The Law Society

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forward thinking

– A.I. –

Artificial Intelligence and the Legal Profession

Foreword

The interconnected world in which we live brings with it many positive changes in the way we communicate with our customers, clients and business partners. Providing a fast and efficient service, without compromising quality, often goes hand in hand with finding new methods to deliver this service. More often than not technology forms a key part of the package.

This report provides compelling reasons why AI can bring with it new ways for law firms to do business, simplify how client work is researched, reduce costs and bring the expertise of the legal profession to a wider audience.

Lawtech, the adoption of AI and new technologies has the potential to reduce costs and increase access to those seeking legal advice. However, in order to maximise the benefits, there also needs to be an awareness of the means to mitigate any potential challenges or risks. When implementing new technology into a firm, it is vitally important to understand how this might change the firm's risk profile. Understanding any potential risks associated with AI and adopting new procedures can help to mitigate those risks and allow firms to benefit.

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Artificial Intelligence and the Legal Profession

> **THE CHANGE –** There are rapid developments in Artificial Intelligence (AI) which will have significant implications both for the legal profession and for a number of areas of the law itself.

What is AI?

The term 'Artificial Intelligence' can be applied to computer systems which are intended to replicate human cognitive functions. In particular it includes 'machine learning', where algorithms detect patterns in data, and apply these new patterns to automate certain tasks.

Artificial Intelligence also includes approaches such as Natural Language Processing[1] (the ability to communicate naturally, as in the well-known Turing Test), the core concept of Machine Learning (incremental improvement of algorithmic predictions), and neural networks (systems modelled on the brain's structure). In this document, the term AI is used in its widest sense.

The long-term goals of AI research include reasoning, knowledge, planning, communication, and perception; at present we are some way from achieving these goals in full.

Typically an AI system is provided with a 'training set' of data about the subject and its algorithms then identify relationships within the data. This 'training' can be based on humans correcting machine responses (supervised learning; 'reinforcement learning'), or simply by the system responding to feedback from its environment ('unsupervised learning'). For example the system developed to play the game Go (AlphaGo) was trained on over 30 million moves and was able to come up with moves no Go experts imagined (Knight 2016) when it beat the world champion five games to nil.

How far has it developed?

The term 'Narrow AI' is used for systems designed to achieve a specific goal, such as playing chess or Go, or diagnosing an illness. Current AI systems are of this type.

One of the more advanced AI systems at present is IBM's Watson.[2] This is a question answering computing system that IBM built to apply advanced natural language processing, information retrieval, knowledge representation, automated reasoning, and machine learning technologies. It is being used to develop applications in healthcare, the pharmaceutical industry, publishing, and biotechnology, as a teaching assistant and for weather forecasting. It is also available to third parties to develop their own applications.

One particular application of AI is in 'chatbots', which power virtual assistants like Apple's Siri, Google Assistant or Amazon's Alexa. More sophisticated chatbots use natural language processing. Examples include an AI-powered chatbot doctor, Melody, developed by Chinese search giant Baidu (Gellego 2016). The bot asks patients their symptoms, which are compared with all the previous medical knowledge Melody has stored. After that, the symptoms and a range of possible diagnoses are sent to the doctor,

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1 Natural language processing (NLP) is based on neural networks which use a large collection of connected simple units called artificial neurons, loosely analogous to axons in a biological brain.

2 www.ibm.com

who will recommend the next steps. Melody has been trained on medical textbooks, records, and messages between actual patients and doctors.

Currently, systems like Siri and IBM's Watson can follow simple spoken or typed commands and answer basic questions, but they cannot hold a conversation and have no real understanding of the words they use – and this highlights the difference between learning and understanding in these systems. Language is difficult, and linked with common sense, but an experimental system at Stanford can understand puns, and another can cope with hyperbole. If it is told that some people had to wait 'forever' for a table in a restaurant, it will automatically decide that the literal meaning is improbable, and the people probably just hung around for a long time and were annoyed (Knight 2016).

Where is it going?

Deloitte recently announced Deloitte Catalyst, a network of companies working to translate the potential of disruptive technologies into practical business solutions for the firm's clients. For example, Ayasdi expects to accelerate the use of its proven artificial intelligence capabilities to address pressing problems of leading financial services and healthcare organisations (Ayasdi 2016).

AI can be used to supplement human intelligence (Yakowicz 2017). Tom Gruber, an AI guru and Siri co-creator, believes that AI technology could be used to enhance human cognition and memory. AI technology would help you store memories and experiences much as computers store data with instant recall.

AI has not completely surpassed human decision-makers yet. The FT reported on hedge fund traders outperforming an AI system by using their 'gut feelings' (FT 2016) but we can expect further developments in that area as a number of companies are raising funding – Sentient Technologies has raised $143m from backers such as Tata Group, Numerai has raised $6m – and leading hedge funds have expressed interest (Bloomberg 2017). Overall, legaltech in 2017 saw $233m (£172m) invested across 61 major deals, edging ahead of 2016 according to an investment report by Tracxn.

A more long-term objective is 'General AI', where human intelligence is mimicked so that any task can be undertaken. This in theory could lead to systems that are more intelligent than humans, a point also known as 'The Singularity'. Some commentators, including Stephen Hawking and Bill Gates, expressed concern that General AI could have potentially dangerous consequences (Observer 2015). However, many influential commentators believe that General AI is some way off, if in fact possible at all (MIT 2011).

The rise of algorithmic marketplaces facilitates the publication and consumption of reusable algorithms, enabling data scientists and machine learning engineers to build and monetise artificial intelligence and machine learning models. One goal is to democratise access to the most advanced artificial intelligence available and avoid a situation where algorithms need to be coded from scratch in every situation, including mass duplication of effort (Chowdhry 2018). Algorithmia is the largest marketplace for algorithms in the world. Currently, the service has over 60,000 developers tapping into a library of over 5,000 algorithms. Many of those algorithms revolve around machine learning.

Advances in AI will come not just from the development of new algorithms and algorithmic combinations but from the increasing power of computers themselves. Computing is moving from serial processing to parallel processing, allowing many more calculations to be performed simultaneously (Smith 2017). Computers exploiting quantum effects[3] should be capable of performing many calculations at once (Nature 2017).

> "What if you could have a memory that was as good as computer memory?"
>
> **Tom Gruber, AI guru and Siri co-creator**

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3   Rather than encode information as bits that can be in one of two states, 0 or 1, quantum computers use 'qubits' that can be in 'superpositions' of both at once.

