http://www.afr.com/technology/innovation-czar-bill-ferris-warns-of-innovation-irrelevance-20170918-gyjna8>>.

¹⁵ Tom Lodewyke, *Firm's Real Estate App Wins International Accolade* (22 August 2017) *Lawyers Weekly* <<https://www.lawyersweekly.com.au/biglaw/21720-firm-s-real-estate-app-wins-international-accolade>>.

New York and London, which is said to have been successful in over 160,000 cases.¹⁶ Similar programs have been created to assist people in areas as diverse as claiming refunds for delayed flights, applying for emergency housing and claiming asylum.¹⁷

21 Online dispute resolution is now mandated in many multi-user small transactional disputes such as those which occur via eBay and PayPal. Tens of millions of disputes are resolved this way each year.¹⁸ Online dispute resolution processes such as this are often designed to be used without requiring the assistance of a lawyer and are promoted as offering relatively quick and cost efficient means of resolving disputes.¹⁹ A key driver, therefore, is the idea that they promote access to justice.²⁰ In particular, they are seen as offering potential for the “*missing middle*”, those who may not be able to afford legal representation but who do not fall within the 8% of Australians who qualify for legal aid.²¹

22 Last year, the Australian government provided funding of \$341 000, which is a relatively small amount, to National Legal Aid to investigate the creation of an artificial intelligence system to be used in divorce proceedings. The National Legal Aid chairman, Graham Hill, estimated that 20% of all family law disputes in Australia could be resolved through online dispute resolution.²² This would save thousands of hours of court time and thousands of dollars in legal fees. The importance of this development is that, if implemented, it will free up judicial resources to be used for difficult disputes and in cases where the legal principles need to be established or clarified.

¹⁶ Ibid 48.

¹⁷ Amber Jenner, ‘The Future of Dispute Resolution: AI’ (Kennedys blog, 27 April 2017).

¹⁸ For example, around 60 million disputes are resolved through online mechanisms for eBay each year: National Legal Aid, ‘From eBay to DIY divorce: Artificial Intelligence, “Robot Lawyers” & Beyond’ (Media alert, 6 July 2016).

¹⁹ Michael Legg, ‘The Future of Dispute Resolution: Online ADR and Online Courts’ (University of New South Wales Law Research Series, 1 September 2016) 8.

²⁰ Ibid.

²¹ Tony Yoo, ‘E-Divorce: How Artificial Intelligence Could Help Australian Couples Break Up Quickly and Cheaply’, *Business Insider* (10 August 2016).

²² Ibid.

- 23 The system that National Legal Aid is investigating is based on a Dutch model²³ known as Rechtwijzer technology that has already been adopted in Canada and the United Kingdom.²⁴ It is designed to give proposals that are shaped by the context of the particular dispute. For example, in custody matters it is programmed to ask the ages of the children so that the proposals it produces are sensitive to their developmental needs.²⁵ The program was designed with the assistance of the team that established the eBay dispute resolution system.
- 24 However, since National Legal Aid commenced its investigation, the Dutch program has proved financially unsustainable and has been dissolved and restructured.²⁶ One of the key reasons for the program's demise was that it struggled to establish a mutually reinforcing partnership with traditional justice institutions.²⁷ A suggested solution to this issue is public-private partnership.²⁸ That suggestion is highly problematic, as I seek to explain.
- 25 The judicial system is the justice arm of government with the specific function of impartially adjudicating disputes between the State and the Citizen and between Citizen and Citizen. "*Citizen*" in this context includes any entity with legal personality. Corporations are the classic example. The impartial exercise of the judicial function is fundamental to the proper and orderly operation of society. The moment that aspects of that function are minimised or shared, and in particular shared with entities that in other emanations may be litigants before the Court, an essential element of the rule of law is compromised.
- 26 It must also be remembered that technology is not necessarily neutral and a software design may, through its programming, reflect a preference for certain

²³ Known as 'Rechtwijzer technology'.

