REVIEW ESSAY:

TECHNOLOGY AND THE PROFESSIONS: UTOPIAN AND DYSTOPIAN FUTURES

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In the year since its publication there has been widespread praise for *The Future of the Professions: How Technology Will Transform the Work of Human Experts* ('The Future of the Professions') by Richard Susskind and Daniel Susskind.[1] But readers seem to absorb differing lessons from it. The Lord Chief Justice of England and Wales (Lord Thomas of Cwmgiedd) says he has 'had the benefit of the Susskinds' core thesis how to use technology not simply to enable the legal professions to do better what they now do, but to reshape justice for the benefit of the public'.[2] Dan Bindman, however, draws the less sanguine lesson that '[t]he authors predict that "our professions will be dismantled incrementally"', and they had better prepare for this.[3] Philip Evans of the Boston Consulting Group considers that the authors 'demolish each profession's faith in its immutable uniqueness. Instead they trace inexorable and universal forces that will drive disintermediation, deconstruction and disruption'.[4] Richard Susskind captures this ambivalence:

> This book sets out two futures for the professions. Both rest on technology. One is reassuringly familiar. It is a more efficient version of what we have today. The other is transformational – a gradual replacement of professionals by increasingly capable systems.[5]

[1] Richard Susskind and Daniel Susskind, *The Future of the Professions: How Technology Will Transform the Work of Human Experts* (Oxford University Press, 2015). For an impressive selection by the publisher, see Oxford University Press, *The Future of the Professions: Reviews and Awards* <https://global.oup.com/academic/product/the-future-of-the-professions-9780198713395?cc=au& lang=en&#>.

[2] Oxford University Press, above n 1.

[3] Ibid.

[4] Ibid.

[5] Richard Susskind, *Richard's Latest Book: The Future of the Professions* <http://www.susskind.com>.

So this is not a dogmatic book, but one which sets out alternative possible futures.

At least from a lawyer's perspective, this jointly authored book needs to be read in the context of Richard Susskind's solo book from almost a decade earlier, *The End of Lawyers? Rethinking the Nature of Legal Service*[6] (in which he insists the question mark in the title is important), as it shows some increasing pessimism. For readability, I have referred to the authors of both books as 'Susskind', and by abbreviations of their titles.

I   INTRODUCTION – SHARING EXPERTISE, CREATING COMMONS?

To encapsulate the theme of *The Future of the Professions*, Susskind starts from the question '[h]ow do we share practical expertise in society?', and the answer suggested for 'a print-based industrial society' is 'through professions'.[7] However, in the digitally mediated society, which we are now entering, the answer will be different. In that context, Susskind's prediction is: '[i]n the post-professional society, we predict that practical expertise will be available online'.[8] That leads to the key moral question 'who *should* own and control [this] practical expertise'?[9] Susskind's answer is that most would choose a future in which comprehensive computerised professional expertise was held in a commons, accessible without cost. Susskind thinks this Rawlsian e-just society is feasible, but far from inevitable.

This conclusion by Susskind is an optimistic one (at least for the sharing of expertise, if not for traditional professions), about which I ought to be enthusiastic. I agree with much of the analysis that leads to it, but I reach more pessimistic conclusions, including much more dystopian options for the future for most professionals. This article will explain why. Laurence Eastham, in a favourable review of *The Future of the Professions*, says '[i]t was always one of my criticisms of Richard Susskind's work that he did not know enough stupid and venal people'.[10] I have a similar reaction here – Susskind pays insufficient attention to the 'dark side', the specific ways in which technologies can be applied to employ people who consider themselves to be 'professionals' in unsatisfying and exploited working lives, as well as causing their unemployment. There is unlikely to be a shortage of people eager to exploit those who are the junior or less secure members of any profession.

6　　Richard Susskind, *The End of Lawyers? Rethinking the Nature of Legal Service* (Oxford University Press, revised ed, 2010) ('The End of Lawyers').

7　　Susskind and Susskind, *The Future of the Professions*, above n 1, 270 (emphasis altered).

8　　Ibid 303.

9　　Ibid 304 (emphasis added).

10　Laurence Eastham, *Book Review: The Future of the Professions* (16 October 2015), Society for Computers and Law <http://www.scl.org/site.aspx?i=ed44393>.

A A Focus on Part of the Professions

Professions are very broad categories. Although elusive to define, they share characteristics of: degrees of autonomy from the state in their regulation; professions of service of the public interest; shared knowledge and training, which is supposed to result in the application of experienced judgment (the focus of this article); professional ethics and codes which are often serious; and many restrictive practices.[11] Susskind stresses that 'above all [professionals] have technical knowledge of their disciplines that lay people do not have in their heads or at their fingertips', and also that they have 'the ability and the wherewithal to apply this knowledge' to the problems of those who their profession serves.[12] A key aspect of Susskind's approach is the belief that '[i]t is the role of professionals to curate the knowledge over which they have mastery, on behalf of their professions and the recipients of their services'.[13] This leads to the central and unexpected role that the creation of commons has in their analysis of the effect of technology on professions.

Professions include as their members many of the wealthiest and most powerful people in our society, whose conditions of professional work are unlikely to be much affected by what is discussed here. However, the majority of members of professions are not wealthy, do not earn high salaries, and have little control over what types of 'professional' work they are required to do. They may have periods of unemployment or be new entrants and vulnerable for that reason. Both this article and significant parts of Susskind's book consider whether technological change may have benign effects on their lives. But more attention should be paid to the possible ill effects and that is the focus of this review.

Like Richard Susskind, I have been involved since the mid-1980s in the issues around methods of incorporating legal information and expertise in 'legal information systems'. In the pre-WWW decade from 1984, my preoccupation was 'AI and Law' or 'legal expert systems', both in the academic development of theoretical models, and as a very small-scale entrepreneur in a business (DataLex) which built and successfully sold legal expert systems on copyright and privacy law.[14] Since 1995, I have been more focussed on the Internet distribution of free access to legal information of many types, as a co-founder of the Australasian Legal Information Institute ('AustLII').[15] This experience in the differences and difficulties involved in attempting to create usable legal information systems involving many types of information and expertise, is the

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11   Justine Rogers, Dimity Kingsford Smith and John Chellew, 'The Large Professional Service Firm: A New Force in the Regulative Bargain' (2017) 40 *University of New South Wales Law Journal* 218.

