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The Digital Revolution from a Legal Historical Perspective¹

1 Introduction

‘Still valid today is the lesson from the first industrial revolution – that the extent to which society embraces technological innovation is a major determinant of progress’. The quote stems from Karl Schwab, the director of the World Economic Forum, who introduced the concept of the “*Fourth Industrial Revolution*” to a broader audience by writing a booklet on the topic in 2016.² One of his goals was *‘to increase awareness of the comprehensiveness and speed of the technological revolution and its multifaceted impact’.*³ This edition of *De Lege* on Artificial Intelligence and Law illustrates that awareness is undoubtedly growing.

Schwab’s quote is also interesting because he makes a reference to the First Industrial Revolution. In uncertain times, people tend to look at the past to take lessons for the future. There have been three industrial revolutions before: periods of fundamental industrial and societal transformations that have changed the world forever. In this contribution, I will take a closer look at how law has been dealing with these earlier industrial revolutions. Can we learn something from the past? Are we just repeating a pattern or is something new going on? Which lessons can

¹ I would like to thank Katja de Vries, Rawaz Shanagar, Miljana Todorović, Sebastiaan Vandenbogaerde and Matthias Van Der Haegen for their valuable comments on this contribution.

² Karl Schwab, *The Fourth Industrial Revolution* (World Economic Forum 2016) 13.

³ *Id.* 9.

we take from the past, to be better prepared for the future? Since long I have been fascinated by the industrial revolutions and their interaction with law. I did my doctoral research on this topic, by studying the process of juridification of workplace accidents in the nineteenth century in Belgium.⁴ I am also increasingly interested in the ongoing digital revolution. A few years ago, I was surprised to find out that in the seminars on comparative legal history, my master students did not have a clue about what was going on. They literally had never heard of smart contracts, the Internet of Things or blockchain. How was this possible? Were we delivering already outdated lawyers to the labour market? This motivated me to include a lecture on “*legal futurology*” in our legal history course, to at least point out to the students the ongoing digital revolution and its many challenges and opportunities. In this text, I will try to bring the past and the future together.

2 The First Industrial Revolution – the Age of Steam

The First Industrial Revolution started in the mid-18th century in Great Britain. Coal mines fuelled steam engines that literally drove industrialisation. Textile factories mechanised. Already early on, the law was used to tame the industrial beast. In 1802, the Parliament of the United Kingdom passed the first of a series of Factory Acts, to protect workers in the mechanised cotton factories.⁵ In France, Napoleon regulated the coal mines in 1810 and installed a mining inspection in 1813.⁶ In 1831, Prussia dealt with its steam engines and in 1838 with the upcoming railroads, introducing a regime of strict liability.⁷ Law also facilitated the indus-

⁴ Bruno Debaenst, *Een proces van bloed, zweet en tranen. Juridisering van arbeidsongevallen in de negentiende eeuw in België* (KVAW 2011); see also Bruno Debaenst, ‘A Study on Juridification. The Case of Industrial Accidents in Nineteenth Century Belgium’ [2013] 81 (1-2) Legal History Review 247.

⁵ E.P. Hennock, *The origins of the welfare state in England and Germany, 1850–1914* (Cambridge University Press 2007) 73–85.

⁶ Loi concernant les mines, les minières et les carriers 1810; Décret contenant les dispositions de police relatives à l’exploitation des mines 1813.

⁷ Strict liability was motivated because of the dangerous nature of the railroad activities and covered personal injury, damage to transported goods and damage to any other goods, including damage to neighbouring land. Miquel Martín-Casals, ‘Technological

trial revolution. The British patent system, for instance, was continually evolving and responding to the needs of the industrialising economy, without any legislative reform.⁸ Inventors could easily obtain and enforce patent rights, which encouraged them to develop new technology. In the 1830s, several German states, such as Baden and Saxony, changed their expropriation legislation to facilitate the construction of railroads.⁹ In other words, law played a pivotal role in regulating and facilitating the industrial revolution.¹⁰ The other way around, the First Industrial Revolution seems not to have had any direct impact on the legal sector (legal education, legal professions, legal methodology).

