Technology and the Law

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Lord Hodge, Deputy President of The Supreme

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I. Introduction[1]

My theme tonight is of the need for lawmakers, regulators and judges in the United Kingdom to be alive to the demands for change that technology will make of our legal systems and the opportunities and challenges which that technology creates for the legal professions. The executive branches of government, our legislators and courts will have to adapt to the effects of technological change, to embrace its opportunities and to control its downside. Many predictions are made as to what the future holds. Most will be wrong. But I have no doubt as to the need for our public authorities to be ready to address whatever does come down the road.

We live in a time of rapid technological change. Recent decades have seen four important developments. There has been a huge increase in the computational and data processing power of IT systems. Data has become available on an unprecedented scale. The cost of storing data has fallen precipitously. And we have seen the development of increasingly sophisticated software services. From the dawn of civilisation until 2003, humans created a sum total of five exabytes of information. By 2010, the same volume of information was being generated every two days.[2] According to Richard Susskind, IT Adviser to the Lord Chief Justice of England and Wales, we will soon be creating five exabytes of information every hour.[3]

One particular technological development has been described as "unlike any other technology or phenomenon that we have had to regulate previously"[4]: Artificial Intelligence ("AI"). There are various definitions of AI, which focus on its ability to perform tasks that otherwise would require human intelligence.[5] However AI is not confined to matching human intelligence in the performance of tasks: AI can surpass it. Machines beat grand masters at chess and outperform

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[1] I am very grateful to Francesca Ruddy, my Judicial Assistant, for her assistance in researching this talk.
[2] Eric Schmidt, then CEO of Google addressing the 2010 Techonomy conference: https://www.youtube.com/watch?v=UAcCIsrAq70 (at 8:00).
[3] Richard Susskind, *Online Courts and the Future of Justice* (OUP: 2019) pg. 37.
[4] As stated by Jacob Turner on Law Pod UK by One Crown Office Row on episode 71, 'Robot Rules with Jacob Turner' (4 March 2019).
[5] See, for instance, Jacob Turner, *Robot Rules: regulating artificial intelligence* (Palgrave Macmillan: 2019) pg. 16.

expert players of "Go".[6] As such, I would prefer to define AI as computer systems able to perform tasks which traditionally have required human intelligence or tasks whose completion is beyond human intelligence. In his recently published book, called "A World without Work", Daniel Susskind, one of Richard's sons, records how, in the early years of computer science, researchers initially focussed on how far computers could match human capabilities, underestimating the power of what they were creating, but how over time, in what he calls "the pragmatist revolution", AI theorists and scientists realised that machines could be developed which thought in different ways from human beings.[7]

Technologists are creating new capabilities at speed. Perhaps we need to ask ourselves the questions which were asked of bankers in and after 2008: "do you know what you are doing?". Last week in a fascinating seminar on "The Internet and the Law" in the Royal Society, the audience of scientists and lawyers learned of how the internet developed out of research funded by the US Defense Department and similar bodies in western countries and how it took off once internet technology merged with mobile phone technology in the 1990s. We learned also of the development of technology, which was produced for intelligence services to exfiltrate intelligence from countries with repressive regimes by creating layers of encryption (like the layers of an onion) and the routing of information in ways which prevented the identification of the source and the ultimate destination of the information. This capability, which may be a boom for intelligence services, has also become the means of enabling and concealing criminal activity on a large scale. It is the technology of the Dark Web. Last month, when I gave a lecture in Aberdeen at a conference on Cybersecurity in the North Sea, a young computer scientist approached me to express his concern that he and other software developers were pressurised by the market to produce software at great speed. The software was needed for positive reasons to facilitate beneficial results; but he worried that it also had the potential for harm which was being overlooked; and he worried about legal liability for that harm if it came about.

More recently still, there has been coverage in the press about concerns over the security of the "internet of things". We increasingly have devices which are capable of communication with the internet, to perform useful tasks in our homes. For example, software in some monitors which we use to see and speak to babies and children in their beds can be hacked by malicious persons. Software has bugs and needs to be updated to protect it against malicious penetration. But do

[6] In 1997, IBM's Deep Blue defeated Gary Kasparov at chess and in 2016 Google DeepMind's AlphaGo program beat the 18-time world champion Lee Sedol.
[7] Daniel Susskind, *A World without Work* (Allen Lane: 2020) chapter 3.

we know how to prevent misuse? And what are we to do if the supplier refuses to maintain a service to update the security of the devices which it has sold? Consider the latest publicity about the absence of security patches for Android devices marketed before 2012. Or if the supplier becomes insolvent? Old problems are emerging in new contexts. I am not concerned with those so much as with the new problems which the technology is creating.