12   Susskind and Susskind, *The Future of the Professions*, above n 1, 16 (citations omitted).

13   Ibid.

14   On stacks of floppy discs, in those low bandwidth days. For publications concerning the DataLex Project, see Graham Greenleaf, *Expert System Publications (The DataLex Project)* (30 December 2011) AustLII <http://www2.austlii.edu.au/~graham/expert_systems.html>.

15   AustLII <http://www.austlii.edu.au/>, described by Susskind as having a 'large part' in the free access provision of cases and legislation in many jurisdictions: Susskind and Susskind, *The Future of the Professions*, above n 1, 69.

basis of this review. Because of my background, many of the examples I will draw on are from the legal domain.

B Which Technologies Transform Professional Work?

One of Susskind's basic arguments in *The Future of the Professions* is that, in a 'technology-based Internet society', professions are affected by (i) *automation* efficiencies that limit the number of people needed for many traditional professional tasks; and (ii) *innovation* which creates new ways of sharing practical expertise.[16] In discussing 'transformation by technology' Susskind no longer uses Christensen's distinction between 'sustaining' and 'disruptive' technologies,[17] but distinguishes 'automation' (more efficient carrying out of some task which is already being done – largely the same as 'sustaining') and 'innovation' (carrying out a new task not before done – less provocative than 'disruptive').[18] However, automation can be 'transformative', for example, 'teleprofessionalism' or 'Skype on steroids'.[19]

In this sense, innovations in professional work are rare. In law, I would suggest that text retrieval systems are innovative, but they only became so due to the combination of relevance-ranking of search results (to make them usable), and distribution via the web. In most professions, the availability of professional domain information has been transformative, at least for those not at the high end of their professions, because it has made the difference between having effective access to this information and not having it at all. As yet, I argue, the computerised application of professional expertise to individual situations has had a much less innovative effect on most professions.

Whether by innovation or automation, many new roles arise which are different from those of today's professionals. Part of this article assesses whether Susskind's identification of these new roles is adequate.

II DIGITISING THE COMPONENTS OF EXPERTISE

We need to start by distinguishing among three different types of digitisation that are relevant to professionalism, distinctions which Susskind does not always keep separate: representation of information used by experts; representation of expertise and its general application; and application of expertise to individual situations. These three categories are not neatly separated in reality. Information does not choose itself to be represented, and choice is itself the application of some expertise. Automated application of expertise may sometimes conclude with generalisations, not individual prescriptions.

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16   Susskind and Susskind, *The Future of the Professions*, above n 1, 270–1.
17   Clayton M Christensen, *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail* (Harvard Business Review Press, 1997), cited in ibid 110.
18   Susskind and Susskind, *The Future of the Professions*, above n 1, 110.
19   Ibid 111.

By so distinguishing, we can then consider more precisely how likely is it that each category will be 'liberated' and become part of 'the commons' in some way. I will use the expression 'commons' in a broad and non-technical usage to include information or expertise which is either available to everyone to access and use at no cost (often but not necessarily for unrestricted reproduction as 'open content'[20]), and also that which is available only to qualified members of a profession on equal terms governed by the profession.[21] The model of '[t]he evolution of professional work' developed by Susskind pictures its final stage, 'externalization' as including three possibilities: 'charge online', 'no-charge online' and 'commons' (essentially meaning 're-usable').[22] This is an evolution from a decade ago, when the 'commoditization' stage of the same diagram did not include either free access or commons,[23] although collaborative wiki-like legal websites were envisaged.[24] Now, commons are an essential aspect of Susskind's model.

A   Representing Expert Domain Information

Representations of information used by experts are the most likely aspect of expertise both to be digitised and to be part of the commons. Databases of the 'raw' domain information essential to professionals, such as standards, statistics, legislation, medical and pharmaceutical data, and court decisions, are by and large already substantially digitised and available online. The utility of these databases is increasingly improved by smarter retrieval systems, and smarter data structures which link together related data items (and improve retrieval), ranging from mass automation of hypertext links to semantic web structures, to sophisticated metadata extracted by data-mining techniques.

Much of this domain information is being made available as commons, at least for free access and often as open content. For example, the majority of countries provide current legislation and case law online, and as open content, usually via government sources of the information. In many countries such as Australia, free access 'legal information institutes' ('LIIs') aggregate this data and add value to it, making it a resource commonly used by professionals.

At present, much 'raw' domain information is still only available through commercial publishers. Standards, which are essential to all professions, are only available at high prices through commercial publishers (in Australia[25]), even though they are developed by the free pooling of expertise of many professionals. In some cases this scarcity is supported by monopolistic practices within professions. For example, 'authorised reports' of the decisions of higher courts in Australia are protected by restrictive citation practices in courts.

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20   This distinction is between information being available for 'free access' and information which is part of the public domain. Information which is available for free access is still part of a commons for this purpose.
21   This is essentially a distinction between an open and closed commons.
22   Susskind and Susskind, *The Future of the Professions,* above n 1, 197.
23   Susskind, *The End of Lawyers*, above n 6, ch 2.
24   Ibid ch 4.6.
25   Standards Australia has a publishing arrangement through which standards are sold, not free access.

However, if we look back a little more than 20 years to the start of widespread availability of such data via the web, the contrast in availability is extraordinary, and is tending toward comprehensive commons availability for many categories of information. Such an impression is somewhat illusory, as the creation of new tools creates perceived needs for newer (and bigger) data. But it seems that access to necessary data is not likely to be the major impediment to Susskind's 'commons of expertise' developing.

The tools needed for the creation of smarter retrieval and smarter data structures are, by and large, available as free and open-source software ('FOSS').[26] At a more fundamental level, so is the software necessary for enterprise level operation of complex websites, such as the Linux operating system, Apache web servers etc. There is every reason to expect that the FOSS communities will continue to provide the software infrastructure necessary for a commons of professional domain information as sophisticated as that provided by proprietary software (which may be too expensive to support commons initiatives). Professions wanting a commons of domain information can therefore benefit from the contributions of the FOSS communities, but should recognise the obligations to the public that this brings with it.

B   Representing Expertise

When professional expertise is represented (or embodied or reified) this is usually in a generalised form which may or may not be applicable to an individual situation where expertise is needed due to the enormous variation of situations which may arise. It is up to the reader (usually the correct term) to apply the expertise to the individual situation.