3 The Second Industrial Revolution – the Age of Electricity

Around the 1870s, the Second Industrial Revolution began with new technologies, such as electricity, the telegraph and the telephone, chemical industry and the production line. Meanwhile, the sectors of the First Industrial Revolution continued to grow and to develop. Countries like Germany and Japan industrialised at a high speed. All around the world, railroads were constructed. Law increasingly had to deal with interesting legal questions raised by the ongoing industrialisation. One example was electricity, which was mostly invisible, powerful and had an incredible arrangement of new, fascinating possible applications. Lawyers had to figure out how they could legally frame this elusive matter. All kinds of

Change and the Development of Liability for Fault: A General Introduction', in: Miquel Martín-Casals (ed.), *The Development of Liability in relation to Technological Change* (Cambridge University Press 2010), 7. See also Nina vom Feld, *Staatsentlastung im Technikrecht. Dampfkesselgesetzgebung und überwachung im Preussen 1831-1914* (Klostermann 2007); M Eckardt, *Technischer Wandel und Rechtsevolution. Ein Beitrag zur ökonomischen Theorie der Rechtsentwicklung am Beispiel des deutschen Unfallschadensrecht im 19. Jahrhundert* (Mohr 2001). D. Ziegler, *Eisenbahnen und Staat im Zeitalter der Industrialisierung* (Steiner 1998).

⁸ Sean Bottomley, *The British patent system during the industrial revolution, 1700–1852* (Cambridge University Press 2014).

⁹ Interestingly, the Swedish Expropriation Law of 1845 did not have a link with the construction of railroads. See Jonatan Bromander, *Expropriation i Sverige – en rättshistorisk analys* (examensarbete Juridiska institutionen Uppsala 2020).

¹⁰ Marc Steinberg, *England's great transformation: law, labor, and the Industrial Revolution* (The University of Chicago Press 2016).

difficult legal issues emerged.¹¹ What was electricity? An object? Which legal qualification should it receive? Electricity could be produced, measured, traded, stolen, etc. Other difficulties arose. The Industrial Revolution developed organically; over the years, each country or even each company had developed its own standards. Lawyers and engineers gathered at international conferences to develop universal standards, for instance, regarding electricity.¹²

The Second Industrial Revolution increasingly fuelled the legal development. New branches of law popped up and old ones blossomed. “*Industrial law*” became the hot topic of the day. For instance, in Belgium in 1898, no less than three specialised journals on this topic saw the light of day.¹³ Industrial law included *inter alia* patent law that had to deal with the numerous conflicts arising out of scientific discoveries and technical advances. Industrial workplace accidents also received increasing attention from lawyers, because of the many liability issues that arose. For instance, in 1884, a Belgian lawyer, Charles-Xavier Sainctelette, wrote a fascinating booklet titled “*De la garantie et de la responsabilité (accidents de transport et de travail)*” – “*On warrantee and liability (transport and workplace accidents)*”.¹⁴ Starting from railroad liability cases from the

¹¹ A famous example is the efforts by the German Reichsgereicht to define the railroad in 1879: ‘[e]ine Eisenbahn [...] ein Unternehmen [sei], gerichtet auf wiederholte Fortbewegung von Personen oder Sachen über nicht ganz unbedeutende Raumstrecken auf metallener Grundlage, welche durch ihre Konsistenz, Konstruktion und Glätte den Transport großer Gewichtsmassen beziehungsweise die Erzielung einer verhältnismäßig bedeutenden Schnelligkeit der Transportbewegung zu ermöglichen bestimmt ist, und durch diese Eigenart in Verbindung mit den außerdem zur Erzeugung der Transportbewegung benutzten Naturkräften – Dampf, Elektrizität, tierischer oder menschlicher Muskeltätigkeit, bei geneigter Ebene der Bahn auch schon durch die eigene Schwere der Transportgefäße und deren Ladung usw. – bei dem Betriebe des Unternehmens auf derselben eine verhältnismäßig gewaltige, je nach den Umständen nur bezweckterweise nützliche oder auch Menschenleben vernichtende und menschliche Gesundheit verletzende Wirkung zu erzeugen fähig ist’. One has to know what a railroad is to understand the definition. Roman Konertz & Raoul Schönhof, *Das technische Phänomen “Künstliche Intelligenz” im allgemeinen Zivilrecht* (Nomos 2020) 16.