A prodigious amount of information is now available on the web. Much of it is of great benefit to humanity but there is also harmful material such as material which promotes self-harm or suicide, child abuse or other sexual abuse and, of course, terrorism. When faced with a blizzard of data, good, bad and indifferent, on whom should we impose responsibility for policing web platforms and removing harmful content?[8] And will the individual nation state be able to enforce such obligations?

Returning to the subject of AI, within its field, there is "machine learning", which involves the design of an algorithm which optimises automatically through experience and with limited or no human intervention.[9] Machine learning can be used to find patterns in large amounts of data (commonly referred to as "big data analytics") from increasingly diverse sources. There is, of course, no shortage of data for this purpose.

Big data analytics and AI can be used for what many consider to be questionable purposes. For instance, in China, the government is developing a "social credit system" using big data analytics to assess the economic and social reputations of its citizens and businesses and to reward or punish as a result. The scoring system operates by mining people's data in order to construct a full profile of their behaviour, including their friends, their health records, online purchases, legal matters, and tax payments (to name a few), and it combines that data with images gathered from China's 200 million surveillance cameras and facial recognition software.[10]

Whilst Western governments have not sought to exercise the sort of social control over their citizens to which the Chinese government aspires, it is increasingly common for Western

[8] The UK Government Online Harms White Paper proposes a new regulatory framework for online safety, imposing obligations on tech companies to counter illegal content and activity. It proposes to impose on such companies a new statutory duty of care and to establish an independent regulator to oversee and enforce that duty. https://www.gov.uk/government/consultations/online-harms-white-paper/online-harms-white-paper.

[9] Financial Stability Board, 'Artificial Intelligence and machine learning in financial services' (1 November 2017).

[10] Bernard Marr, 'Chinese Social Credit Score', *FORBES* (21 January 2019), available at: https://www.forbes.com/sites/bernardmarr/2019/01/21/chinese-social-credit-score-utopian-big-data-bliss-or-black-mirror-on-steroids/#331260d448b8.

businesses to gather and use "reputational information" in order to monitor and influence the behaviours of their partners and consumers. For instance, platforms such as eBay, Airbnb and Deliveroo collect and publish feedback and "ratings" from service users, so as to cultivate and reward trustworthy providers and expel poor performers.[11] In the case of Uber, the rating system is mutual, with both riders and drivers at risk of expulsion or loss of privileges if their scores fall below acceptable levels.[12] More significantly, data brokers such as Experian generate credit scores based on their assessment of available data relating to our lifestyles and consumption habits. These ratings, in turn, determine our access to key financial products such as mortgages. In short, we need to look at the risks which AI creates in our societies.

The potential impact of error or abuse in the underlying data inputs and algorithms could be very significant for the data subjects. Yet the possibility of this happening is far from remote. We have all seen how trusted ratings providers can be targeted with deliberately false reviews, whether by unscrupulous, self-promoting retailers[13] or as a form of political protest.[14] It is also well-documented that algorithms can replicate and amplify human biases.[15] Such was the case with the AI recruitment software developed at Amazon's Edinburgh office in 2014, which had to be withdrawn after it "taught itself that male candidates were preferable".[16] It is heartening that the developers in this case picked up on the skewed results of the CV shortlists. But because the proprietary code underlying popular rating systems is invariably confidential, there is alarmingly little scope for outsiders to unearth errors or abuse, or to seek redress for any resulting harm.

Painting on a broader canvas, Daniel Susskind warns that machines will bring about much more radical socio-economic change. They will, he predicts, reduce opportunities for employment and that in future states may have encourage their underemployed or unemployed citizens to engage

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[11] D. Mac Sithig and M. Siems, 'The Chinese Social Credit System: A Model for Other Countries?' (2019) *Modern Law Review* 1034 at pgs. 1039-1040

[12] *Ibid* at pg. 1041

[13] BBC News 'Amazon 'flooded by fake five-star reviews' - Which? Report' (16 April 2019) https://www.bbc.co.uk/news/business-47941181.