Professionals represented their expertise in many ways prior to the Internet – in textbooks, instruction manuals, journal articles, encyclopedias, and in very significant, but more mundane, forms such as citators and checklists (often as supervisors of non-professionals). In the pre-Internet era, compilations of expertise may have been collective (eg commissioned encyclopedia articles, or *Halsbury's Laws*), but were very rarely 'crowd sourced' (the *Oxford English Dictionary* is a rare exception[27]). The economics of publishing meant that such reification of expertise could rarely be provided as a commons, and instead it usually became an economic asset of a commercial publisher and an author.[28] Even when the copyright in compiled expertise was held by a non-profit semi-professional body such as a Council of Law Reporting, objectives such as low-cost availability were rarely met, and the subscription costs were just as expensive as for purely commercial products.

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26   For example, with text retrieval software, high performance open-source free text search engines are available, such as Apache's Lucene and AustLII's Sino: see Philip Tiet Hue Chung, *Overcoming Technical Challenges in Developing a Global Free Access Legal Information System for Research – The WorldLII Experience* (PhD Thesis, University of New South Wales, 2013) ch 5 <http://unsworks.unsw.edu.au/fapi/datastream/unsworks:12156/SOURCE02?view=true>.

27   Simon Winchester, *The Meaning of Everything: The Story of the Oxford English Dictionary* (Oxford University Press, 2003).

28   There were always exceptions, such as some public health information which was freely available.

The Internet changes some but not all of these factors. Expertise is a very valuable asset of many professionals. It is very time-consuming to consciously embody it in any form, and many professionals are very reluctant to 'give it away', either because they believe it gives them a competitive advantage, or because they would prefer to be paid by a publisher, or simply because publishing expertise is so time-consuming, difficult and potentially risky. Commercial publishers of such expertise, whether in print or online, are not going to disappear. Commons must always coexist with commerce.

In the last quarter century there have been many changes, the revolutionary potential of which are only becoming apparent through the accretion of successes such as the following:

- Online, free-access, peer-reviewed science and medical journals have demonstrated that access to the highest quality new research can be delivered outside of the control of traditional commercial publishers. Free access repositories of current scholarship [29] and archives of published journals [30] are also providing major collections of expertise relevant to professionalism.

- Academic funding bodies (eg the Australian Research Council) have started to require that outputs of all publicly-funded research should be available via a free-access repository within a period of time (eg six months).

- The FOSS movements, predating the web, have long demonstrated that the highest quality and most complex forms of software are developed free of most intellectual property ('IP') restrictions. Better still for commons growth, they are distributed under viral licences requiring any re-use to be under similar commons terms. This shows that a significant part of a vital body of professionals – software developers – has come to accept that the embodiments of their expertise should be part of a commons.

- The crowd-sourced Wikipedia demonstrates that under certain circumstances (including viral licensing, and perhaps the monopoly effects of 'online gravity' [31]), the expert and non-expert public can combine to create the largest, free, and probably by now most reliable encyclopedia. If the trajectory already attained over 15 years is sustained, it will be a previously unimaginable foundation for future commons-based professional enterprises by 2030.

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29 The Social Science Research Network <http://www.ssrn.com/en/> has been a leading example, but its future is uncertain following its acquisition by Elsevier.

30 Graham Greenleaf, Philip Chung and Andrew Mowbray, 'Free Scholarship: Developing a National Legal Scholarship Library' in Ginevra Peruginelli and Sebastiano Faro (eds), *Access to Legal Scholarship: Tools, Approaches, Technologies* (G Giappichelli Editore, 2017, forthcoming).

31 McCarthy considers that Wikipedia, after six years (2007), already had such a critical mass of authors and readers that it was immune to anything but the most radically innovative competitor, having its own 'online gravity': Paul X McCarthy, *Online Gravity* (Simon and Schuster, 2015) 115.

- Wikipedia's open wiki model containing amateur contributions might make communities of professional expertise uncomfortable and lead them to create closed wikis that may only be edited by professionals. An example is that 70 legal professionals from the Northern Territory have pooled their expertise to write and maintain the *Northern Territory Law Handbook*[32] through such a closed wiki. This can enhance professional reputation in a way that Wikipedia cannot.

- Sometimes an automated analysis of domain data might not do everything that a professionally curated one would do, but its other virtues (eg comprehensiveness), and availability as a commons, might outweigh these factors. An example is LawCite, a free access law citator which is at least comparable to commercial citators in scope, although it does not interpret cases ('followed', 'distinguished', etc).[33]

The combination of factors such as these – peer-reviewed free content; funding body pressure; viral licensing; crowd-sourcing; collaborative editing by closed professional groups; open content professional groupings; and automated substitutions for expertise – and many others, may threaten the viability of some types of commercial control of the publishing of expertise, but more importantly they demonstrate it is becoming viable for professionals to control the representation of their own expertise, as a commons.

C Applying Expertise to Individual Situations

It is, however, the application of this expertise to individual situations (the problems of individual patients, clients, etc) via programs which Susskind sees as a major threat to the future of professionals and professions.

At present, the number of convincing examples and their commercial viability do not make it inevitable that there will be generalised dire results for professions.[34] To understand the implications, it is necessary to distinguish which types of expertise are being successfully applied. We need to distinguish at least three types of the programmatic applications of expertise: where 'knowledge engineers' embody expertise in programs; embedded knowledge; and machine-generated expertise; plus a related category, 'communities of experience'.

In those areas where expertise can be effectively applied programmatically, can this be developed as a commons, or only as commercial products? That is one of the major questions posed by Susskind.

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32   Melinda Schroeder, *Northern Territory Law Handbook* (26 July 2016) AustLII Communities <http://austlii.community/foswiki/NTLawHbk/NTLawHandbook>.

33   As at 22 February 2017, LawCite had indexed 5 264 059 cases, law reform documents and journal articles: AustLII, *LawCite* <http://www.austlii.edu.au/lawcite/>. See Andrew Mowbray, Philip Chung and Graham Greenleaf, 'A Free Access, Automated Law Citator with International Scope: The LawCite Project' (2016) 7(3) *European Journal of Law and Technology* <http://ejlt.org/article/view/496>.

34   An October 2016 survey of 'the adoption of machine-learning based AI in legal services' by large UK law firms, over the previous year, only reported three applications that had actually been developed, plus a further nine 'collaboration[s]', 'agreement[s]', partnerships, etc: Richard Kemp, 'Legal Aspects of Artificial Intelligence' (White Paper, Kemp IT Law, November 2016) 8 <http://www.kempitlaw.com/wp-content/uploads/2016/11/Legal-Aspects-of-AI-Kemp-IT-Law-v2.0-Nov-2016-.pdf>.