Overview

Advances in artificial intelligence have made many other developments possible. Horizon Scanning has identified a number of key emerging strands of AI development and use:
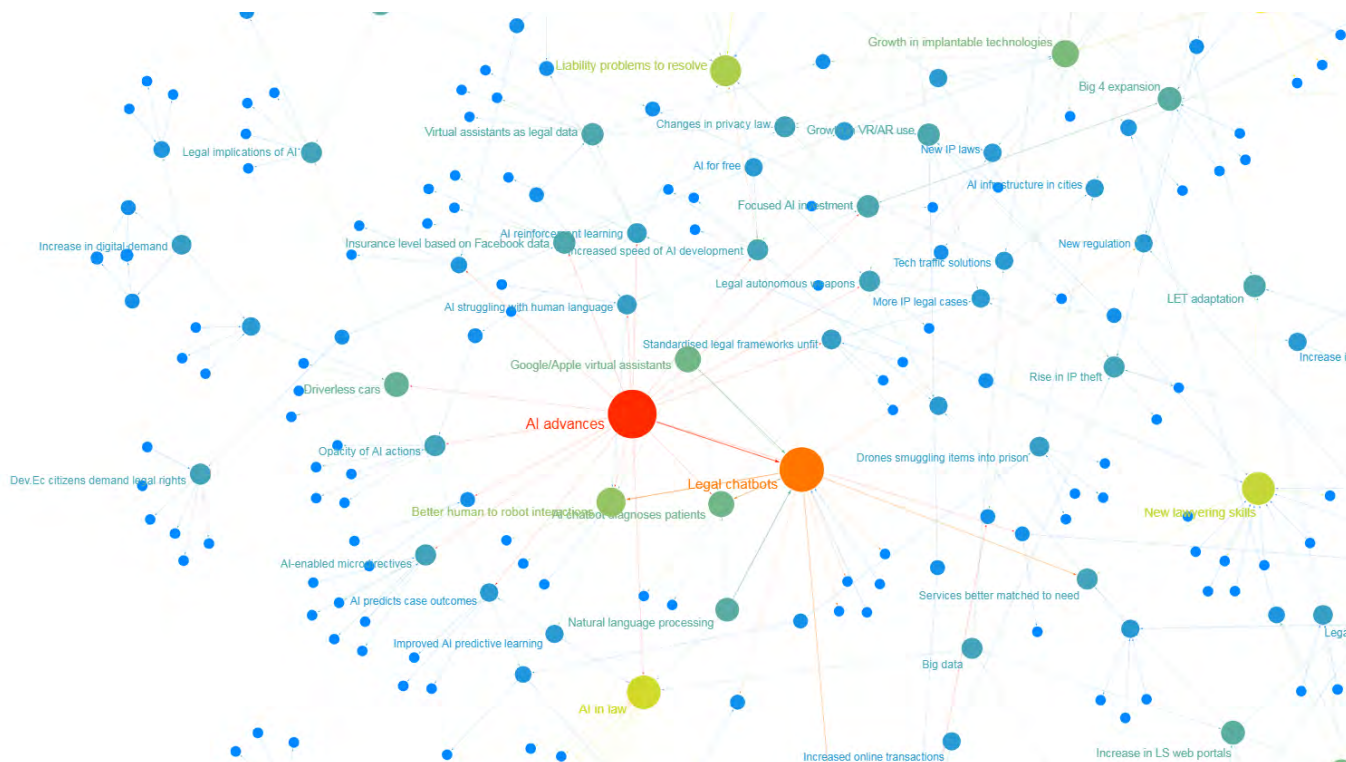
- **Q&A chatbots,** where natural language processing enables the system to respond to user needs, are on the rise. The ability of machines to understand human language and anticipate our needs is leading to an improvement in machine-to-human interactions.

- **Addressing business problems,** currently in areas such as financial services, healthcare and law, by taking on board vast quantities of historical information and drawing conclusions; these may be combined with chatbots for ease of use. These systems may also begin to eat away at the roles that constitute the knowledge value chain in law firms.

- **The exploratory use of AI in legal contexts**, for example: to predict case outcomes; shaping the services needed by lawyers' clients; and raising questions about the state of current regulatory frameworks and legal liabilities in respect of AI systems.

- **Supplementing human intelligence**, enabling a mix of intellectual and emotional/relational responses.

What developments has the scanning identified in the legal profession?

The Law Society report, *Capturing Technological Innovation in Legal Services* (Chittenden 2017) included a section on AI. This described several AI systems under development and gaining traction, such as Kira, and which are now becoming more well-established following test uses and adoption by law firms.

Areas of applications identified include:

- **Document analysis:** Slaughter and May and the University of Cambridge produced a system called Luminance to transform document analysis. Luminance enhances the entire transaction process for law firms and their clients by modelling how solicitors think to draw out key findings without the need to be told what to look for (FT 2017). The system, backed by Mike Lynch, former CEO of Autonomy, won the 'Best AI product in Legal' at the inaugural CogX AI Innovation Awards in June, and is currently deployed by 26 organisations in 12 countries (Luminance 2017). Subsequent development has seen Luminance expand beyond Due Diligence into real estate documentation and, most recently, to cover areas such as the impact of Brexit on contracts and GDPR compliance (artificiallawyer 2018).

- **Contract intelligence:** ThoughtRiver is contract intelligence software for the legal sector which uses machine learning to scan contracts and other legal documents and presents the information in an online dashboard which allows users to visualise risk. ThoughtRiver Review mimics traditional legal assessment enabling users to apply risk policies based on the contractual position, the wording used and the context in which it appears. The software is underpinned by the Fathom Contextual Interpretation Engine™, developed with senior natural language processing and machine learning experts at Cambridge University. Fathom lets users know the meaning of clauses, and how that meaning sits within the user's own context, enabling valuable, nuanced insights into contractual risks and concerns, quickly and cost-effectively across one or thousands of documents. ThoughtRiver has also launched a GDPR compliance analysis tool in addition to its existing contract analysis software.

- **Document delivery:** Australian company LawPath released a chatbot for clients looking for customised legal privacy solutions. 'Lexi' is a privacy policy bot and an experiment in the automated delivery of legal documents. The conversational instant-messaging interface is able to provide consumers with privacy law information and generate a real-time compliance policy specific to a client's needs (Coade 2016).

- **Legal adviser support:** US law firm BakerHostetler is using a company called ROSS which builds on IBM's Watson to develop a legal adviser (ROSS Intelligence 2016). Lawyers ask ROSS their research question in natural language, as they would a person, then ROSS reviews the relevant law stored in its system, gathers evidence, draws inferences and returns highly relevant, evidence-based candidate answers. ROSS also monitors the law around the clock to notify users of new court decisions that can affect a case. The programme continually learns from the lawyers who use it to bring back better results each time.

- **Clinical negligence analysis:** Fletchers, the largest UK medical negligence law firm, has teamed up with the University of Liverpool with the aim of creating a clinical negligence 'robot lawyer' – in practice, a decision support system which reviews similar previous cases. The project has the support of a £225,000 grant from government-backed funder Innovate UK (Connelly 2016a).