[14]David Streitfeld, 'Swarming a Book Online' *The New York Times* (20 January 2013), available at: https://www.nytimes.com/2013/01/21/business/a-casualty-on-the-battlefield-of-amazons-partisan-book-reviews.html. See also Alison Flood 'Amazon redacts one-star reviews of Hillary Clinton's What Happened' *The Guardian* (14 September 2017), available at: https://www.theguardian.com/books/2017/sep/14/amazon-redacts-one-star-reviews-of-hillary-clintons-what-happened.

[15] Daniel Cossins, 'Discriminating algorithms: 5 times AI showed prejudice' *New Scientist* (12 April 2018), available at: https://www.newscientist.com/article/2166207-discriminating-algorithms-5-times-ai-showed-prejudice/. See also Miranda Bogen 'All the Ways Hiring Algorithms Can Introduce Bias' *Harvard Business Review* (6 May 2019), available at: https://hbr.org/2019/05/all-the-ways-hiring-algorithms-can-introduce-bias;

[16] Maya Oppenheim, 'Amazon scraps 'sexist AI' recruitment tool' *The Independent* (11 October 2018) https://www.independent.co.uk/life-style/gadgets-and-tech/amazon-ai-sexist-recruitment-tool-algorithm-a8579161.html.

in other activity and fund them through significantly higher top tax rates on those with capital and those who remain fully employed.[17] Whether he is correct, I cannot say. None of us know the future; but technological change poses challenges which we need to address.

The focus of my address today is on two matters: first, the need to adapt our laws to accommodate and regulate emerging technologies; and second, the opportunities these technologies present for improvements in legal practice and the justice system.

II. Adapting the law to accommodate and regulate emerging technologies

What is clear from the examples I have mentioned is that the speed of technological developments poses a real challenge to the law and to regulation. The McKinsey Global Institute concluded that AI and big data are not only contributing to the transformation of society but, as compared to the Industrial Revolution, the revolution is "happening ten times faster and at 300 times the scale, or roughly 3000 times the impact".[18]

How then are legislators, judges and lawyers to apply and adapt the law, especially in a commercial context?

A successful system of commercial law must promote rather than hinder honest commercial activity. A legal system which offers a high degree of legal certainty will tend to reduce the cost of transactions and so encourage commerce. In the eighteenth century, the great Scottish jurist, Lord Mansfield, whom many would regard as the father of English commercial law, stated:

> "In all mercantile transactions the great object should be certainty: and therefore, it is of more consequence that a rule should be certain, than whether the rule is established one way or the other."[19]

Similarly, and more recently, Lord Goff stated in an extrajudicial writing:

> "[Judges] are there to give effect to [businessmen's] transactions, not frustrate them; we are there to oil the wheels of commerce, not to put a spanner in the works, or even grit in the oil."[20]

[17] Daniel Susskind, *A World without Work* (Allen Lane: 2020), chs 10 and 12.
[18] Richard Dobbs, James Manyika, and Jonathan Woetzel, 'The Four Global Forces Breaking all the Trends', 2015.
[19] *Vallejo* v *Wheeler* (1774) 1 Cowp 143 at 153.
[20] Lord Goff of Chieveley, 'Commercial contracts and the commercial court', [1984] LMCLQ 382 at 391.

How then can a legal system promote that certainty and oil the wheels of commerce when its traditional structure has not been adapted to accommodate the novel forms of transacting which technology offers?

Contract law

I start with contract law and the advent of "smart contracts". As many of you will know, "smart contracts" are contracts which can be partially or fully executed without human intervention. At their simplest, they involve an instruction to the computer that if X happens then the computer is to act to make Y the result. This process of "if-then" instructions can be compared to the operation of an automatic vending machine. If you wish to buy a snack, you put money in the machine, select the product and the machine takes the money and delivers you your snack.[21] In such a simple form, there should be no problem in upholding the existence of a contract in legal systems such as the common law (in which I include in this context Scots law), which assess the intention of the contracting parties objectively, so long as the parties were aware, when contracting, of the nature of the arrangement which they were entering into.