²⁴ Rachael Brown, 'Robot Lawyers Could Make Time-Consuming, Expensive Court Conflict Thing of the Past', *ABC News* (6 July 2016).

²⁵ *Ibid.*

²⁶ Roger Smith, 'Goodbye, Rechtwijzer: hello, Justice42' (Law, Technology and Access to Justice blog, 31 March 2017).

²⁷ *Ibid.*

²⁸ *Ibid.*

values over others.²⁹ An example of this is found in the case of eBay, which has been accused of favouring buyers over sellers through its adoption of a 'buyer-is-always-right' policy.³⁰ Similarly, the more fact based, complex, and evaluative the legal problem, the less likely online dispute resolution will be an appropriate forum.

Facilitating procedures in court

27 Technology is also changing the nature of court procedure and processes. There has been widespread use of technology in the court system for over two decades and this is increasing. This has occurred mostly in the administrative functions of the court. However, there is now significant use of technological processes in the pre-trial procedures and in the hearing process itself.

28 Typical examples include:

- (1) Online filing;
- (2) E-discovery and document management support systems in large cases (paid for by the parties);
- (3) Real time transcript (paid for by the parties);
- (4) Electronic courtrooms (at least one in each major court complex);
- (5) Use of video links in criminal matters (the prisoner is provided with a secure room within the jail rather than being transported to court);
- (6) Use of 'safe rooms' from which vulnerable witnesses may give evidence. (This is used when a child is to give evidence, e.g. in a child sex offence case. It may also be used where a victim of domestic

²⁹ Legg, above n 19, 12.

³⁰ Ibid 12.

violence is to give evidence or where some other safety or security issue exists in relation to a person); and

(7) The availability of devices in the court room to enable access to legal databases during the course of argument.

29 Particular challenges for the court system in respect of the use of technology include:

(1) the extent to which parties are able to navigate the technology; and

(2) the cost of the technology and the time and monetary cost involved in training judges to use new technology.

30 Figures in the United Kingdom (where there has recently been a strong focus on technological development in the judicial system) indicate that around one fifth of the population cannot or will not engage in using technology and only a third are classed in the category of those who are able to use it without support.³¹ This raises serious access to justice questions.³²

31 Very few general court systems have the financial or human resources to provide the same level of technological support as that which is found in large commercial enterprises and large commercial law firms. Technology including hardware and software systems is inherently expensive. For example, the United Kingdom government recently committed over £700 million “to modernize and fully digitize the courts”,³³ which continue to be largely paper-based.³⁴

³¹ Ibid.

³² See, eg, Anne Wallace, ‘Technology and the Judiciary: The Use of Technology in the Criminal Trial Process’ paper presented at the 4th National Outlook Symposium on Crime in Australia: New Crimes or New Responses (Australian Institute of Criminology, Canberra, 21-22 June 2001).

³³ Richard Susskind, *Tomorrow’s Lawyers* (Oxford University Press, 2nd ed, 2017) 105.

³⁴ Ibid 104. Almost 20 years ago and before the advent of broadband internet in the home 17 years ago and smartphones 10 years ago – Michael Kirby, then a Justice of the High Court of Australia, predicted that in 25 years “paper, like parchment today, will only be used for documents of special

- 32 Technology also often has a fast inbuilt obsolescence rate and there can be digital communication issues — not all systems can communicate with each other and this becomes more difficult as the technology ages, with different users not only having different systems but systems of different ages. The “*digital communication*” problem has become less relevant in recent years as system providers have discerned the economic advantages in making systems compatible.
- 33 We have also seen the development of what is known as “*virtual courts*”. The extent to which a court is “*virtual*” can vary from a conventional courtroom set-up which uses a video link – for example in cases involving child witnesses or other witnesses who may be particularly vulnerable – to arrangements by which the parties, witnesses and the judge video conference from different locations.³⁵ It has been suggested that this entirely virtual set up is particularly well-suited to arbitration and other alternative dispute resolution techniques.³⁶ In appropriate cases, particularly where the evidence is not contentious or is of an expert nature, this resource is invaluable. However, anecdotally it appears that the virtual court is problematic where issues regarding the credibility of witnesses are involved.
- 34 Another question which arises from the “*virtual courtroom*” is whether and the extent to which their use advances respect for courts – as the institution in which justice is formally administered – and fosters a sense of respect for the rule of law in the community. It is a similar problem to what I referred to earlier with flexible work practices – the perception that in the absence of direct human contact the worth of what is being undertaken is lessened.
- 35 Whilst it is said that online courts have the potential to deliver the speedier resolution of cases, this may come at the cost of allowing a litigant to feel as if