- **Case outcome prediction:** Researchers at University College London, the University of Sheffield and the University of Pennsylvania applied an AI algorithm to the judicial decisions of 584 cases that went through the European Court of Human Rights and found patterns in the text. Having learned from these cases, the algorithm was able to predict the outcome of other cases with 79% accuracy. It found that rather than legal argument being predictive of case outcomes, the most reliable factors were non-legal elements: language used, topics covered and circumstances mentioned in the case text (Boran 2016). Yet, this approach is heavily reliant on the quality of the data collected and analysed – as in the old adage 'Garbage-in-Garbage-out'.

- **Public legal education:** The University of Cambridge worked on LawBot, with the aim of helping ordinary people understand the legally complex problems associated with 26 major criminal offences in English and Welsh law, and to decide which available legal actions to pursue with a qualified solicitor (Connelly 2016). More recently, this project has focused on divorce law (DivorceBot), a potentially more well-defined area to tackle (Connelly 2017).

Some of these innovations and experiments are still in their early phases, so scepticism about their effectiveness may still be warranted. However, the fact that AI Innovation Awards are now emerging suggests that verifiable progress is being made. Furlong suggests that 'we're going to see the adoption of AI in the legal market, more broadly speaking, rather than in the legal profession for quite some time to come', with the lead taken by large corporate clients, major consumer law start-ups and stealth competitors to law firms (Queens University 2018).

What are the likely implications in the legal profession?

These developments suggest that there will be many opportunities for the application of AI in the legal profession that could have far-reaching implications. The most likely implications are:

- An impact on the number of legal jobs, initially at lower grades of staff

- Change in the nature of legal jobs, emphasising those skills that humans particularly excel at; and consequent changes in Legal Education and Training (LET)

- Changing organisational structures and business models

- Lower costs and changing fee structures.

Impact on legal jobs

At a recent strategy workshop, with representatives from Government, IT, energy and other sectors, AI was identified as one of the top ten drivers of change over the next 10-15 years (SAMI July 2016). Along with other technological developments – such as immersive communications like virtual reality and augmented reality – political, social and economic drivers will combine to produce a 'Fourth Industrial Revolution' with major impacts on society:

- The decline of traditional employment, and the rise of alternatives – self-employment, sessional employment, and the 'gig' economy

- Growing inequality, with more wealth accumulating in the top percentiles of earnings distribution, and downward pressure on the middle percentiles – possibly leading to...

- Greater social instability/loss of social cohesion

- The difficulty of raising taxes to fund traditional government activities in a global knowledge economy, working against the desire of governments to manage transition in order to maintain social cohesion.

A more detailed and widely reviewed study by Frey & Osborne (2016) of the Oxford Martin School suggests that 47% of UK employment will be significantly affected over the next two decades. According to the OECD, the figure will be 'only' 10% – that is still a lot of employment. A significant challenge to this analysis, however, was that it ignored new jobs created by new technology, an effect we have seen with previous technological advances.

Boston Consulting Group and Bucerius (2016) suggest that individuals performing low-skilled, standardised legal work are the most likely to be made obsolete by technology that leverages law-related decision trees and intelligent search algorithms. The result will be fewer human legal roles overall and fewer generalist roles in particular, with new roles emerging such as legal process managers and legal technicians.

In their book, *The Future of the Professions* (2015), Susskind and Susskind predict that, over decades, there will be technological unemployment in the professions – i.e. there will not be sufficient growth in the types of professional tasks in which people, not machines, have the advantage, to keep most professionals in full employment. While the Susskinds consider a range of developments in technology – exponential growth, increasingly pervasive devices and increasingly connected humans as well as AI – they assert that developments of AI systems in the 2020s are likely to have significant impacts on the professions. They argue that, for the professions, knowledge is fundamentally what is on offer and AI provides new ways of producing knowledge and making it available in society – ways which may not require professionals. Successful developments of AI[4], coupled with intrinsic qualities of knowledge which make its exclusive ownership difficult, will, in the Susskinds' view, expedite the rise of systems used to assist human experts or replace them in carrying out professional tasks.

These views are both supported and challenged. Pistone and Horn (2016) suggest that business model innovations will support technological advances across the whole network of entities involved in provision of legal services (law schools, firms, prosecutors, defenders, court systems and regulators). They say that impacts will be most pronounced in demand for entry-level solicitors – but then where will the senior solicitors of the future come from?

Burnett (2016) also argues that the introduction of AI means that fewer people will be required to do lower skilled, transactional work leading to a smaller base at the bottom. Solicitors will no longer be gaining skills and judgment by working their way up through the ranks. How will they gain these skills? How will leaders of the future be developed? How can the experience and judgment of senior people (which is needed to train AI systems) be captured before they retire?
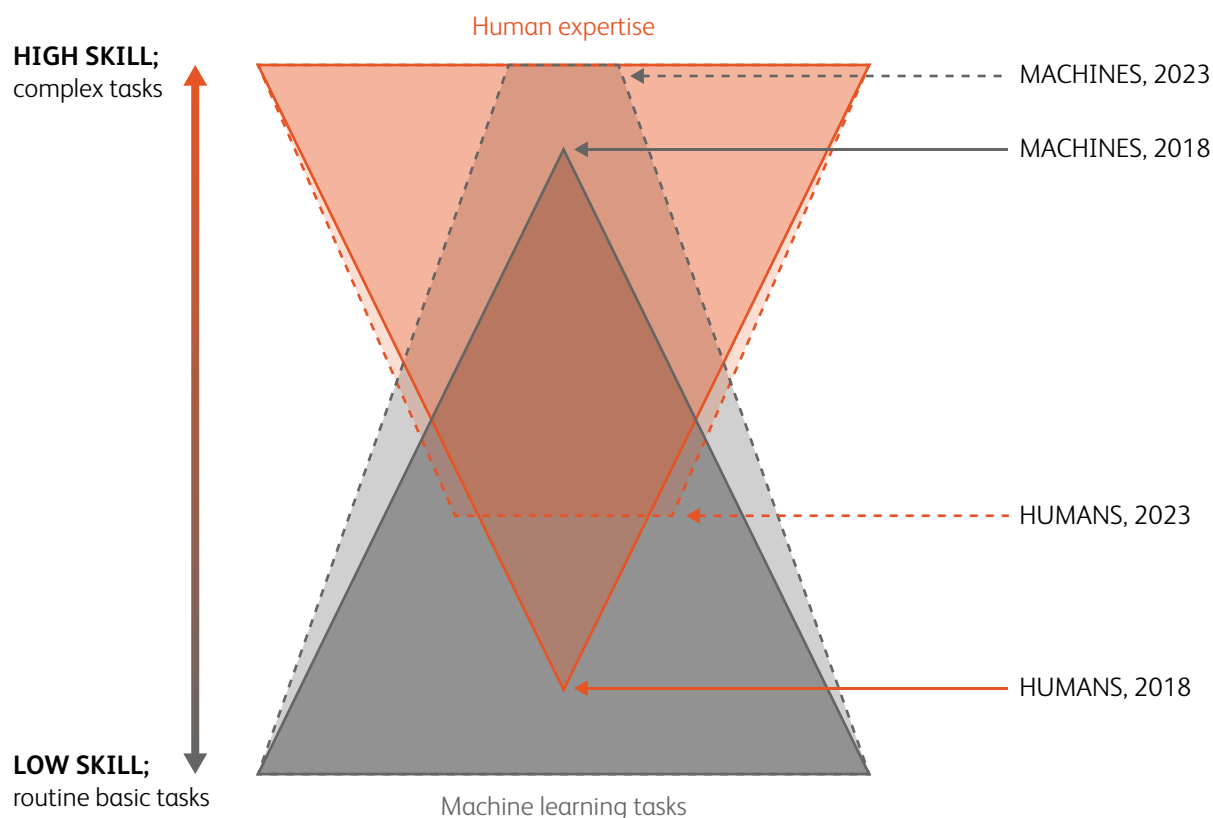
Systems such as IBM Watson assisting junior lawyers means that, for Janet Fuhrer, President of the Canadian Bar Association, 'a junior lawyer will have access to a 25-year-plus archive of experience and legal knowledge, but a 25-year-experienced lawyer may not have access to the technology that the younger lawyer is using' (Queens University 2018). Furlong suggests that new lawyers coming into the profession need to know three things (i) what is happening in the legal marketplace; (ii) what kind of skills, attributes and knowledge are needed; and (iii) how to assimilate into the market/profession. For him, the current change and growing use of technology presents 'real potential to open up an entirely new approach to how we train lawyers, how we segue lawyers into the legal profession and the legal market and how we establish 'initial professional competence' (Queens University 2018)