1   *'Knowledge Engineering'*

Programs where 'Knowledge Engineering' incorporate both (i) formal domain knowledge; and (ii) the experience of domain experts ('to somehow mine the jewels from expert professionals' heads'[35]), have at various times been described as 'expert systems', 'knowledge-based systems' or just artificial intelligence ('AI'). Here, human reasoning is what is being modelled, whether based on causal models, heuristics based on experience, or interpretation of formalisms (eg standards, statutes). These traditional notions of expertise require that such 'expert systems' can give explanations for the conclusions they reach.

There are varieties of successful development of such systems, including those that assist in the completion of tax returns, or determine entitlement to welfare benefits, and 'intelligent agent' software which roam through tax, audit, and accountancy data files looking for exceptions. Document assembly systems generating complex documents through interactions with users are increasingly common, originally for use by lawyers but increasingly for lay use.[36] Online dispute resolution has numerous examples of systems successfully resolving very large numbers of disputes.[37] Another major area of success has been 'predictive coding': using software to determine which documents should be disclosed in very large-scale litigation with more effectiveness than junior lawyers,[38] and now with approval by United Kingdom ('UK') courts. [39] In medicine there are remarkable successes claimed, such as the pharmacy robot known as Epocrates that has issued more than a million prescriptions without error and automated the interaction of different drugs.[40]

Susskind sees the 'knowledge engineer' as someone with some professional training, but who is not the domain expert.[41] The problem is that this model has only had modest success. The alternative model, direct coding of expertise by domain experts, has done little better. Both approaches hit what has been called the 'knowledge acquisition bottleneck'.[42] Coding any complex advisory system is exceptionally difficult to sustain, update, or use to produce explanations of why conclusions are reached.

There are other technical obstacles, not just knowledge acquisition, which make it very difficult to develop such expert systems that go beyond a certain level of complexity. It is possible, by using propositional representations of

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35   Susskind and Susskind, *The Future of the Professions*, above n 1, 221.
36   Ibid 69.
37   Ibid 70.
38   Ibid 69.
39   Chloe Smith, 'Landmark Ruling on Predictive Coding in Disclosure', *The Law Society Gazette* (online), 17 February 2016 <http://www.lawgazette.co.uk/law/landmark-ruling-on-predictive-coding-in-disclosure/5053681.fullarticle>.
40   Susskind and Susskind, *The Future of the Professions*, above n 1, 49.
41   Ibid 222.
42   Graham Greenleaf and Andrew Mowbray, 'Controlling and Augmenting Legal Inferencing: *ysh*, a Case Study' (Paper presented at the 4th International Conference on Artificial Intelligence and Law, Amsterdam, Netherlands, 15–18 June 1993) 162–6; J Cullen and A Bryman, 'The Knowledge Acquisition Bottleneck: Time for Reassessment?' (1988) 5(3) *Expert Systems* 216.

knowledge, for a system to generate dialogues asking the questions for which it needs answers, and even to provide explanations of its conclusions, directly from the knowledge representation.[43] However, the problems for which it is desired to build expert systems to resolve may very easily exceed the capacity of propositional logic, and require predicate calculus. Such knowledge representations are much more complex to encode, less easy for domain experts to understand, and more difficult to generate dialogues and explanations from.

Susskind also assumes that the resulting application of expertise is 'delivered not by human beings but through some form of online service'.[44] While this may sometimes be the case, it is just as likely that the effective operation of the system will require *interpretation* by a skilled user. Programs are good at resolving certain aspects of complex problems, but humans are better at resolving others. The model of a 'semi-expert program' being used by a skilled operator able to supply human interpretation at the points where it is needed, is not one which Susskind discusses, but is one to which I will return in relation to new gradients of professionalism.

Despite these difficulties associated with the creation and maintenance of more complex types of expert systems, some which deal with relatively straightforward problems are now commercially successful. In law, examples include expert systems which can complete individual tax returns, design some structures, or draft wills or simple contracts. Tax authorities worldwide have made good use of such systems,[45] changing the nature of the work of tax professionals. Such systems have large markets and do not require frequent updating. Replacement of this repetitive work can be a significant threat to part of the lower end of professional work. These successes, often cited by Susskind, simulate human understanding of legislation, documents, or processes used by experts.

Susskind recognises the knowledge acquisition problem in part, saying that such systems were 'hugely time-consuming for the experts whose knowledge went into the system'.[46] Susskind attributes the failure of the AI wave of the 1980s to deliver many commercially successful systems primarily to the fact that 'the invention of the Web shifted the emphasis' of much of the AI and law community and others to the development of different web-based systems.[47] This is correct (I am one of many examples), but to say that checklists, flowcharts and frequently asked questions available on the Web deliver much of the functionality that expert systems were aiming to provide,[48] very seriously understates the ambitions of such systems to deliver at least the individual application of complex legislation and its interpretation. It also ignores the other problems mentioned above. However, this does not matter because Susskind, in

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43   Graham Greenleaf, Andrew Mowbray and Peter van Dijk, 'Representing and Using Legal Knowledge in Integrated Decision Support Systems: Datalex Workstations' (1995) 3 *Artificial Intelligence and Law* 97.
44   Susskind and Susskind, *The Future of the Professions,* above n 1, 222.
45   Ibid 85–8.
46   Ibid 184.
47   Ibid 185.
48   Ibid.

effect, abandons this 'expert systems' approach to AI by arguing that the current 'second wave' of AI takes a completely different approach, exemplified by Big Data and Watson,[49] to which I now turn: 'brute-force processing and massive storage capacity, rather than simulation of human thought processes'.[50]

2   *'Machine-Generated Expertise'*

'Machine-generated expertise' – where 'practical expertise is originated by machines and not by human beings'[51] – is not very precisely described, but Susskind expects that its most likely applications will include 'systems that can, more or less autonomously, make diagnoses in medicine, analyse financial information, design buildings, and predict the decisions of courts'.[52] However, it seems that what Susskind is primarily envisaging is programs based on machine-learning techniques, often associated with 'big data' and data analytics.[53] These are typically based on predictions made on the basis of correlations, and not on inferences from any causal models of a domain.[54] It is characteristic of such programs that they cannot give any explanation for their results; they cannot explain *why* they are correct. As Susskind correctly puts it, in many areas 'we can develop high performing, non-thinking machines that can outperform the best human experts, even though they go about their business in quite unhuman ways', so '[w]e will not need to understand and then replicate the way human experts work, nor will we need to develop thinking machines to replace much of the work currently undertaken by human professionals'.[55] To think otherwise is Susskind's 'AI fallacy' – Deep Blue does not play chess like we do.[56]