significance – and by hobbyists”. That prediction was overoptimistic although it is closer to fulfilment than even 5 years ago: Michael Kirby, ‘The Future of Courts – Do They Have One?’

³⁵ Susskind, above n 33, 109-110.

³⁶ Legg, above n 19.

they have had their “*day in court*”.³⁷ Similarly, the element of public vindication that accompanies a courtroom hearing may not be felt in the virtual sphere.

36 The “*virtual*” element may impact positively on the way in which cases are argued. Justice Kirby has observed, based on his time on the High Court, that advocacy in special leave hearings conducted by video link was generally briefer than those conducted in the physical presence of the court – although statistical evidence indicates that this does not have an effect on the outcome of the application.³⁸

37 There is also the possibility – if not the likelihood, depending upon the systems used – for an online court to be public and therefore completely accessible.³⁹ The privacy implications of this are obvious. Additionally, there is the risk that unmeritorious claims may be brought more easily, impacting upon defendants in terms of time, money and other resources.

38 Another significant effect of virtual court processes is that a “*court*” ceases to be a distinct place and instead becomes a service.⁴⁰ While judicial decision-making involves the delivery of justice to individual entities in a particular case and so could perhaps be described as “*judicial services*”, the commoditisation of the judicial system is not consistent with the rule of law.

39 It becomes necessary to ask therefore to what extent a “*virtual court*” is truly a court. In the context of seeking to address cost and delay in civil litigation, former High Court Chief Justice Murray Gleeson has said that:

“the court of the future will need to embrace, and respond appropriately to, the demands of the future, while remaining a court. For that purpose, judges themselves, and especially judicial leaders, need a clear idea of what being a court involves. This means understanding the characteristics of the judicial function and discriminating between the essential and the inessential”.⁴¹

³⁷ Susskind, above n 33, 118.

³⁸ Kirby, above n 34.

³⁹ Susskind, above n 33, 119.

⁴⁰ *Ibid* 111.

⁴¹ Murray Gleeson, ‘The Judicial Method: Essentials and Inessentials’, paper presented at the District and County Court Judges’ Conference (Sydney, 25 June 2009) 6-7.

40 What then are the essential and the inessential functions of a court?

41 In Australia, the answer to the question “*what is a court and what are its essential or defining characteristics?*”, is shaped by our constitutional context, and in particular the separation of powers doctrine.⁴² The High Court’s decision in *Kable v DPP (NSW)* makes clear that in a constitutional sense, a “*court*” is a body which exercises judicial power or powers not inconsistent with the judicial function.⁴³

42 Murray Gleeson has suggested that many of the administrative features of the judicial role, for example, case allocation and management, are not essential elements of a court.⁴⁴ Rather, the essential characteristics of the judicial function are threefold: first, that trials are conducted in public; second, that both sides of an argument are heard, and; third, that reasons are given for a decision.⁴⁵ Similarly, a fair hearing is an essential feature of the court process. What this entails will vary in the circumstances. For example, it does not necessarily require that a party be given unlimited time, nor even that a case be heard through an adversarial trial.⁴⁶

43 If an essential aspect of the judicial function is that a trial be held in public, one can ask whether that provides the answer to the oft repeated suggestion that artificial intelligence adjudications will replace judicial determinations

44 The question and the challenge therefore, is whether it is possible or desirable to confine the requirement that cases be heard in public to certain types of trials? Criminal trials, it seems would be the archetypical example of this, some family law cases and cases in which a legal principle is in issue or requires development being other examples.