At the moment human expertise dominates at high skill complex tasks, whilst machines lead on low skill, routine tasks. Over the next five years we will see fewer humans involved in routine and automated work, whilst advances in machine intelligence will see more machines capable of executing complex reasoning and decision-making tasks.

In a collection of blogs called 'Legal Mosaic', Cohen (2016) distinguishes between the practice of law and the delivery of law, arguing that the technology has profoundly changed the delivery of legal services. Across the board, this means that 'just being a solicitor doesn't cut it anymore'. Further, for young solicitors to be market ready they will need a new set of skills including e-discovery, contract management, IP, cyber security and project management.

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4   Specifically, using Big Data and providing systems that can perform tasks that would normally require human intelligence, robotics (machines with manual dexterity and skills) and affective computing which would enable machines to detect and express emotion.

Human expertise

HIGH SKILL;
complex tasks

MACHINES, 2023

MACHINES, 2018

HUMANS, 2023

HUMANS, 2018

LOW SKILL;
routine basic tasks

Machine learning tasks

On the other hand, US Professor Dana Remus (University of North Carolina law school) and Professor Frank Levy (Massachusetts Institute of Technology's department of urban studies and planning) argue that technology is changing rather than replacing the work of lawyers (Remus and Levy 2016). Examining the potential for current or near-term automation on six categories of lawyering tasks and potential employment effects by mapping automation against data on these tasks, they conclude that only relatively structured and repetitive tasks can currently be automated. According to the data used, these represent a modest proportion of lawyers' billable hours. In the final analysis, because law firms had 'a well-established reputation for slow technology adoption', the authors estimated that 'employment loss... would indicate that demand for lawyers' hours is decreasing by 2.5% per year'.

An important consideration is that Remus and Levy's analysis is based on current tasks and current AI capabilities, whereas the futures imagined by the Susskinds is based on anticipating future developments in AI. However, an issue addressed by Remus and Levy, and avoided by the Susskinds, is the impact of AI on matters of professional values as well as the Rule of Law as a public good.

Impact on types of work

The application of AI both within the profession and also in clients' organisations is likely to change the types of work the legal profession carries out.

In 2018, a LawGeex study, conducted in collaboration with Duke and Stanford Law Schools, pitted AI against 20 top U.S. trained lawyers with decades of experience specifically in reviewing non-disclosure agreements (NDAs). The legal AI system took 26 seconds to complete the review. Human lawyers took an average of over 92 minutes. The AI system achieved a 94% accuracy rate at surfacing risks, while the experienced human lawyers averaged 85% accuracy for the same task (Jia 2018). As well as reducing the more routine document analysis and review tasks, AI will be used by clients themselves to reduce complexity and ambiguity – which are two important reasons for consulting lawyers. For example a 'smart land registry' could run all the searches automatically, and combined with an autonomous home-inspector drone produce a conclusive and unambiguous report of the state of the title and physical property (Yunusov 2016).

Today's Artificial Intelligence (AI) lacks our general intelligence; nevertheless, some areas in which lawyers should expect to see an increasing number of tech-triggered legal problems are insurance, mortgages, data protection, IP, criminal sentencing, privacy, surveillance, medical diagnosis, AI created contracts, currency/banking and legal research. Additionally, robots powered by AI (e.g. self-driving vehicles, robot surgeons, factory workers, drones) will bring growing legal challenges around liability, ethics and accountability – including difficulties such as how to cross examine an algorithm? In machine learning based systems, finding out what the system was 'thinking' at the time of an accident or error is a highly specialised task, and will require new approaches and types of expert witness.

Whilst some routine jobs may go, other new jobs will emerge. Issues of liability around AI systems could actually increase the need for legal support. Law firms will need far more tech-minded entrants implementing and monitoring new AI systems.

As always, but perhaps ever more so, solicitors will need to understand the changing face of business and markets and help their clients to understand, articulate and mitigate the risks.

Impact on Skills and LET

This area is so important, with AI impacts linked to several other drivers, that we have written a separate paper on the subject. Four key themes indicate the nature of the issue:

- **The Millennial workforce:** A generational shift is taking shape as the concept of looking for the single career ladder or career trajectory gives way to the 'career experience'. According to the Pew Research Centre, Millennials now make up more than half of the workforce. This generation expect a mobile working environment, are fuelling the new 'freelance economy' and will, on average, spend no longer than 16 months with an employer. This 'loyalty challenge' is driven by expectations for a rewarding, purposeful work experience, constant learning and development opportunities and dynamic career progression (Deloitte 2016 Global Millennial Survey).

- **Cross-discipline 'Flash teams':** A new breed of talent is emerging that finds professionals with cross-functional skill sets who can work across the digital spectrum of multiple industries. Regardless of job title, organisations are building flexible, insightful teams that can jump in at any point from conception to execution. Deliberately designed, small and flexible teams will become the predominant approach toward fluctuating workloads, shrinking timeframes and intense flurries of information exchange and coordination (fuelled also by the growing freelance economy). Teams will form, converge, act and dismantle as work changes. By 2028 team-working will be a legitimate organisational principle, driven and managed by algorithms (Walker 2017).

- **Digital world skills:** The OECD's review of 'Skills for a Digital World' (OECD 2016) highlights the need not just for improved ICT skills but for numeracy and socio-emotional skills too; organisations/ employers will be challenged to adopt new mindsets and rethink what skills are critical to their workforce and what 'learning' and 'development' mean in the context of their business. Digital disruption and social networking have also changed the ways in which organisations hire, manage and support people.