Such machine-learning-based approaches now have many success stories, including in the legal profession where they have been used to predict case outcomes to enable more prudent investment in litigation, and other claims that are made.[57] 'Big Data' approaches may also, in time, greatly change the work of audit professionals by allowing all transactions of a business to be scrutinised (not just a sample, as is the case now), and outliers identified.[58] If such systems are demonstrably effective in providing outcomes, and are therefore money-saving, explanations of how and why they achieve their results may not be required. However, this approach can only deal with part of the situations where the advice of professionals is now obtained: those where no justification or explanation of the advice given is required. Big data analytics may well be used by professionals to carry out new tasks, or achieve better results with previously

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49   Ibid 186.
50   Ibid 187.
51   Ibid 226.
52   Ibid 228.
53   Ibid 160–4.
54   Viktor Mayer-Schönberger and Kenneth Cukier, *Big Data: A Revolution That Will Transform How We Live, Work, and Think* (Houghton Mifflin Harcourt, 2013).
55   Susskind and Susskind, *The Future of the Professions,* above n 1, 276.
56   Ibid 276–8.
57   Dakshina Chandra, 'Quantitative Legal Predictions and the Changing Practice of Law' *Computers and Law* (Australia), July 2016, 7–9.
58   Susskind and Susskind, *The Future of the Professions,* above n 1, 91–3.

difficult tasks (like predicting outcomes of court cases). An example of an application is that courts are increasingly accepting that 'predictive coding' can be agreed upon by parties to litigation as the basis of discovery of documents in order to drastically reduce the costs associated with human inspection of millions of documents potentially relevant to discovery.[59]

IBM's Watson, successor to Deep Blue, also uses various forms of 'brute force' approaches to tackling problems, including storage of vast amounts of information, extremely fast and multifaceted search capacities, natural language processing, 'knowledge processing and reasoning' and generic capacities (not inherently domain-specific). For Susskind, it exemplifies 'the coming of the second wave of AI', radically different from the 'first wave of rule-based expert systems of the 1980s', not only because of greater capacity, but because Watson does not attempt 'to replicate the thinking processes of human specialists'.[60] Susskind believes, based on studying Watson, that

> [t]he day will come, for most professional problems, when users will be able to describe their difficulties in natural language to a computer system on the Internet, and receive a reasoned response, useful advice, and polished supporting documents, all to the standard of an expert professional practitioner.[61]

This is a big claim – the biggest made in this book because it is so generic. It is uncharacteristic of Susskind's usual caution – except in its uncertain future date of delivery. I do not think it is supported by the evidence presented. There is a big difference between giving the right answers to questions in *Jeopardy!* (or any other right answers – predictions), and 'reasoned response, useful advice, and polished supporting documents', all of which imply an ability to explain and justify conclusions reached. If Watson does not replicate human-like reasoning, what will its justifications look like? I do not think I am committing Susskind's sin of 'technological myopia' ('the tendency to underestimate the potential of tomorrow's applications by evaluating them in terms of today's enabling technologies')[62] by this scepticism. It is still unduly optimistic to expect that one system will be able to deliver all aspects of professional expertise, at least while such machines think humans are still useful to keep around.

3   *'Embedded Knowledge'*

'Embedded knowledge', as Susskind describes it,[63] is much simpler and more successful. Successful examples are multiplying, particularly in relation to regulatory compliance: the breathalyser determining whether a car can start; the 'intelligent building' which constantly tests itself and complies with

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59   'In *Pyrrho Investments Ltd and another v MWB Property Ltd and others* [2016] EWHC 256 (Ch), the use of predictive coding in electronic disclosure was judicially approved for the first time in a reported UK decision': Susan Monty, 'E-disclosure Predictive Coding' *The Law Society Gazette* (online), 14 March 2016 <https://www.lawgazette.co.uk/practice-points/e-disclosure-predictive-coding/5054119.article>.

60   Susskind and Susskind, *The Future of the Professions,* above n 1, 165, 186–7. That contrast is correct, but there were earlier 'waves' of AI which attempted to develop generic computer 'intelligence' before the 1980s.

61   Susskind and Susskind, *The Future of the Professions,* above n 1, 166.

62   Ibid 44.

63   Ibid 225.

environmental laws; the IP object designed to enforce a particular view of IP laws; and medical monitoring systems. Data privacy laws are starting to require 'privacy by design' and 'privacy by default' in software and systems. Susskind is right that the embedding of such expertise in the material world often starts with programming by knowledge engineers. This is a form of mass delivery of one-to-many expertise, which eliminates the need for repeated interventions by regulatory experts.[64] These are important innovations, but they seem to be a more sophisticated version of what engineering has always done, with programming now added to the engineers' tools. They are examples of Lessig's 'code'.[65] Perhaps Foucault also anticipated the Internet of Things when he said '[t]he judges of normality are present everywhere'.[66] Such embedded knowledge could be the result of either knowledge engineering or 'machine-generated expertise'. It is not obvious that work previously routinely carried out by professionals will be replaced by such developments.

'Smart contracts' are widely touted as having major potential effects in disintermediating provision of legal services by turning automated contracts (such as expert systems created by knowledge engineering) into embedded knowledge as self-executing contracts. Although there is very serious research on embodying contracts in digital form,[67] the exceptionally severe 'knowledge acquisition' problems involved in doing this for more than trivial contracts is generally not understood by less expert authors and is lost in the enthusiasm for replacing lawyers.

The 'self-executing' aspect is often assumed to be achieved using a combination of digital currencies and blockchain (distributed ledgers),[68] although in fact there are many combinations of technologies that can be used to achieve such results. Confidence in this particular combination of technologies was shaken by an apparently successful diversion of US$50 million from the Decentralised Autonomous Organisation ('DAO'), a smart contract for investment purposes built on Ethereum, a major platform for a form of digital currency.[69] Much of the enthusiasm for blockchain-based applications comes

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64   Ibid 225–6.