But the law must address how to provide a remedy if contractual consent has been vitiated, for example, by misrepresentation or fraud. Smart contracts are self-executing as the terms of the agreement between a buyer and a seller are written into lines of code which exist in a blockchain. When the coded conditions are met, a product is released or a payment made. No-one, including a court, can stop the performance of a smart contract. The courts will not be able to cancel the performance of the contract.[22] But a remedy may lie in the law of unjust enrichment in both common law and civil law jurisdictions to compel the parties to re-transfer the property or money which was the subject of the transaction.

Much greater problems in the law of contract may arise if computers are developed to use machine learning to optimise the transactions which they enter into. If businesses were to use computers with machine learning capability to deal with other computers with similar ability, they could autonomously generate transactions which would not fit easily into our contract law. How will the law attribute those decisions to the intention of the contracting parties? Should the

[21] The example of the vending machine was the chosen illustration of the idea behind a smart contract which Nick Szabo used when he coined the term "Smart contracts" in his 1997 paper "The Idea of Smart Contracts". The "smart contract" in the sense used by Nick Szabo involves no machine learning but simply implements "if-then" instructions.

[22] Unscrambling an executed contract on blockchain is difficult to achieve, requiring one to go back in the chain to a point before the contract, creating a fork and re-creating the chain without the impugned transaction.

law say that those who willingly use computers with machine learning to effect their transactions are to be taken as intending to be contractually bound by the deals which those autonomous machines make? If there is to be a contract drafted or adapted by machines, there will have to be significant development to our law of contract which will require careful and imaginative consideration.

Delict/Tort

The law will also have to address the existence of civil liability outside the field of contract law. In the law of delict or tort, liability can result from the combination of a wrongful intention to harm another or foresight of harm to another and a causal link between the individual's action (or inaction) and the harm which the other suffers. If an adverse outcome is the result of a decision by a computer, to whom will the law attribute fault? How will the law see a causal connection between a human's acts and that outcome? Who is to be responsible for the machines' decisions, or its biases?

And when one addresses economic delicts, namely the intentional infliction of harm by unlawful means, inducing breach of contract or conspiracy, which require a mental element of an intention to cause harm, or the delict of fraud, in which the knowledge or belief of the misrepresentor is relevant,[23] how do you impose liability for the harm caused by the autonomous acts or malfunctioning of computers ?

Will there have to be legislation to impose liability on the developer of AI systems as one might in relation to the manufacturer of driverless cars? Or should legislation impose liability on those who choose to use such devices? Or is it fair to hold humans liable at all if the AI systems write their own algorithms? One possibility is to give an AI system, like a corporation, legal personality and to impose an obligation of compulsory third party insurance against harm caused without fault. In addition, or alternatively, a body of law will need to develop to decide how to allocate liability.[24]

Parliament and the Government are taking steps to establish mechanisms for *ex ante* scrutiny of AI, enlisting the help of The Alan Turing Institute to make algorithmic systems fair, transparent

[23] Joe Thomson, "Delictual Liability" (4th ed) chapter 2.
[24] Woodrow Barfield, 'Towards a law of artificial intelligence' in Woodrow Barfield and Ugo Pagallo, *Research Handbook on the Law of Artificial Intelligence* (Edward Elgar Publishing: 2018) pg. 5.

and ethical.[25] Recommendations include opening 'black box' systems to improve comprehension and explanation of algorithmic decision-making, preserving protected characteristics like gender and ethnicity in automated systems, and balancing innovation with privacy in analysis of personal data.[26] Whilst these initiatives are promising, it will be vital to address the wider legal questions I have mentioned.

Property

The law of property will also need be adapted to take account of emerging technologies. For instance, if computers using AI generate intellectual property, who owns that property? If machines act autonomously to create new contracts, should there be copyright, and who should own it? Similar questions arise in relation to patents if such machines invent things which have industrial application. In relation to copyright, UK law treats as the author of a computer-generated work the person by whom the arrangements necessary for the creation of the work are undertaken.[27] This approach appears to have considerable potential to create disputes, particularly if a machine is involved in the arrangements.

Perhaps the most pressing question in relation to the law of property concerns the treatment of crypto-assets. For example, if digital currencies were to achieve a stability so far absent and were accepted widely in exchange for goods and services or for other uses,[28] their nature as property would need to be defined.