- **Legal Education curricula:** Pistone and Horn (2016) argue that AI and other changes are creating a crisis for law schools in the U.S. context. With regulatory changes to legal education and training in England and Wales, the pressure is likely to be greater. Deloitte's *Brawn to Brains* Report (2016) notes that in the future businesses will need more skills that include digital know-how, management capability, creativity, entrepreneurship and complex problem-solving. Characteristics such as an entrepreneurial spirit, curiosity, creativity and strategic thinking skills could assume far more significance in the education and recruitment of future lawyers.

The Law Practice Program offered by Ryerson University covers innovation, business plans, how to practice and use technology in practice. Increasingly we will see legal education focus on skills such as critical cross-industry problem-solving, flexibility, entrepreneurship and the ability to excel at contract-based and project-based challenges.

Impact on organisational structure and strategic planning

If entry level jobs decline, there will be a change to the organisational structure of law firms. Recruitment will fall, but succession planning will become ever more important. New or enhanced skills, for example in client management, will be needed across the organisation. If AI becomes part of the general IT function, its increased importance may transform the power structure of the organisation so that the Head of IT could become a much more important role. Conversely, if technology decisions become more embedded across the organisation and sit within the remit of senior partners and/or innovation roles, the importance of the Head of IT role could diminish.

Accenture undertook research with 35 senior executives responsible for digital transformation at their organisations and found that nearly two thirds believe that the ubiquity of suggestion tools and inference engines will open the doors to the more active use of intelligent machines for strategy and decision-making (Thomas, Fuchs and Silverstone 2016: 4). Thomas et al. also suggest that, in the not too distant future, machines will look for openings in the market – differences that signal growth opportunities – in much the same way that automated trading does now. They will also be trained to look for parallels in adjacent markets.

> *'Organisations will soon be training computers to think systematically – to look both upstream and downstream to determine the potential consequences of management decisions... leverage historical data to help executives avoid repeating mistakes... search out parallel situations in other organisations and even other industries in order to identify any unanticipated consequences of a proposed strategy'*
>
> **(Thomas, Fuchs and Silverstone 2016: 4).**

For GCs, law firm owners and senior decision makers, the benefits from intelligent machines include ability to:

Expose the long-term implications of short-term decisions

Use machine intelligence to enhance systemic thinking and to help build a complex picture of the ways in which seemingly distinct entities (eg economic, ecological, political systems) can interact to produce positive or negative implications for the business over the longer term.

Experiment to uncover new sources of value

Machine intelligence can structure experiments and trial situations at low cost and high speed. This enables decision-makers to consider a much broader range of alternative actions, over different time periods, without subjecting the business to unnecessary risk – including entry into new markets and services.

Augment human judgment

Machine intelligence can help to optimise human judgment. The capacity to run countless 'what if' experiments can help decision-makers to better test and fine-tune their human judgment in identifying and resolving various cultural, moral and ethical issues for different scenarios in the business' future.

Findings from the 2017 Accenture Technology Strategy survey found that nearly 50% of respondents think that AI deployment will spur a change in their business models, whilst 53% indicate AI will enable them to exploit new market opportunities (Brashear, Shacklady and Sinclair 2017).

Lower costs, changing fee structures

For many, the main objective of replacing tasks or people with technology is to reduce costs.

A Slaughter and May pilot (Connelly 2016b) aimed to free up highly-trained solicitors who would otherwise be scanning through thousands of pages of repetitive documents so that they could spend more of their time analysing the findings and negotiating the terms of the deal.

Clifford Chance is aiming to alleviate the time spent on traditional due diligence methods, as clients are under substantial pressure to reduce legal spend whilst needing more support to manage the increasing risks and complex issues that their companies are facing (Connelly 2016c).

Firms may also look to maintain their fee level by focussing on more added value activities within their offerings. What will remain important is the ability to view a client's needs in a holistic way and devise appropriate solutions to wider business needs.

Lower costs could open up demand from those who previously could not afford legal advice, thereby increasing the size of the market. Although there is little evidence of this so far, as only a few high-end companies are operating such systems, over a 5 to 10 year horizon this could begin to become evident. There are quality assurance issues to be addressed in such an event.

What legal concerns do AI systems raise?

This section considers legal issues arising from the increased use of AI systems in society generally.

Transparency

A basic principle of justice is transparency – the requirement to explain and justify the reasons for a decision. This applies across almost all fields of decision-making, both in the public sphere and within organisations.

Several commentators have highlighted the challenges of this principle in the application of AI systems where, as we saw with AlphaGo, even the system's designers may not be able to explain its actions.

As AI algorithms grow more advanced, it becomes more difficult to make sense of their inner workings. Moreover, as these systems are self-organising they are inherently without external guidance. Although AI systems may well be much better at decision-making than humans (e.g. autonomous cars almost certainly will reduce the number of accidents in the long term), in the near-term, the power of AI is to 'nudge' human thinking, rather than make decisions.

In making decisions about what to include or exclude in an output, algorithms usually have to go through a step which prioritises information. 'Algorithmic bias' is as real a threat as human bias (Buolamwini 2016). The data an AI system is 'trained' on may well include systemic bias, so that the outcome could in effect be racial profiling, and entrenching 'white male' bias. There are at present no universal professional standards for data science. This raises the need to create such standards against which individuals adhere in order to build confidence in the use of algorithmic systems – and especially in legal contexts. As AI becomes more pervasive within law firms and legal departments, a foundation with strong guidelines for ethical use, transparency, privacy, cross-department sharing and more becomes crucial.

Even more challenging is balancing the impacts in the short-term with the long-term. Is the system's objective to benefit the present generation or to promote a time-

neutral aggregate of well-being of future generations? (Bostrom 2017).

The Institute of Electrical and Electronic Engineers (IEEE) addressed the issue of 'Accountability and verifiability in AI systems' (IEEE 2016) with the natural presumption that AI systems should fully comply with the law. But this raises many challenges, around governance and liability, societal impact, and the need for a 'human in the loop'. They sought for AI systems to explain themselves, identify uncertainty and an appeal process.

Ethics

The role of ethics in the conduct of electronic interactions between people, businesses and 'things' raises challenges around the moral implications or unintended consequences that result from the coming together of technology and humans. Big data, cloud and autonomous systems provoke questions around security, privacy and fundamental freedoms, whilst AI and social media challenge us to define how we value work and each other.

Importantly, global distribution of data centres, data sources and intelligent systems means there is limited control of the data or intentions outside our borders. The ethics of AI and data uses remains a high concern and key topic for debate, but such debates should be tempered by the acknowledgment of constraints to act on systems, corporations and practices based globally or legally outside English and Welsh control.

More generally, there are debates to be had about the ethics of AI systems (Bostrom 2017) which are perhaps more systemic and urgent than those in other fields such as medicine:

- Is society content with AI that kills? Military applications are inevitable, including lethal autonomous weapons, which might incite new arms races, or lower the threshold for nations to go to war, or give terrorists and assassins new tools for violence – but again how much influence can we have on regimes and systems beyond our borders?