65   Lawrence Lessig, *Code and Other Laws of Cyberspace* (Basic Books, 1999).

66   Michel Foucault, *Discipline and Punish: The Birth of the Prison* (Alan Sheridan trans, Penguin Books, 1977) 304 [trans of: *Surveiller et Punir: Naissance de la Prison* (first published 1975)].

67   See, eg, Mark D Flood and Oliver R Goodenough, 'Contract as Automaton: The Computational Representation of Financial Agreements' (Working Paper No 15-04, Office of Financial Research, 26 March 2015) <https://www.financialresearch.gov/working-papers/files/OFRwp-2015-04_Contract-as-Automaton-The-Computational-Representation-of-Financial-Agreements.pdf>; Florian Idelberger et al, 'Evaluation of Logic-Based Smart Contracts for Blockchain Systems' in Jose Julio Alferes et al (eds), *Rule Technologies, Research, Tools, and Applications* (Lecture Notes in Computer Science vol 9718, Springer, 2016).

68   Roy Keidar and Eli Greenbaum, 'Blockchain: The Power to Reinvigorate Law Firms', *The Lawyer* (London) 1 August 2016.

69   Rob Price, 'Digital Currency Ethereum Is Cratering Because of a $50 Million Hack', *Business Insider Australia* (online), 18 June 2016 <http://www.businessinsider.com.au/dao-hacked-ethereum-crashing-in-value-tens-of-millions-allegedly-stolen-2016-6?r=UK&IR=T>; Klint Finley, 'A $50 Million Hack Just Showed That the DAO Was All Too Human', *Wired* (online), 6 June 18 2016 <http://www.wired.com/2016/06/50-million-hack-just-showed-dao-human/>.

from naïve acceptance of its supposed feature of having an 'immutable' [70] distributed ledger, [71] which appeals to those who imagine that there can be internet self-regulation beyond the reach of law. [72] In reality, judges in equity, consumer law, bankruptcy etc are likely to have as little hesitation in ordering that an 'immutable' distributed ledger entry be undone, as they would have in ordering the reversal of a fraudulent transaction recorded by a bank. [73] The DAO's 'immutability' was destroyed by the DAO itself, when it decided to 'fork', effectively undoing the disputed transaction. Technology affecting professions is just as subject to hype and short-lived enthusiasms as any other aspect of the Internet.

4   *Software's Impact on Professions*

To sum up, the extent of the threat posed to professions by the application of expertise to individual situations through software is still very difficult to estimate. Expert systems developed by knowledge engineers can economically automate answering problems up to a certain level of complexity, where there is a mass market. Beyond that, knowledge acquisition and other bottlenecks make their applicability unproven. Embedded knowledge delivered through software will continue to permeate the material world and to impose 'normal' behaviour which adheres to medical, accounting or legal norms. Machine-generated expertise will be relied upon increasingly in relation to the set of problems where prediction of a 'correct' answer is sufficient (by whatever path it is reached), and explanations in terms of underlying causes and human reasoning are not required.

5   *Beyond Software: 'Communities of Experience'*

Susskind also envisages the application of knowledge, not through programs, but in 'communities of experience', which individualises the application of expertise through human interaction. This model involves 'the contributions of past recipients of professional service or of non-experts who have managed to

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70   From the DAO website 'about' page: '[t]he DAO is borne from immutable, unstoppable, and irrefutable computer code, operated entirely by its members, and fueled using ETH which Creates DAO tokens': Matt Levine 'Blockchain Company's Smart Contracts Were Dumb', *Bloomberg View* (online), 17 June 2016 <https://www.bloomberg.com/view/articles/2016-06-17/blockchain-company-s-smart-contracts-were-dumb>, quoting the DAO <https://daohub.org/about.html>.

71   Winston Maxwell and Richard Diffenthal, 'Does Blockchain's Trust Architecture Make Dumb Contracts Smarter?' on Hogan Lovells, *Hogan Lovells: Global Media and Communications Watch* (18 November 2016) <http://www.hlmediacomms.com/2016/11/18/does-blockchains-trust-architecture-make-dumb-contracts-smarter/>.

72   For an influential paper, see Aaron Wright and Primavera De Filippi, 'Decentralized Blockchain Technology and the Rise of Lex Cryptographia' (Research Paper, 10 March 2015) <https://ssrn.com/abstract=2580664>.

73   Summary by the author of remarks by Justice M J Beazley: see Justice M J Beazley, 'Opening Remarks' (Speech delivered at The Future with Blockchain Forum, UNSW CBD Campus, 27 October 2016) <http://www.supremecourt.justice.nsw.gov.au/Documents/Publications/Speeches/2016%20Speeches/Beazley_20161027.pdf>. For other legal complications, see also Scott Farrell, 'A Tear in the Fabric? Blockchain within the Legal and Regulatory Landscape' (Speech delivered at The Future with Blockchain Forum, UNSW CBD Campus, 27 October 2016).

sort out problems for themselves'.[74] This aspect involves the representation of past experience (but not professional expertise) in, say, a website, but it also involves members of such a community directly contributing to assist to resolve specific issues faced by others. Susskind refers to the crowdsourcing of the resolution of problems, 'in the spirit, for example, of systems like Wikipedia'.[75] Analogies to TripAdvisor, crowdsourced restaurant recommendations, and 'Q&A' programming websites[76] may also be apt. While 'the spirit' of Wikipedia is important, the viral character of the licences by which all contributors must provide their content, the complex protocols concerning amendment of contributions and resolution of disputes between contributors, and the virtues of size (the visibility of bugs to a 'million pairs of eyeballs'), are essential to building and maintaining this spirit.

The circumstances under which these virtues can be recreated in the context of professionalism are not explored by Susskind. Nevertheless, Susskind provides examples of existing patient networks such as PatientsLikeMe, with 300 000 people sharing medical experiences. Various networks of medical professionals share experiences of diagnoses.[77] At least a dozen United States-based legal services have tried to make a success of crowdsourcing, some by aiming to develop legal research sites (modelled on Wikipedia), and others by allowing users to post legal questions or issues for argument, with other users posting cases they believe to be relevant and their reasons, with various charging models. An original supporter of these crowdsourcing services argues they have all failed within a few years 'because of the lack of one essential ingredient: participation by lawyers'.[78] An exception to these failures is 'CanLII Connects', which differs from most of them in that it has a 'closed wiki' model in which contributors have to be qualified, and the Canadian Legal Information Institute ('CanLII') already has a very large community of users for its research services.[79]

'Communities of experience' are not much more implausible than the idea of Wikipedia itself. They include the added danger of liability for giving advice in specific situations rather than generalised advice. On the one hand, if such methods of applying expertise/experience were very successful, they would provide competition and diminish the need for some professional services, at least at the lower end of the scale. On the other hand, by participating in such communities, some professionals might enhance their reputations (if the forum allowed this). Whether the quality of applications of expertise available from

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74   Susskind and Susskind, *The Future of the Professions*, above n 1, 223.