⁴² Margaret Beazley and Christopher Frommer, ‘The Distinctive Role of the Judge: “The Least Dangerous Branch of Government”’ in Michael Legg (ed), *Resolving Civil Disputes* (LexisNexis Butterworths, 2016) 3, 5.

⁴³ (1996) 189 CLR 51.

⁴⁴ Gleeson, above n 41, 5. See also the discussion of the features of judicial power in Beazley and Frommer, above n 42.

⁴⁵ Gleeson, above n 41, 9.

⁴⁶ *Ibid* 7-8.

- 45 It is interesting to observe at this point that last year computer scientists at University College London developed an Artificial Intelligence adjudication system which was designed to “*weigh up legal evidence and moral questions of right and wrong*” and reached the same verdict as judges of the European Court of Human Rights in 79% of the 584 cases it considered.⁴⁷
- 46 Without the details of the cases used in the model, it is difficult to assess whether the artificially intelligent outcomes were fortuitous or whether the outcome in each case was obvious in any event as is sometimes the case – even in complex litigation in the courts.
- 47 Secondly, the European system is different to the common law system within which we practice. Significantly, it lacks the oral tradition which still remains a feature of judicial determination in our system.
- 48 Thirdly, a significant proportion of the cases that come before the courts for adjudication require value-based judgments. We see this, for instance, in areas of administrative law which confer a discretion on a decision-maker – for example, providing that a decision-maker *may* do something if *satisfied* of particular matters. It is difficult to see that the principled but evaluative nature of this discretionary decision-making would necessarily find an easy replication in the artificial intelligence judge.
- 49 Nonetheless, it must be accepted that these experiments will multiply, the technology which drives them will improve and the algorithms which make them possible will be refined. Accordingly, it should not be assumed that in 20 years’ time, the judicial or legal function will be the same as it is today. Alternate dispute resolution in all its manifestations has already had an impact and, in the case of arbitration, a system of private and confidential adjudication is well entrenched internationally. However, there will always remain the burning question: is the artificially intelligent determination correct

⁴⁷ Chris Johnston, ‘Artificial Intelligence ‘Judge’ Developed by UCL Computer Scientists’, *The Guardian* (24 October 2016).

and is a fair result achieved? Someone has to make be able to make that decision.

The impact of technology on the development of law

50 Another interesting and important challenge for lawyers will be to understand the legal problems arising from technological innovation across industry, commerce and social communication.

51 Online commerce and the inter-jurisdictional dealings facilitated by the development of the internet give rise to a range of unique legal issues. For example, the capacity of multinational corporations, and particularly online businesses, to minimise their exposure to taxes has been an area of interest and concern within the industry.⁴⁸ It has been reported that in 2010 eBay paid UK taxes of £1.2 million on profits of around £250 million, a figure which represents a tax rate of approximately 0.48%. Lawyers advising corporate clients in this context will have to consider how to best do so in a manner that balances legal tax minimisation with illegal tax avoidance.

52 Online and inter-jurisdictional contracts also raise complex issues surrounding jurisdiction and choice of law. This is most commonly resolved through an express choice of law clause, which in turn raises issues surrounding “*jurisdiction shopping*”.⁴⁹

53 Meanwhile, relatively new developments such as blockchain technology raise legal issues while also offering solutions. Blockchain technology may be one of the most innovative and useful tools in modern commerce (although at the Prime Minister’s Innovation Summit held in September 2017, it was suggested that there was already better technology available). The uses of blockchain and similar or improved technologies include tracing and certifying the

⁴⁸ Ian J Lloyd, *Information Technology Law* (Oxford University Press, 7th ed, 2014) 425.

⁴⁹ Alan Davidson, *Social Media and Electronic Commerce Law* (Cambridge University Press, 2nd ed, 2016) 328.

sustainable provenance of retail products⁵⁰ and its use as an anti-counterfeiting tool by tracking products such as pharmaceuticals and luxury goods,⁵¹ and by combating fraud and tracking provenance in the diamond industry,⁵² to name a few examples. However, questions also arise regarding the regulation of blockchain, particularly in relation to the privacy of information stored on it.