- AI techniques could be used to launch cyber attacks

- Facial recognition, sentiment analysis, and data mining algorithms could be used to discriminate against disfavoured groups, or invade people's privacy, or enable oppressive regimes to more effectively target political dissidents.

The law itself may need to change to deal with these issues. The House of Commons Science and Technology Committee (2016) has already recognised the issue: 'While it is too soon to set down sector-wide regulations for this nascent field, it is vital that careful scrutiny of the ethical, legal and societal dimensions of artificially intelligent systems begins now.'

Even proponents of AI, such as Elon Musk's OpenAI group, recognise the need to police AI that could be used for 'nefarious' means (Metz 2016).

It may be necessary to develop AI systems that disobey human orders, subject to some higher-order principles of safety and protection of life (Briggs & Scheutz 2017). Developing the principles for such actions is a huge challenge.

Remus and Levy (2016) were also concerned that the core values of legal professionalism meant that it might not always be desirable, even if feasible, to replace humans with computers because of the different way they perform the task. This assertion raises questions about what the core values of the legal profession are and what they should or could be in the future. What is the core value of a solicitor beyond reserved activities? And should we define the limit of what being a solicitor or lawyer is?

Liability

Should AI developers be liable for damage caused by their product? In most other fields, product liability is an established principle. But if the product is performing in ways no-one could have predicted, is it still reasonable to assign blame to the developer (Lea 2017)? AI systems are likely to interact with other systems/sensors in an Internet of Things, so assigning liability becomes difficult. They are also fundamentally reliant on the data they were trained on, so liability may be seen to lie there; equally there are risks of AI systems that are vulnerable to hacking.

An EU committee was particularly concerned about liability issues (European Parliament 2016) suggesting legal responsibility of a robot's or AI system's harmful action was becoming a crucial issue. They argued that 'traditional rules will not suffice' as it was not possible to identify the party responsible. The same system exposed to different learning experiences may well act differently. One idea is to apply a levy and have a no fault compensation agreement – based on the idea that one would spend more on a court case to determine liability than on the levy.

Electronic personhood

There is an important gulf between AI that works as an accurate proxy of human intelligence and AI that behaves like a human being. Many concerns around AI taking on more complex and cognitive roles are based on the assumption that any entity with intelligence will have the same kind of ambitions as humans. But we should not assume that an advanced version of AI will become or want to become a person. The dynamics of trust between people and machines are not yet well-understood.

Far enough into the future, will AI/robots be sufficiently advanced to deserve 'personhood'? The EU committee referred to above argued that this was the way forward. (European Parliament 2016). Rights and responsibilities should be defined, analogous to corporate personhood, which allows firms to take part in legal cases both as the plaintiff and respondent. Note the committee made it clear that this was not about giving robots rights, but a legal fiction intended to make applying current laws easier. This is potentially a massive disruption to social and economic norms.

However, the Common Law approach allows judges to evolve the law and, for some, it is an overreach to call for new laws when existing ones can be applied in, or transitioned to, new contexts. Equally, the extent of personhood may be limited by the fact that (for now at least) a machine has no vested interest in its decisions and does not feel anguish over those decisions.

Public acceptance

AI limitations are currently the social aspects. The reason AI fails so often is socio-technical – a misunderstanding of how humans interact with technology. The role of designers is to figure out how to build collaborative relationships between people and machines that help smart systems enhance human creativity and agency rather than simply replacing them. The systems must be able to adapt to ever-changing factors and new information and weigh complex and ambiguous situations the way we humans do. That is how human users will learn to trust system recommendations and come to rely on them as partners in solving complex problems.

Algorithms share many features with previous technological innovations mired in controversy. Just like the introduction of genetically modified crops, vaccines and nuclear power in previous decades, the use of algorithmic decision making has broad social implications, combined with a lack of transparency, accountability and choice. NESTA (2017) predicts that public disquiet about the decisions that algorithms make, the way they affect us, and the lack of debate around their introduction, will become mainstream. Yet AI just needs to be better than humans to bring value to certain tasks or thought processes; it is misguided to assume these systems must either be perfect or they are useless.

Conclusions

Over the next few years there can be little doubt that AI will begin to have a noticeable impact on the legal profession. Law firms and in-house legal departments have opportunities to explore and challenges to address, but it is clear there will be change.

There are also difficult ethical questions for society to decide, for which the Law Society may be in a unique position to lead debate.

Questions for members to consider:

- Are individuals prepared to let data drive decision outcomes?

- Do individuals trust the data and the insights their systems generate? (especially when those insights conflict with long-held assumptions?)

- Have leaders identified the talent/skills needed to realise the business benefits from machine intelligence (data science; statistical reasoning; systems thinking etc)?

- Are managers receiving relevant training to prepare for intelligent machines?

- Are departments willing to share data openly so that all options are evaluated seriously (resource allocation)?

- Are senior management open to being observed and critiqued by intelligent systems in their decisions/decision-making?
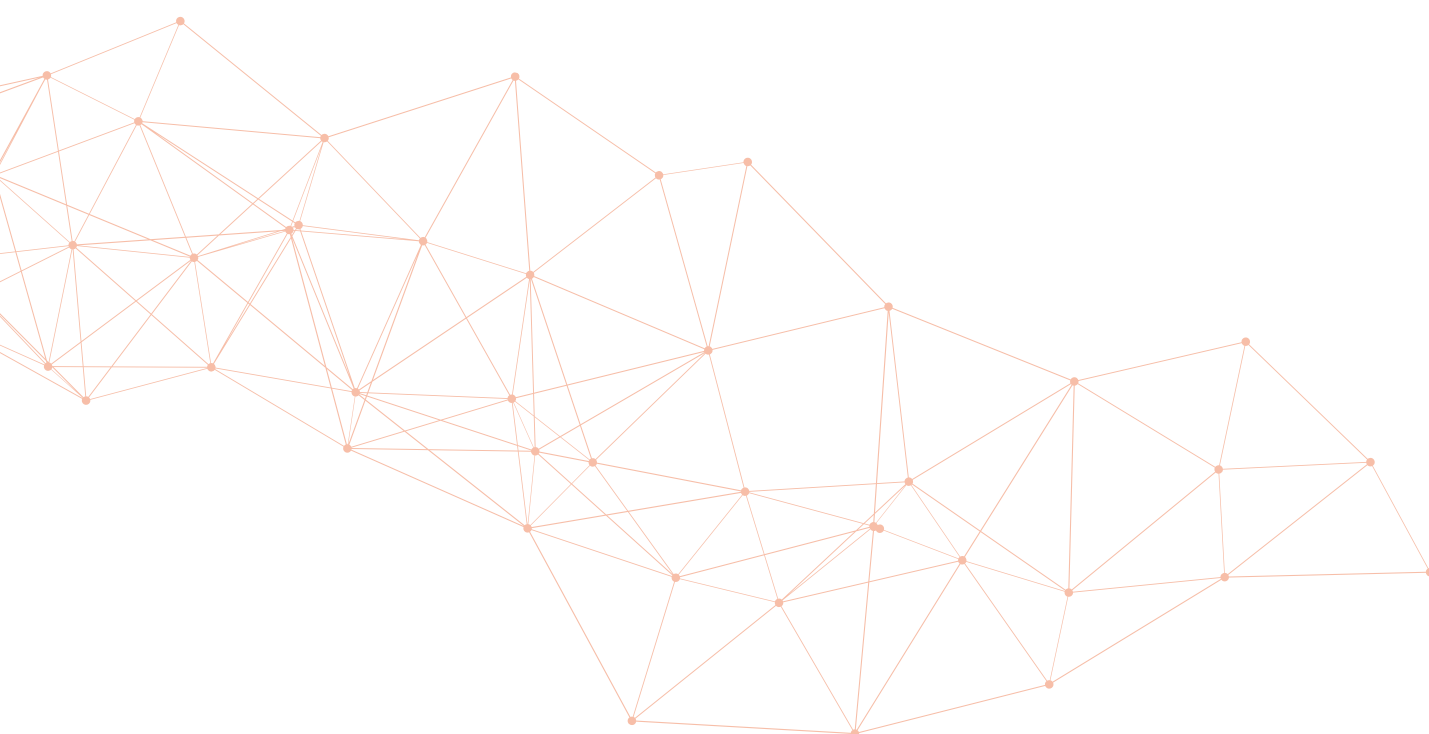
References