¹² Miloš Vec, *Recht und Normierung in der Industriellen Revolution. Neue Strukturen der Normsetzung in Völkerrecht, staatlicher Gesetzgebung und gesellschaftlicher Selbstnormierung* (Klostermann Vittorio 2006).

¹³ The *Revue pratique et juridique des accidents du travail* (1898–1899), the *Revue pratique du droit industriel* (1898–1919) and the *Revue des questions de droit industriel* (1898–1942).

¹⁴ Charles-Xavier Sainctelette, *De la garantie et de la responsabilité (accidents de transport et de travail)* (Bruylant 1884).

early 1880s, he developed a completely new theory. Sainctelette was an early legal realist who started from reality (= the world as it was) and criticised the dominant exegetic school, which looked at the world through the lens of legal fiction (= the world as it is in the law codes). One decade later, these ideas would be elaborated within the famous French “*École de la libre recherche scientifique*”. The industrial issues would also stimulate the development of insurance law and modern social law (labour law and social security law). Interestingly, the law faculties reacted strikingly slow on these new developments. The example of industrial and social law at the Belgian law faculties can illustrate this.¹⁵ At the end of the 19th century, the first optional courses regarding “*industrial law*” appeared at the universities, albeit outside of the law faculties. It took until 1927, when “*social legislation*” became an optional course in the law curriculum, and it only became obligatory in 1948. In the 1950s, social law expanded with several obligatory and optional courses and a fruitful interfaculty and international collaboration. In the 1960s, the law faculties all installed a specialised master’s programme on social law, anticipating on the judicial reforms and the introduction of new labour courts.

In comparison to the First Industrial Revolution, the Second Industrial Revolution seems to have had some influence on law, through the development of new areas of law; otherwise, the influence was rather limited.

4 The Third Industrial Revolution – the Age of the Computers

The start of the Third Industrial Revolution is generally situated in the 1940s, with the development of the first modern computers (Alan Turing).¹⁶ In the 1970s and 1980s, the personal computer (PC) conquered the world. In the 1990s, the Internet developed with the speed of light, linking together computers from all over the world. For many among us,

¹⁵ Bruno Debaenst & Jérôme de Brouwer, ‘Naissance et développement de l’enseignement universitaire du droit social en Belgique’ [2017] *Tijdschrift voor Sociaal Recht* 19.

¹⁶ Michael Haenlein & Andreas Kaplan, ‘A Brief History of Artificial Intelligence: on the Past, Present, and Future of Artificial Intelligence’ [2019] *California Management Review* 61(4) 5 (6).

the Third Industrial Revolution is *erlebte Geschichte* – lived history.¹⁷ Our own past. With growing older, one develops more and more historical perspective. For instance, when I look back at my own student time, the differences with today are gigantic.¹⁸ I started studying at the university in 1995. The vast majority of students simply did not have a computer. In class, we all took notes by hand, and we turned in handwritten papers and exams. We went to the library to consult books, encyclopaedias and journals. For general information, we turned to so-called “*ad valvas*”: places where announcements were placed on the wall. We did not have cell phones, let alone smartphones: we had to queue for public phones to reach the home front. We went to class or to the pub to see friends and meet up with fellow students. One day, I received a letter saying that the university had created an “e-mail address” for me.¹⁹ There were only a dozen computers with Internet in the faculty, and they were almost always occupied. When I did manage to get a hold of a computer, most of my “e-mails” were already outdated. It felt more like a curiosity than something practical. I did not realise it at the time, but the Third industrial Revolution had caught up with me. In 1998, I got my first computer, a laptop even, to write my master’s thesis. Pure luxury, in comparison to the old typewriter. In 2001, my father gave me his old mobile phone: a gigantic, heavy NOKIA, still with an antenna. We all just underwent the revolution, from day to day, step by step, moving towards the future. Big floppy disks turned into smaller floppy disks and then into memory sticks. Computers increasingly worked faster and had more memory space. Computer programmes professionalised (think about the successive versions of Windows: Windows 95, 98, 2000, XP, etc.). The Internet grew and offered fertile ground for new Big Tech Companies such as Google, Facebook, Amazon, etc. Everything became faster and easier. Mobile phones turned into smart phones. And so on, until we have now reached 2021.