- 54 Information stored using blockchain has traditionally been public and, as a result, one of its major features has been transparency. However, as one might expect, not all companies or individuals are comfortable with the idea of publishing their information on a public database.⁵³ What is more, data stored on blockchains cannot be changed, which means that personal data cannot be altered or removed.⁵⁴ Going forward, this could create a range of issues and potentially inhibit the broader adoption of the technology. The question which arises then, is how to achieve privacy and confidentiality without compromising transparency and efficiency.⁵⁵
- 55 Similar issues have arisen around the use of crypto-currencies such as Bitcoin – which has already proved susceptible to use in illegal transactions on the Dark Web.⁵⁶ Crypto-currencies such as Bitcoin challenge established notions of currency as being issued by a central bank under legislative authority. Bitcoins are “*created, or ‘mined’, by individuals using dedicated software to identify appropriate cryptographic identifiers*”.⁵⁷ Alternatively, they can be bought on online exchange sites.

⁵⁰ See, eg, <https://www.provenance.org/>.

⁵¹ See, eg, <http://www.blockverify.io/>.

⁵² See, eg, <http://www.everledger.io/>.

⁵³ Vitalik Buterin, ‘Privacy on the Blockchain’ (Ethereum blog, 15 January 2016)

<<https://blog.ethereum.org/2016/01/15/privacy-on-the-blockchain/>>.

⁵⁴ Jeni Tennison, *What Is the Impact of Blockchains on Privacy?* (12 November 2015) Open Data Institute <<https://theodi.org/blog/impact-of-blockchains-on-privacy>>.

⁵⁵ George Samman, ‘The Trend Towards Blockchain Privacy: Zero Knowledge Proofs’ (Report, Gilbert + Tobin) 2.

⁵⁶ See Lloyd, above n 48, 464.

⁵⁷ See *ibid* 464.

- 56 In August 2017, the Australian government announced plans to regulate Bitcoin through anti-money laundering laws, following the path of Japan which earlier in 2017 became the first national government to adopt such an approach. Bitcoin exchanges in Japan are now subject to audits and other anti-money laundering safeguards. This move was prompted by the bankruptcy of Mt Gox – then the world’s largest exchange – in 2014. Approximately 850 000 Bitcoins disappeared from Mt Gox prior to its collapse, carrying a value of almost \$3.5 billion in today’s prices.⁵⁸
- 57 Perhaps unsurprisingly, Bitcoin values fell in September 2017 after the Chinese government declared them illegal.⁵⁹ The United States government has also indicated a move toward greater scrutiny in the area.⁶⁰
- 58 The legal issues which are thrown up by these developments are tied to algorithms – the entire Bitcoin currency is built on them! There will be no choice but for the lawyer in the third decade of this century to understand the implications of algorithmic technology. The refrain of the 20th century lawyer “*I did law so I didn’t have to do maths*” will be as archaic as the penny farthing bicycle was at the beginning of the 20th century.
- 59 Earlier this week, the government’s chief innovation adviser Bill Ferris considered how the Australian education system would have to adapt in light of this new era – the age of the algorithm. He explained that while:

“it does not mean turning out more kids with programming and coding skills ... by 2030 it does mean more teenagers with curiosity, problem solving, and computation capabilities relevant to their digital economy and society”.⁶¹

The same could be said, I believe, of tomorrow’s lawyers and legal education.

⁵⁸ Jamie Smyth, ‘Australia Follows Japan in Move to Regulate Bitcoin’, *Financial Times* (17 August 2017) <<https://www.ft.com/content/4cd5cc3c-8309-11e7-a4ce-15b2513cb3ff>>.

⁵⁹ Lulu Yilun Chen and Justina Lee, ‘Bitcoin Tumbles as China’s Central Bank Declares Initial Coin Offerings Illegal’, *Sydney Morning Herald* (5 September 2017) <<http://www.smh.com.au/business/markets/bitcoin-tumbles-as-chinas-central-bank-declares-initial-coin-offerings-illegal-20170904-gyas0z.html>>.