Allen, Paul (2011), *'The Singularity Isn't Near'.* MIT Technology Review.
Retrieved from: **https://www.technologyreview.com/s/425733/paul-allen-the-singularity-isnt-near/**

Artificiallawyer (2018) *'Legal AI Co. Luminance Now Targets Reg Review, Brexit + GDPR'* May 3, 2018. Retrieved from: **www.artificiallawyer.com/2018/05/03/legal-ai-co-luminance-now-targets-reg-review-brexit-gdpr/**

Ayasdi (2016), *'Ayasdi Teams with Deloitte to bring Artificial Intelligence to Financial Services and Healthcare Organizations'.* Retrieved from: **http://www.prnewswire.com/news-releases/ayasdi-teams-with-deloitte-to-bring-artificial-intelligence-to-financial-services-and-healthcare-organizations-300351135.html**

Boran, Marie (2016), *'Artificial Intelligence judges court cases with 79% accuracy'.* Irish Times. Retrieved from: **http://www.irishtimes.com/business/technology/artificial-intelligence-judges-court-cases-with-79-accuracy-1.2842492**

Boston Consulting Group and Bucerius (2016), *How Legal Technology Will Change the Business of Law.* **http://www.bcg.de/documents/file204646.pdf**

Bostrom, Nick (2017), *'Strategic Implications of Openness in AI Development'.*
Retrieved from: **http://www.nickbostrom.com/papers/openness.pdf**

Brashear, J., Shacklady, J. and Sinclair, A. (2017) *The New New Normal: Exponential Growth Powered by AI.* Accenture Strategy. Retrieved from: **https://www.accenture.com/t20171109T103502Z__w__/us-en/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Strategy_8/Accenture-Strategy-AI-Exponential-Growth.pdf**

Brescia, Raymond (2016), *'Law and Social Innovation: Lawyering in the Conceptual Age'.* Albany Law Review, vol.80. Retrieved from: **https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2828107**

Briggs, Gordon & Scheutz, Matthias (2017), *'The case for robot disobedience'*, Scientific American, 316, pp. 44-47.

Buolamwini, Joy (2016), *'The Algorithmic Justice League'*. Retrieved from: **https://medium.com/mit-media-lab/the-algorithmic-justice-league-3cc4131c5148#.iw1k6r9qx**

Burnett, Sarah(2016), *'Legally AI – Disruption in legal services and beyond'.* Retrieved from: **http://www.professionaloutsourcingmagazine.net/insight/legally-ai-disruption-in-legal-services-and-beyond**

Casey, Anthony & Niblett, Anthony (2016), *'Self-Driving Laws'.*
Retrieved from: **http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2804674**

Castelvecchi, David (2017), *'Quantum computers ready to leap out of the lab in 2017'.* Nature. Retrieved from: **http://www.nature.com/news/quantum-computers-ready-to-leap-out-of-the-lab-in-2017-1.21239**

Chittenden, Tara (2017), *Capturing Technological Innovation in Legal Services* (section 2.4). The Law Society.

Chowdhry, A. (2018) *'How Algorithmia Built The Largest Marketplace For Algorithms In The World'* Forbes, January 2018. Retrieved from: **https://www.forbes.com/sites/amitchowdhry/2018/01/22/how-algorithmia-built-the-largest-marketplace-for-algorithms-in-the-world/#4e72641953fd**

Coade, Melissa (2016), *'Chatbot explores frontiers of legal service'* Lawyers Weekly, July 2016. Retrieved from: **http://www.lawyersweekly.com.au/news/19105-chatbot-explores-frontiers-of-legal-service**

Cohen, Mark (2016), *Essays on Legal Delivery.*
Retrieved from: **http://legalmosaic.com/wp-content/uploads/2016/02/LegalMosaic-final.pdf**

Connelly, Thomas (2017), *'LawBot 2.0: crime-identifying 'robot' created by Cambridge University law students can now help with divorces'.* Legal Cheek, February 24, 2017. Retrieved from: **https://www.legalcheek.com/2017/02/lawbot-2-0-crime-identifying-robot-created-by-cambridge-university-law-students-can-now-help-with-divorces/**

Connelly, Thomas (2016a), *'Law firm teams up with Liverpool Uni in bid to create clinical negligence robot lawyer'.* Legal Cheek, December 7, 2016. Retrieved from: **http://www.legalcheek.com/2016/12/law-firm-teams-up-with-liverpool-uni-in-bid-to-create-clinical-negligence-robot-lawyer/**

Connelly, Thomas (2016b), *'Slaughter and May becomes latest magic circle firm to embrace artificial intelligence'.* Legal Cheek, September 14, 2016. Retrieved from: **http://www.legalcheek.com/2016/09/slaughter-and-may-becomes-latest-magic-circle-firm-to-embrace-artificial-intelligence/**

Connelly, Thomas (2016c), *'Magic circle embraces artificial intelligence'.* Legal Cheek, July 5, 2016.
Retrieved from: **http://www.legalcheek.com/2016/07/magic-circle-embraces-artificial-intelligence/**

Cookson, Clive (2016), *'Man v machine: "Gut feelings" key to financial trading success'.* Financial Times.
Retrieved from: **https://www.ft.com/content/79e8b8fc-7c33-11e6-ae24-f193b105145e** [subscriber content]

Dale, Robert (2016), *'Industry Watch: Return of the Chatbots',* Natural Language Engineering 22(5): 811-817.