The Financial Markets Law Committee has suggested that the traditional categories of English law could be extended to recognise virtual choses in possession as a new form of property.[29] In Scotland, where our property law has a strong civilian framework, we would need to recognise a new form of intangible moveable property. However, if crypto-assets become widely used in cross-border commercial transactions, it will be necessary to achieve a degree of international legal consensus on their nature as property rights. Should such currencies, depending on their

[25] House of Lords Select Committee on Artificial Intelligence, 'AI in the UK: ready, willing and able?' Report of Session 2017 – 19, pg. 41; Government response to the House of Lords Artificial Intelligence Select Committee's Report on AI in the UK: Ready, Willing and Able? (June 2018), available at: https://www.parliament.uk/documents/lords-committees/Artificial-Intelligence/AI-Government-Response.pdf, pg. 13.

[26] See https://www.turing.ac.uk/research/challenges/challenge-make-algorithmic-systems-fair-transparent-and-ethical.

[27] Copyright, Designs and Patents Act 1998, sections 9(3) and 178.

[28] Fewer than 600 merchants in the United Kingdom accept exchange tokens as a payment tool. Financial Conduct Authority, "Guidance on Cryptoassets" Consultation Report CP19/13, paras 3.31 – 3.34.

[29] Financial Markets Law Committee, "Fintech: Issues of Legal Complexity" (June 2018), pp 30 and 38.

character, be regarded as money or are they to be seen as securities and regulated as such?[30] Rules will be required to define the nature of tokens and assets held on distributed ledgers and to identify when such property passes from one owner to another. This should involve cooperation between computer specialists and lawyers in order to maximise the benefits of the technology.

Debates on this question are being conducted both North and South of the Border. In England, the LawTech Delivery Panel's UK Jurisdiction Taskforce has published an authoritative statement on the current status of smart contracts and crypto-assets in English private law.[31] Meanwhile, the Scottish Government has established a Working Group on Crypto-assets and Related Technology in Scots Law, which I have the privilege of co-chairing with the Lord Advocate and which is charged with a similar mission. The Working Group proposes to consult stakeholders in the course of this year and to report thereafter.

International cooperation

Of course, it is not enough for our legislatures and courts in the UK to adapt the law to accommodate these novel forms of transacting without looking outside these islands. If advances in technology are to contribute significantly to international commerce, there is a pressing need for international cooperation to establish agreed rules of private international law and harmonised regulations. Many distributed ledger structures will operate across borders. This gives rise to uncertainty as to the governing law in relation to contracts executed and property held in the distributed ledger.

What is the way forward in this respect? I suggest that we should seek to extend the cooperation between regulators, such as the Global Financial Innovation Network, to achieve a greater harmonisation of regulation. Also, countries with a major interest in financial services should cooperate to promote new rules of private international law which could be promulgated by an international body, such as the Hague Conference or Unidroit.

There needs also to be agreement on jurisdiction and enforcement to enable court judgments and arbitration awards to be enforced in several jurisdictions. The Standing International Forum

[30] In London, the FMLC has suggested that virtual currencies which are pegged to "real world" currencies could be regarded as e-money and be negotiable. They suggest that the traditional categories of the common law might be extended to recognise virtual choses in possession as a new form of property: Financial Markets Law Committee, 'Fintech: Issues of Legal Complexity' (June 2018), pgs. 30 & 38.

[31] LawTech Delivery Panel (UK Jurisdiction Taskforce), 'Legal statement on cryptoassets and smart contracts' (November 2019), available at: https://35z8e83m1ih83drye280o9d1-wpengine.netdna-ssl.com/wp-content/uploads/2019/11/6.6056_JO_Cryptocurrencies_Statement_FINAL_WEB_111119-1.pdf

of Commercial Courts is working on enforcement of commercial judgments for money and might be a suitable body to seek agreement on rules of jurisdiction and enforcement.

In all this, ethical considerations, the interests of the consumer, and the need for privacy and data integrity will have to be balanced carefully against the potential benefits the new technology brings in terms of lowering transaction costs, broadening access to commerce, increasing market efficiency and enhancing consumer choice. It will be a most challenging task with important ramifications for the well-being of our societies in the years to come.

The Quoine case

An illustration of the problems which the law faces in adapting to technology can be seen in a judgment of the Singapore Court of Appeal in *Quoine Pte Ltd v B2C2 Ltd* which it handed down towards the end of last month.[32]

The case concerned a disastrous transaction on a cryptocurrency exchange platform. The judgment begins with the words: "The world of cryptocurrency trading is not for the faint-hearted". Indeed, it is not.