75   Ibid. Susskind also mentions Linux, but contributors to FOSS projects will very often be experts.

76   For example, Stack Overflow <stackoverflow.com>; Quora <https://www.quora.com>.

77   Susskind and Susskind, *The Future of the Professions*, above n 1, 52.

78   Robert Ambrogi, '2 New Websites Offer Platforms for Crowdsourced Legal Research', *American Bar Association Journal* (online), 1 January 2014 <http://www.abajournal.com/magazine/article/2_new_ websites_offer_platform_for_crowdsourced_legal_research/>; Robert Ambrogi, 'The Failure of Crowdsourcing in Law (So Far, at Least)' on Robert Ambrogi, *LawSites* (10 August 2015) <http://www.lawsitesblog.com/2015/08/the-failure-of-crowdsourcing-in-law-so-far-at-least.html>.

79   CanLII Connects <http://canliiconnects.org/en/>. See Ambrogi, 'The Failure of Crowdsourcing in Law', above n 78.

such sites would ever provide a commons which would assist professionals to maintain their expertise and independence is unknown.

D   Conclusions: Expertise and commons

The free availability of the domain data necessary for professionals to function, while far from complete, has a trajectory of increasingly comprehensive 'commons' availability. Because of recent developments in Internet publishing, and policies of funding sources, it is becoming feasible for professionals to control the representation of their own expertise in generalised forms, and thus to be able to rely upon a body of professional expertise of their peers in order to support their own expertise.

However, there is no such obvious tendency toward commons in relation to the three categories of software-based application of expertise to individual cases. Few examples are discussed by Susskind. Tools for knowledge engineering and for creating machine-generated expertise are available as FOSS and are of high quality, but the communities of users necessary to develop applications (similar to the FOSS or Wikipedia communities) have not yet developed. I will return to this in the final part. 'Embedded knowledge' may well be of benefit to end-users (consumers of many types) but will be an outcome of industrial processes which are not likely to be part of a commons, although it could be embedded in tools that professionals will purchase and use.

III   FUTURE MODES OF PROFESSIONALISM, AND THEIR RELATIONSHIPS TO EXPERTISE

In *The Future of the Professions*, Susskind puts forward seven models of '[p]roduction and distribution of expertise';[80] and it is from here that the range of models for future professional work must be inferred. Mixing 'production' and 'distribution' of expertise does not work very well because expertise can be captured by one of these models but distributed by another, so I have moved three of them to the earlier discussion in Part II(C), 'Applying Expertise to Individual Situations' (embedded knowledge; machine-generated expertise; and 'communities of experience'), while leaving in 'knowledge engineers' because they are a possible future category of specialisation.

These four (originally seven) categories answer a slightly different question than the five models of legal work that Susskind sets out in *The End of Lawyers* a decade earlier. Susskind predicted 'there will be five categories of lawyers in the future'[81] but noted these were 'long-term predictions, stretching to 2016 and beyond'.[82] In order to consider the possible future modes of professionalism, I have combined discussion of Susskind's two sets of categories, under the headings in *The Future of the Professions*, noting where *The End of Lawyers*

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80   Susskind and Susskind, *The Future of the Professions,* above n 1, 215–27.
81   Susskind, *The End of Lawyers*, above n 6, 271.
82   Ibid 275.

suggests something different, and adding two more sub-categories from *The End of Lawyers*. Four categories result.

A 'Traditional Experts'

The traditional professional does bespoke work for individual clients, in what is essentially a reactive mode. This is essentially the same as the 'expert trusted adviser' in *The End of Lawyers*, who Susskind saw maintaining his or her role '[f]or the foreseeable future', acting for 'clients who have novel, complex or high value challenges'.[83] Susskind envisaged little change to senior barristers' work, but envisaged that their number 'will be greatly reduced',[84] and the commercial structures or business models within which they work may well change.[85]

In that book, Susskind also argued that two variations on this traditional expert role are likely to be important for lawyers in the future, and they may be categories also relevant to the future of other professions:

1. *'Risk manager'* – A 'legal risk manager'[86] anticipates risks for clients and puts compliance or risk-avoidance systems into client operations, something law mega-firms need for themselves. This would involve a more proactive role on behalf of clients than is associated with traditional lawyers. Preventative roles in health, accounting, engineering and some other professions are also growing in importance.

2. *Hybrid professional* – The multidisciplinary 'legal hybrid', with 'rigorous training' in more than one discipline,' was the other emerging category of lawyer proposed by Susskind.[87] Although this is of particular relevance to lawyers, because both litigation and specialised transactions can clearly benefit from hybrid professionals, it may have wider relevance.

B 'Para-professional'

These workers use 'support tools' created by experts, but the use of these tools requires the skills of a 'para-professional'. A decade earlier, these 'para-professionals' had a more prestigious title of 'enhanced practitioners' (with professional training), 'enhanced by modern techniques … supporting the delivery of standardized, systematized and (when in-house) packaged legal service'.[88] However, Susskind already saw their numbers drastically diminishing because the market would only bear their high costs where absolutely necessary and would be more likely instead to use less skilled paralegals (without professional training) or to outsource work that could be done using such systems to less expensive overseas destinations.[89]

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83   Ibid 271.
84   Ibid 273
85   Ibid 279.
86   Ibid 272–3.
87   Ibid 273.
88   Ibid 271.
89   Ibid 272.

It may be that the reality will be an intermediate category of what I call 'pseudo-lawyers', who have the training, the formal status, and the self-image of a lawyer, but are really closer to a low-paid paralegal doing repetitive work involving moderate levels of expertise. This will usually involve driving and interpreting computerised products developed by those with more expertise. On one view this is the dystopian commoditisation of an ideal, the symbiotic interrelationship between human and programmed expertise,[90] which was easier to argue for even a decade ago.