⁶⁰ *Ibid.*

⁶¹ Patrick and Coorey, above n 14.

- 60 Another matter about which there has not been a great deal of discussion is the impact of technology on judgment writing and therefore on the development and application of law in common law systems. A feature of the common law system of jurisprudence is the exposition of the judge's reasons for having determined the case in the particular way that he or she did.
- 61 Many courts in common law systems now publish their reasons for judgment on their websites, or otherwise make them freely accessible.⁶² Whilst this is often lauded as promoting access to justice, it may, in fact, complicate the role of courts lower in the judicial hierarchy, which face an increase in the range of binding or persuasive authorities available to them.
- 62 At an appellate level, it is also possible to observe a trend of "*historicism*" in which courts take full advantage of increasing digital and text searchable legal archives to trace legal terms and concepts back to their historical origins.⁶³ The use of decisions from other national courts, both in the common law and civil systems, is also more readily facilitated than in earlier times. These factors, combined with the digital production of reasons has, at least arguably, resulted in appellate reasons becoming longer and more elaborate.⁶⁴
- 63 The suggestion has also been made that "*just as television created 'sound bite' journalism, so does computerized legal research create 'law-byte' reasoning*".⁶⁵ The manner in which digitized search engines operate emphasises words, rather than legal principles, language and ideas. The result of this has been described as a phenomenon whereby "*propositions of law are coming increasingly to be transmitted from case to case in the form of 'word concepts' which are constantly restated but the meaning of which is*

⁶² Stephen Gageler, 'What Is Information Technology Doing to the Common Law?' (2014) 38 *Australian Bar Review* 146, 155.

⁶³ *Ibid* 155.

⁶⁴ *Ibid* 156.

⁶⁵ A O Larsen, 'Factual Precedents' (2013) 162 *University of Pennsylvania Law Review* 59, 76.

rarely unpacked".⁶⁶ If this criticism is correct, it is possible that the jurisprudence of the particular court will be weakened.

The human cost

64 The one matter that cannot be overlooked in the proper functioning of the legal system is the human factor. Legal issues arise out of human conduct and court decisions have an impact on the individuals who participate in them. Individuals need to feel that they are treated 'fairly' in their interaction with the legal system. Fairness in this context is not only in the outcome of their case or resolution of their issue. It is the human need to be listened to.

65 Very few court cases leave a person feeling "*warm and fuzzy*". However, every court case should leave the individuals engaged in it with a sense of being treated with respect, which in turn engenders respect for the judicial system. Those who use the court for personal chicanery or treat it with disdain by falsifying evidence need to understand that there is a system which is larger than their conduct. A law abiding community deserves a society in which their rights and safety are respected. The role of the court is foundational to that society. Robots on their own won't achieve this.

Conclusion

66 For young lawyers this period of rapid change may mean that the future feels uncertain and full of not-insignificant challenges. To a certain extent this is true. However, this uncertainty also offers great possibilities. You are uniquely positioned at the forefront of this new era of law and lawyering, it will be you who will get to determine what the future looks like. The challenge will be to embrace algorithmic technology to streamline legal processes and enhance the administration of justice while also recognising what are – at this point – its inherent limitations and the need for human involvement and monitoring.

⁶⁶ Gageler, above n 62, 156.

- 67 For an idea of how artificial intelligence might be used in lawyering and judging, we might look to Watson, the question-answering computer system developed by IBM that competed in, and won, the quiz show Jeopardy in 2011. Watson is currently involved in a number of projects in the medical field which seek to develop its use as a tool in diagnosis and in canvassing treatment options. It is foreseeable that a similar program could be used to assist, and not replace, lawyers and judges – although of course we would have to call it Sherlock!
- 68 Navigating these issues is not easy; however, it is a task we must take on if we are committed to maintaining not only a legal system that is efficient and cost-effective but a legal profession that is properly equipped to deal with social conditions in what is a time of extraordinary technological innovation.