It is only when looking back that it becomes obvious the revolution we have gone through. One can only wonder how future legal historians

¹⁷ For another example, from an older colleague: Herbert B. Dixon Jr., ‘Technology and the Law 50 Years Ago,’ [2014] 53 Judges J. 38.

¹⁸ For a similar discourse, see Bernice B Donald & N Chase Teeple, ‘Not Your Father’s Legal Profession: Technology, Globalization, Diversity, and the Future of Law Practice in the United States’ [2014] 44 (3) The University of Memphis Law Review 645.

¹⁹ It was Bruno.Debaenst@rug.ac.be. RUG: the old abbreviation of “Rijksuniversiteit Gent”. AC: academic. The current abbreviation is UGent.

will look back at this spectacular period. They will be able to observe the following phenomena.

The first is the force of human adaptability. The computer revolution went very naturally. The transition happened gradually, step by step. Just as with electricity, we simply grew accustomed to the computational wonders. Lawyers also adapted to the new tools and new ways of information gathering. Ethan Katsh testified in 1996 that “virtually all lawyers associated with the 500 largest law firms had computers on their desks”. It was an exciting time and futurists such as Richard Susskind predicted huge changes in the legal world.²⁰

However, despite the many fundamental changes brought by the computer, we can meanwhile also observe that the general impact of the Third Industrial Revolution on law has not been that drastic. The way in which legal professionals process and share information may have changed because of the computer, e-mail and the Internet, but these technologies have not fundamentally transformed the way lawyers work.²¹ Lawyers are rather conservative, and they do not like to change their usual modus operandi.²² It is this force of tradition that explains why it took (takes) so long for many of the predictions from the nineties to become real. Look at legal books and journals. In the 1990s, futurists predicted virtual libraries.²³ Even if this has nowadays largely become true, we still have paper books and journals. However, the revolution is ongoing and unstoppable. In 2016, Columbia Law School cancelled its subscriptions to 450 Law Reviews – all the journals that immediately uploaded their content to HeinOnline.²⁴ There was simply no longer a need to buy the paper version. The lesson is clear: eventually, all, or nearly all, law reviews

²⁰ Richard Susskind, *The Future of Law: facing the challenges of information technology* (Clarendon Press 1996).

²¹ Willem H. Gravett, ‘Is the Dawn of the Robot Lawyer upon Us? The Fourth Industrial Revolution and the Future of Lawyers’ [2020] 23 Potchefstroom Electronic Law Journal 1.

²² The already mentioned Sainctelette gave a nice description in his 1884 book: ‘(...) de tempérament et d’habitude, les juristes sont conservateurs’. Charles Sainctelette, *De la responsabilité et de la garantie (accidents de transport et de travail)*, (Bruylant, 1884), 49.

²³ Ethan Katsh, ‘Competing in Cyberspace: The Future of the Legal Profession’ [1996] 52 Technological Forecasting and Social Change 66.

²⁴ Thomas W. Merrill, ‘The digital revolution and the future of law reviews’ [2016] 99 Marquette Law Review 1101.

will publish only online.²⁵ In other words: the force of tradition can slow progress down, but it will not stop it.