Quoine ("Q") operated a crypto currency exchange platform and users of the platform contracted with Q to observe the terms and conditions of the platform. B2C2 ("B") used the platform to trade Bitcoin with Ethereum using algorithmic trading software which its director had designed. B's software was "deterministic" in that it was programmed to produce the same output when given the same input. The software used orders from the platform as its inputs to generate quotes for sale and purchase orders. Both B and Q were market makers on the platform, creating liquidity by actively placing orders to buy and sell cryptocurrencies and so minimise volatility in the market which the platform created. Significantly, where input data was not available from the platform, B's software provided for a fail-safe, so-called "deep price" of 10 Bitcoin to 1 Ethereum.

In 2017 Q failed to make necessary changes to operating systems on its platform as a result of oversight. This resulted in the failure of Q's market-making program to generate new orders on the platform. That in turn triggered the fail-safe mechanism in B's software. As a result, in 13

[32] [2020] SGCA (I) 02.

trades in which B sold Ethereum to other users of the platform, Q's platform settled the trades at the fail-safe rate of 10 Bitcoin to 1 Ethereum when the market rate was 0.04 Bitcoin to 1 Ethereum. B received 250 times the Bitcoin which it would have received at the market rate. On the following day, Q learned of the trades and unilaterally cancelled them and reversed the settlement transactions.

B commenced legal proceedings arguing that the cancellation of the trades was in breach of the user platform agreement and the reversal of the settlement transactions was a breach of trust. The judge at first instance found for B on both issues. On appeal the Court of Appeal unanimously rejected the claim for breach of trust, holding that there was no trust. By a majority (Lord Mance dissenting) the court held that Q's cancellation of the trades was a breach of contract.

For present purposes, the judgment is interesting for two principal reasons. First, the majority held in its discussion of the breach trust claim that cryptoassets are capable of being regarded as property. In so doing they cited the UK Jurisdiction Taskforce's legal statement, to which I have referred, but did not express any concluded view as to the type of property that is involved.[33]

Secondly, the Court discussed Q's defence that the trading contracts had been vitiated on the basis of unilateral mistake at common law or equity. The Court agreed that there was no common law defence because the deterministic nature of the software meant that there was no actual mistake as to the terms of the executed transactions.[34] But the Court disagreed on how the equitable doctrine of unilateral mistake could apply to transactions executed by computers. Because the software was deterministic and not autonomous, the Court agreed that the relevant state of knowledge was that of B's programmer. The majority considered that the relevant questions were whether the programmer when setting up B's deep price fail-safe had actual or constructive knowledge of the fact that that offer price would only ever be accepted by a party operating under a mistake and whether the programmer was acting to take advantage of that mistake? On the facts, the majority held that the programmer did not have the requisite knowledge as he would have had to "foresee a perfect storm of events" and they accepted the judge's finding that the programmer had had no sinister motive.[35] Lord Mance dissented, arguing that the law should be adapted to algorithmic programs and artificial intelligence so as to

[33] Paras 137-144.
[34] Paras 114-116, 182
[35] Paras 103, 126-127.

produce results consistent with reason and justice. For him the central question was whether there was a rational basis for the abnormal prices in the surrounding circumstances or the state of the market or whether the only possible conclusion was that some fundamental error had taken place. He argued that the proper enquiry was whether an honest and reasonable trader in the programmer's position with knowledge of what had happened would at once have perceived that some fundamental error had occurred. In this novel circumstance, unconscionability was not a prerequisite for relief: the unknown activities of computers in the middle of the night had given B what an honourable and reasonable trader would recognise as an unjustified windfall and the contracts could not stand.[36]

I hope that I have not taken too much time over this one recent case, but I think that it illustrates the complexity of adapting our law to computerised trading even in the absence of autonomous computers. I am not confident that the Lord Chancellor's foot has the potential to grow to accommodate autonomous computer trading. Legislation will probably be needed.

III. Effects of technological change on legal practice

Changes to legal practice

The legal profession is having to adapt to technological advances. Many commentators have suggested that the legal profession is on the brink of unprecedented upheaval.[37] In the traditional model on which we rely, legal advice is crafted by lawyers and delivered on a one-to-one basis. Trials take place in a courtroom where procedure is formal and sometimes difficult for the parties to comprehend.