A more optimistic and perhaps realistic approach is that this represents a desirable breakdown of the previously rigid divisions between professionals and others, and recognition of gradations of expertise. This is exemplified by the recognition of a new class of health practitioners in the UK's National Health Service ('NHS'), the 'physician associate' with lesser training than a traditional physician, but functions going beyond the prescribing and minor operational powers of some specialist nurses. Susskind sees such physician associates as likely users of medical diagnostic technologies.[91]

C 'Networked Experts'

Another variation on the traditional model comprises ad hoc assemblages of expertise ('[g]roups of specialists, often self-employed freelancers'[92]), usually conducted online, in order to address a particular problem of an individual client. Teams of providers may be put together on an ad hoc basis by intermediaries. It is essentially bespoke, reactive, and competitive within the network to supply components of the resolution of a problem. Selection of providers is influenced by previous ratings of providers given by users of the network.[93]

If the intermediary assembling a team is the platform provider for the network, then what Susskind is describing is close to the 'Uber model' of providing professional services. Such platforms are already available for tradespersons. It has all the same risks: the platform sets the prices (driving them down), while taking a significant share of the fees; and the assembled professionals have to pay all the costs of maintaining their professionalism and access to domain knowledge and expertise. In other words, they provide the taxi. Susskind's example of CrowdMed, where people post symptoms and crowdsource diagnoses from 2000 doctors,[94] shows this is starting to occur, but not necessarily with the financial models which could emerge. In law, the networking of 'freelance' legal expertise in the UK has had substantial take-up, organised both by new platform providers such as Axiom, and by existing law firms.[95]

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90   Graham Greenleaf, 'Legal Expert Systems – Robot Lawyers? An Introduction to Knowledge-Based Applications to Law' (Paper presented at Australian Legal Convention, Darling Harbour, Sydney, 12 August 1989) <http://ssrn.com/abstract=2263868>.
91   Susskind and Susskind, *The Future of the Professions,* above n 1, 49–50.
92   Ibid 218
93   Ibid 218–19.
94   Ibid 53.
95   Ibid 68.

Less sophisticated than the 'Uber model' of networked provision of services, but probably just as threatening to some providers of professional services, are the cluster web-enabled means of empowering consumers identified by Susskind as starting to affect professional services: reputation rating (as for restaurants and hotels, like TripAdvisor); price comparison systems in relation to particular types of work; and professional auctions. Although Susskind admits that 'these systems are in their early versions – for example, BetterDoctor and ZocDoc in medicine, WeBuildHomes in architecture, Avvo in law, and Expert360 and Vumero in consulting', all expose professionals to forms of competition which they are not used to.[96]

D 'Knowledge Engineer'

The task of knowledge engineering in relation to embodying professional knowledge is discussed above. Susskind describes knowledge engineers as 'specialists in knowledge elicitation',[97] and sees them as often having professional training, but not as being the relevant domain expert, only the knowledge engineer. As mentioned earlier, it is still an open question which model will work – knowledge engineer completely separate from domain expert; or domain expert as knowledge engineer. At present, there is too little evidence that either scales up very well, and this 'knowledge acquisition bottleneck' is largely ignored by Susskind. A decade earlier, Susskind seemed to opt for the domain expert having a major role: the role of the *'legal knowledge engineer'* 'will need highly skilled lawyers', particularly if a firm's reputation depends on it.[98] The role of knowledge engineering in the professionalism of the future remains elusive.

E Migration Between Categories?

Susskind asks (in *The End of Lawyers*) whether, if traditional experts and 'enhanced practitioners' are going to diminish greatly in number, these redundant lawyers can become knowledge engineers, risk managers or professional hybrids. A more pessimistic possibility is that many of them will become pseudo-lawyers (lawyer training and status, paralegal conditions) in very large firms, or 'independent' taxi drivers providing services via online platforms. These two dystopian options may be just as applicable to other professions.

IV CONCLUSIONS: CAN WE CREATE A 'COMMONS' OF EXPERTISE?

Susskind concludes with a prediction that '[i]n the post-professional society … practical expertise will be available online',[99] partly because the 'non-rival,

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96 Ibid 129.
97 Ibid 221, 265.
98 Susskind, *The End of Lawyers*, above n 6, 272.
99 Susskind and Susskind, *The Future of the Professions,* above n 1, 303.

non-excludable, cumulative and digitizable' characteristics of information will ensure that such disintermediation occurs.[100] As I have argued, the extent of the likelihood of this disintermediation is far more uncertain than Susskind expects.

If we assume that these developments will be as important as Susskind expects, this leads to his main moral question: 'who *should* own and control [this] practical expertise'?[101] By posing this as a moral question, one of justice, Susskind suggests it can be resolved (at least in part) by Rawlsian arguments about justice. From a Rawlsian perspective on justice, if we had to choose 'from behind a veil of ignorance [about our own life chances], most people would choose to liberate than enclose'.[102] In other words, most would choose a future in which comprehensive computerised professional expertise was held in a commons, accessible without cost. Susskind thinks this Rawlsian e-just society is feasible, but far from inevitable, and that the future could be a mix of both proprietary and common ownership of expertise.

However, moral positions are one thing, history another – when did capitalism observe a Rawlsian view of justice? Susskind and I would both like to see a utopia of free, individualised, expert advice. Susskind does recognise that 'this shift will not come about spontaneously. It is a goal to which we must actively strive'.[103] But it is possible to agree with Susskind's more modest final sentences: '[w]e now have the means to share expertise much *more* widely across our world. We should also have the will'.[104] I agree, but stress that most of the encapsulated expertise is going to be locked up in (new) private hands unless there are enormous efforts by civil society (fostering adoption of commons-related licensing or free access), universities (in teaching knowledge engineering with domain skills), and governments (in funding some knowledge engineering and related developments with high paybacks, without controlling them). On this semi-optimistic scenario, public bodies, members of the public, and parts of the professions might maintain sufficient commons to support the continuation of professional expertise. This commons would be an alternative to professional expertise controlled by commercial organisations.

On both the optimistic and dystopian scenarios, the future will see a gradual decline in traditional professional work (and its job satisfactions), or control by professional bodies. But it could lead to different forms of professionalism based on professions that ensured that they supported the creation, as commons resources, of the information and expertise needed to carry out their professional work, and ensured that its control remained in democratic hands. By making this issue central to *The Future of the Professions*, Richard and Daniel Susskind have taken a courageous step, for which future discussions of technology and professions will be indebted.

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100   Ibid 305.
101   Ibid 304 (emphasis added).
102   Ibid 307.
103   Ibid.
104   Ibid 308 (emphasis added).