Another observation is that – just as with the previous two industrial revolutions – lawyers quickly conquered the uncharted territory created by the new Industrial Revolution. Already in the 1960s, Jan Hellner and Peter Seipel from Stockholm University got interested in the possible legal applications of computers.²⁶ It led in 1968 to the *Arbetsgrupp för ADB* (automatisk databehandling) *och Juridik*, which studied both the search for legal information by computers, and the legal questions that arose from the new technology. The group organised teaching and seminars, built a specialised library and supported research.²⁷ In 1977, Peter Seipel defended his PhD titled “*Computing law: perspectives on a new legal discipline*”.²⁸ In 1981, the *Arbetsgrupp* transformed into the *Institutet för Rättsinformatik* (The Swedish Law and Informatics Research Institute) at Stockholm University.²⁹ The Institute served (and serves) as a platform where people from inside and outside the university could meet to discuss law and informatics.

Just as with the previous industrial revolutions, new areas of law have emerged on the crossroad of law and the Third Industrial Revolution. New journals have been founded, such as “*Computer Law & Security Review*” in 1985 and “*Information & Communication Technology Law*” in 1992. The law curriculum has also been updated with some new courses such as “*Rättsinformatik*” in Stockholm and “*Information och rätt – immaterialrätt, yttranderätt och Internet*” in Uppsala. All in all, however, the new areas of law have remained marginal. They are the object of a few specialists, and they have not affected the mainstream law curriculum.

²⁵ Katharine T. Schaffzin, ‘The Future of Law Reviews: Online-Only Journals’ [2016] 32 *TOURO L. REV.* 243.

²⁶ Agneta Lundgren (ed.), *Svenska föreningen för ADB & Juridik 25 år 2006* (Svenska föreningen för ADB och Juridik 2006).

²⁷ One example: “Jag har haft förmånen att få denna uppsats diskuterad inom Arbetsgruppen för ADB och Juridik vid Juridiska Institutionen i Stockholm (...)” Peter Seipel, ‘Om användning av automatisk databehandlingsteknik inom juridiken’ [1970] *Svensk Juristtidning* 17.

²⁸ Peter Seipel, *Computing law: perspectives on a new legal discipline* (LiberFörlag 1977).

²⁹ Institutet för rättsinformatik – The Swedish Law and Informatics Research Institute, Law and Information Technology, ICT regulations, E-governance, Privacy (irilaw.org) consulted on 13 August 2021.

5 The Fourth Industrial Revolution – The Age of Artificial Intelligence (AI)

Today, while the Third Industrial Revolution is still ongoing and deepening, the Fourth Industrial Revolution has already started to unleash its powers.³⁰ We are at the dawn of the Age of Artificial Intelligence (AI).³¹ Technology is advancing at an incredible speed, with the simultaneous and interactive development of AI, Augmented and Virtual Reality, the Internet of Things, Blockchain, Drones, Robots and 3D Printing.³² The driving forces behind these evolutions are the advancements in computing, where the speed, power and capacity have been doubling every two years.³³ *‘Between 2000 and 2017 three critical things happened simultaneously in the technology universe: computer processing power increased from 10^3 to 10^7 ; the cost of data storage reduced from \$12.4 per GB to \$0.0004 per GB; and there was unquantifiable and astronomically huge data growth’*.³⁴

When looking at the interaction of the Fourth Industrial Revolution with law, we can detect some familiar patterns that we recognise from the previous industrial revolutions.³⁵ To start with, some lawyers are quickly becoming cyberspace astronauts, to boldly go where no man has gone before, to discover new and uncharted territory or do something that no one has done before.³⁶ The AI universe needs regulation, and the many

³⁰ Cfr. the already mentioned Karl Schwab.

³¹ On the history of Artificial Intelligence, see: Michael Haenlein & Andreas Kaplan, ‘A Brief History of Artificial Intelligence: on the Past, Present, and Future of Artificial Intelligence’ [2019] *California Management Review* 61(4) 5.