This traditional model is proving too expensive for many. Dickens overstated the position when he referred to legal papers as "mountains of costly nonsense", but unfortunately, legal and court services are simply unaffordable for many users.[38] Even companies with deeper pockets are reticent to spend vast sums on tasks like document review and due diligence. In response, the legal sector is employing AI in novel ways.

It seems that some corporations are leading the way and that may pose a challenge to professional law firms. For instance, in Coca-Cola's legal department, AI tools have streamlined

[36] Paras 194, 198, 200, 204.
[37] Richard Susskind and Daniel Susskind, *The Future of the Professions: How Technology Will Transform the Work of Human Experts"* (OUP: 2015) pg. 67
[38] Charles Dickens, *Bleak House* (Penguin: 1996), pg. 14.

the drafting process for many contractual documents, reducing the time that lawyers had been spending on review from as much as 10 hours to about 15 minutes. Not only does this improve efficiency, observers say, it also results in more consistent agreements while freeing up the legal team for more strategic tasks.[39] Similarly, JP Morgan Chase invested in its own proprietary AI platform – COIN (short for Contract Intelligence) – to review commercial loan agreements. The financial giant estimates that this automation has saved 360,000 hours of work by lawyers and loan officers annually, and it has expanded this platform to more complex matters, including credit default swaps and custody agreements.[40]

Law firms are also employing AI to support or even replace lawyers in the execution of core legal tasks.[41] In *Pyrrho Investments v MWB Property*, an English court expressly endorsed, for the first time, the use of predictive coding software, a form of machine learning that takes data input by people about document relevance and then applies it to much larger document sets.[42]. In a subsequent case, the Companies Court adopted Master Matthews' reasoning and ordered the use of predictive coding despite firm objections from the claimant. As in *Pyrrho Investments*, the court was persuaded that traditional keyword searches and manual review would be no more effective and considerably more expensive.[43]

Litigants are now generating and retaining such enormous volumes of data that AI-assisted document review has shifted into the mainstream. In fact, the Business and Property Courts of England and Wales now require parties to provide a reasoned justification for any decision not to use predictive coding where the "universe" of documents to be reviewed for disclosure exceeds 50,000 files.[44]

Technology in the courts

Of course, the courts must also adapt to advances in technology. Technological improvements to the systems, processes and infrastructure of the courts are necessary for any jurisdiction which

[39] Michael Heric and Neal Goldman, 'Corporate Legal Eagles Start to Embrace Artificial Intelligence', Bain & Company Brief, (05 February 2019), available at: https://www.bain.com/insights/corporate-legal-eagles-start-to-embrace-artificial-intelligence/.
[40] John Browning, 'Will Robot Lawyers Take Our Jobs?', *D Magazine*, (March 2019), available at: https://www.bain.com/insights/corporate-legal-eagles-start-to-embrace-artificial-intelligence/.
[41] Christian Veith and others, 'How Legal Technology Will Change the Business of Law' (January 2016), available at: http://www.bucerius-education.de/fileadmin/content/pdf/studies_publications/Legal_Tech_Report_2016.pdf.
[42] [2016] EWHC 256 (Ch).
[43] *Brown v BCA Trading Ltd & Ors* [2016] EWHC 1464 (Ch).
[44] See Questions 13 and 14 in Section 2 of the Disclosure Review Document, available at: http://www.justice.gov.uk/courts/procedure-rules/civil/rules/practice-direction-51u-disclosure-pilot-for-the-business-and-property-courts

seriously aspires to be a global centre of excellence for the resolution of disputes. To this end, the courts in England and Wales are embracing a variety of initiatives, including e-filing, computer-assisted transcription, document display systems, electronic presentation of evidence and the examination of witnesses by video link to protect the vulnerable and to enable witnesses located overseas or at a great distance to contribute to the forensic process without travelling to the court. I recall similar initiatives when I was a commercial judge in Scotland in both commercial and IP cases.

In addition, HM Courts & Tribunal Service, in collaboration with the Ministry of Justice, is investing over £1bn to "modernise and upgrade" the justice system.[45] The reform programme comprises more than 50 distinct projects.[46]

The geographic structure or spread of our courts dates back to a past age and modern communications, by which I mean both means of transport and electronic communications, have given an opportunity to rationalise the location of our courts. The process of court closures has in some cases been controversial as communities resent the loss of local facilities, but technology can, one would hope, reduce the inconvenience which local court closures have caused and will cause.