Dickson, Ben (2017), *'Artificial Intelligence has to deal with its transparency problems'.* Retrieved from: **https://thenextweb.com/artificial-intelligence/2017/04/23/artificial-intelligence-has-to-deal-with-its-transparency**

Fedor, Lauren (2017), *'Mike Lynch backs AI project to aid M&A lawyers'.* Financial Times.
Retrieved from: **https://www.ft.com/content/de068446-7a57-11e6-ae24-f193b105145e**

Frey, Carl & Osborne, Michael (2017), *'The Future of Employment: How Susceptible are Jobs to Computerisation?'.*
Retrieved from: **http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf**

Gellego, Jellor (2016), *'An AI-Powered Chatbot Is Helping Doctors Diagnose Patients'.*
Retrieved from: **http://futurism.com/an-ai-powered-chatbot-is-helping-doctors-diagnose-patients/**

Hern, Alex (2017), *'Give robots 'personhood' status, EU committee argues'.* The Guardian. Retrieved from: **https://www.theguardian.com/technology/2017/jan/12/give-robots-personhood-status-eu-committee-argues**

House of Commons, Science and Technology Committee (2016), *'Robotics and the Law'.*
Retrieved from: **https://www.publications.parliament.uk/pa/cm201617/cmselect/cmsctech/145/145.pdf**

Institute of Electrical and Electronic Engineers (2016), *'Law'* in: The IEEE Global Initiative for Ethical Considerations in Artificial Intelligence and Autonomous Systems (pp.89-94).
Retrieved from: **http://standards.ieee.org/develop/indconn/ec/ead_law.pdf**

Jia, M. (2018) *'AI could help, not hinder, the success of future legal professionals'* March 20, 2018. Retrieved from: **https://venturebeat.com/2018/03/20/ai-could-help-not-hinder-the-success-of-future-legal-professionals/**

Knight, Will (2016), *'AI's language problem'.* MIT Technology Review.
Retrieved from: **https://www.technologyreview.com/s/602094/ais-language-problem**

Lea, Gary (2017), *'What happens when the robots get it wrong?'*. LexisNexis blogs. Retrieved from:
http://blogs.lexisnexis.co.uk/futureoflaw/2017/03/what-happens-when-the-robots-get-it-wrong/

Luminance (2017), *'Luminance awarded Best AI Product in Legal'.* Press Release.
Retrieved from: **https://www.luminance.com/press/PressRelease_Cogx_june17.html**

Metz, Cade (2016), *'Openai is calling for techie cops to battle code gone rogue'.* WIRED, February 2016.
Retrieved from: **http://www.wired.com/2016/08/openai-calling-techie-cops-battle-code-gone-rogue/**

OECD (2016), *'Skills for a digital world'.*
Retrieved from: **https://www.oecd.org/els/emp/Skills-for-a-Digital-World.pdf**

Pistone, Michele & Horn, Michael (2016), *'Disrupting Law School: How Disruptive Innovation will Revolutionize the Legal World'.* Clayton Christensen Institute for Disruptive Innovation. Retrieved from:
http://www.christenseninstitute.org/wp-content/uploads/2016/03/Disrupting-law-school.pdf

Queens University (2018) *'How will artificial intelligence affect the legal profession in the next decade?'*
Transcript of group discussion. Retrieved from:
https://law.queensu.ca/how-will-artificial-intelligence-affect-legal-profession-next-decade

Remus, Dana & Levy, Frank (2016), *'Can Robots Be Lawyers? Computers, Lawyers, and the Practice of Law'.*
Retrieved from: **https://ssrn.com/abstract=2701092**

ROSS Intelligence (2016), *'ROSS Intelligence announces partnership with BakerHostetler'.*
Retrieved from: **http://www.prnewswire.com/news-releases/ross-intelligence-announces-partnership-with-bakerhostetler-300264039.html**

Sainato, Michael (2015), *'Stephen Hawking, Elon Musk, and Bill Gates Warn About Artificial Intelligence'.* The Observer, August 19, 2015. Retrieved from: **http://observer.com/2015/08/stephen-hawking-elon-musk-and-bill-gates-warn-about-artificial-intelligence/**

SAMI Consulting (July 2016), *'The fourth industrial revolution and the future of work – part 2'.* Retrieved from:
https://samiconsulting.wordpress.com/2016/07/27/the-fourth-industrial-revolution-and-the-future-of-work-part-2/

SAMI Consulting (November 2016), *'Engineering the Future – the IET's Future Festival 50'.* Retrieved from:
https://samiconsulting.wordpress.com/2016/11/16/engineering-the-future-the-iets-future-festival-50/

Satariano, Adam (2017), *'Silicon Valley Hedge Fund Takes On Wall Street With AI Trader'*, Bloomberg. Retrieved from: **https://www.bloomberg.com/news/articles/2017-02-06/silicon-valley-hedge-fund-takes-on-wall-street-with-ai-trader**

Sauer, Gerald (2017), *'A murder case tests Alexa's devotion to your privacy'.* WIRED, February 2017. Retrieved from:
https://www.wired.com/2017/02/murder-case-tests-alexas-devotion-privacy/

Smith, David (2017), *'What's hot in 2017: Technology trends'.* Global Futures and Foresight: Thought Leadership Series. Retrieved from: **http://www.thegff.com/Publisher/File.aspx?ID=185192**

Susskind, R. & Susskind, D. (2015), *The Future of the Professions: How Technology will Transform the Work of Human Experts.* Oxford: Oxford University Press.

Thomas, R., Fuchs, R. and Silverstone, Y. (2016) *A Machine in the C-suite*. Accenture Strategy. Retrieved from: **https://www.accenture.com/t00010101T000000Z__w__/br-pt/_acnmedia/PDF-13/Accenture-Strategy-WotF-Machine-CSuite.pdf**

Usher, Oliver (2017), *'Computer says no: the backlash'.* Retrieved from: **http://www.nesta.org.uk/2017-predictions/computer-says-no-backlash**

Yakowicz, Will (2017), *'Artificial intelligence could one day help you remember everything'.* Retrieved from: **https://www.inc.com/will-yakowicz/tom-gruber-ai-could-improve-human-memory.html**

Yunusov, Pulat (2016), *'Do not fear robot lawyers – fear robot clients',* Legal Futures, posted 20 September 2016. Retrieved from: **www.legalfutures.co.uk/blog/not-fear-robot-lawyers-fear-robot-clients**

The Law Society's Horizon Scanning programme

The Law Society's Research Unit is currently developing a horizon scanning function looking at possible factors that might affect the legal sector (either directly or indirectly) over the next 15 years. The aim of this is to assist members in preparing for future changes that will affect the sector.

If you would like to be involved in our Foresight work, have ideas for emerging issues and/or have feedback on this report, please get in touch with: Dr Tara Chittenden, Law Society Research Unit, **tara.chittenden@lawsociety.org.uk**