The Civil Courts Structure Review (2015-16), chaired by my colleague Lord Briggs, has drawn on the work of the charity Justice, and of Sir Stanley Burnton, to propose a new "Online Solutions Court" for cases of a value under £25,000.

The Online Solutions Court is described as a "radical and important structural change" because "[i]t provides the opportunity to use modern IT to create for the first time a court which will enable civil disputes of modest value and complexity to be justly resolved without the incurring of the disproportionate cost of legal representation".[47]

Perhaps the most important technology underpinning the proposed Online Solutions Court is online triage. In the context of a civil claim, online triage would enable the court to probe the claimant's case by automatically presenting successive questions which are determined by the

[45] Ministry of Justice, 'Transforming Our Justice System', (September 2016), available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/553261/joint-vision-statement.pdf.
[46] See https://www.gov.uk/guidance/hmcts-reform-programme-projects-explained.
[47] Lord Briggs, Civil Courts Structural Review: Interim Report (December 2015), pg. 75.

claimant's answers, so as to convert a convoluted grievance into a legal claim. Online triage would reduce the time-consuming process of returning incomplete forms, and it could be utilised to enable court users to communicate directly with the court about simple claims and replace the complicated procedural rule book.[48]

Online triage is intended to be the first stage in any Online Solutions Court. The second stage is resolution and case management by legally qualified Case Officers, and, the third, determination by judges either online, on the papers, by telephone, by video or in a traditional hearing.

How this will work is yet to be seen. If the triage at the first stage is good enough, it will certainly save parties much of the cost of litigation as they, rather than the lawyers, will do the donkey work of building up their case with the help of the court's software. Achieving this at the first stage will, of course, require assistance to the digitally challenged, and developing that support will also be part of that package. If it is successfully implemented, the Online Solutions Court has the prospect of providing access to justice for people and small businesses who simply do not have the resources to bring an action in the traditional manner.

For those cases which will still require an oral hearing, we should embrace technologies which render the proceedings more accessible and allow court users to participate more flexibly. For a number of years, the Supreme Court's proceedings have been live streamed. As well as making our work more transparent for the public, video-streaming technology permits those involved in proceedings, whether legal advisors or lay clients, to stay abreast of developments whilst working remotely. In fact, when one of my fellow Justices was taken ill during a recent, multi-day hearing, and was unable to continue to sit in court, he was able to follow the proceedings from home and take part in the determination of the appeal. We now conduct some appeal hearings in the Judicial Committee of the Privy Council by video link with counsel addressing us in London from a room in their home jurisdiction. Perhaps, in future, we might all be contributing remotely to hearings by means of such technology.

But it is clear from what I have said that we are only in the foothills of the needed changes. There is much to be done.

IV. Conclusion

[48] Lord Briggs, 'The Civil Online Court in England' (draft).

The long-term implications of advances in technology for our laws and legal profession are not yet clear. But I am struck by the accelerating pace of change and the prospect that, by the end of this decade, systems which are not even conceivable today will have changed our lives profoundly.[49] King Canute would, I think, have recognised the power of the technological tide.

It will be clear from what I have said that it is probably not practicable to develop the common law through case law to create a suitable legal regime for many of the technological developments we have discussed. It appears to me that the judiciary has neither the constitutional competence nor the resources to do so. The changes which are required are not interstitial law-making, which is the long-recognised task of judges. They will require interdisciplinary policy-making and consultation, which a court cannot perform when resolving individual disputes. Similarly, improvements of access to justice, in which judges have an important role, will have to be a collaborative process.

The Lord Chief Justice's initiative in setting up an AI Advisory Group is very welcome as a means of alerting the judiciary and the court system to the challenges of AI. So too, I hope, are similar steps being taken in Scotland, such as the Crypto-assets Working Group, which I have mentioned. But it is the governments and the legislatures in our countries, assisted by specialists, which must facilitate the needed legislation.

The law will have to adapt to the new technologies and the legal profession embrace them. To do this most effectively there must be dialogue and learning across borders. This will involve governments and government lawyers playing a major role in bringing about need change. For that reason, I am very grateful for this opportunity to address you this evening.

Thank you.

[49] As Richard Susskind notes in *Online Courts and the Future of Justice* (OUP: 2019) at pg. 266.