³² I have no doubt that most readers of this contribution have a good understanding of AI, but if necessary, see: Rembrandt Devillé, Nico Sergeysse and Catherine Middag, ‘Basic concepts of AI for legal scholars’ in Jan De Bruyne and Cedric Vanleenhove (eds), *Artificial Intelligence and the Law* (Intersentia 2021) 1.

³³ Benjamin Alarie, Anthony Niblett & Albert H Yoon, ‘Law in the future’ [2016] 66 (4) *University of Toronto Law* 423 (424); Jerry Kaplan, *Artificial Intelligence, What Everyone Needs to Know* (Oxford University Press 2016) – I actually consulted the German translation through *Künstliche Intelligenz - Eine Einführung* (oreilly.com) last consulted on 8 August 2021.

³⁴ Anthony E. Davis, ‘The Future of Law Firms (and Lawyers) in the Age of Artificial Intelligence’ [2020] 16 (1) *Direito e Tecnologia* 1 (3).

³⁵ For a legal theoretical perspective, see: Roman Rouvinsky, ‘Law in the Age of the 4th Industrial Revolution: Between the Impersonal Technology and Shadow Orders’ [2021] 9 (1) *Russian Law Journal* 4.

³⁶ Taken from the intro of the Star Trek television series.

applications of AI raise numerous ethical and legal issues.³⁷ In many cases, law does its trick by applying old rules to new problems.³⁸ Liability questions arising from self-driving cars can be studied in tort law, and smart contracts are part of contract law.³⁹ As with previous industrial revolutions, new specialised journals are popping up. For example, in 2018, the “*Journal of Robotics, Artificial Intelligence & Law*” saw the light of day.⁴⁰ In the foreword of the first issue, the editors gave the following justification: ‘*With developments in this space occurring on a regular basis, and with new laws and rules being enacted to govern them, attorneys and law firms, in-house counsel, business executives, scientists, engineers, corporate compliance officers, government agencies, and everyone interested in robotics and AI need practical information on current developments in these areas. There simply is no better time than right now to begin a new journal on robotics, AI, and law*’.⁴¹ Since 2016, Springer has a series “*Perspectives in Law, Business and Innovation*”, with edited volumes on topics of the Fourth Industrial Revolution: “*New Technology, Big Data and the Law*” (2017); “*Robotics, AI and the Future of Law*” (2018); “*Legal Tech, Smart Contracts and Blockchain*” (2019); “*Big Data, Database and “Ownership” Rights in the Cloud*” (2020); and “*Autonomous Vehicles*” (2021) to name a few.⁴²

³⁷ Michiel Fierens, Stephanie Rossello and Ellen Wauters, ‘Setting the Scene: On AI Ethics and Regulation’, in Jan De Bruyne and Cedric Vanleenhove (eds), *Artificial Intelligence and the Law* (Intersentia 2021) 49; John Frank Weaver, ‘Everything is Not Terminator: The Importance of Regulating AI as Soon as Possible’ [2018] RAIL 131; Nucharee Nuchkoom Smith, ‘The 4th Industrial Revolution requires Strong Intellectual Property Laws: Where does Thailand Stand?’ [2020] 17 (12) Walailak J Sci & Tech 1294. For an oversight of the applications of AI in German law, see Dieter Krimphove, ‘Künstliche Intelligenz im Recht – eine Übersicht’, [2021] 7 Juristische Ausbildung 764.

³⁸ For examples, see: Jan De Bruyne and Cedric Vanleenhove (eds), *Artificial Intelligence and the Law* (Intersentia 2021); Woodrow Barfield & Ugo Pagallo (ed.), *Research Handbook on the Law of Artificial Intelligence* (Edward Elgar Publishing 2018).

³⁹ Jan De Bruyne, Elias Van Gool and Thomas Gils, ‘Tort Law Damage Caused by AI Systems’, in Jan De Bruyne and Cedric Vanleenhove (eds), *Artificial Intelligence and the Law* (Intersentia 2021) 359.

⁴⁰ Other examples are the “*International Journal of Information Technology*” (2017) and the “*Journal of Cross-disciplinary Research in Computational Law*” (2021).

⁴¹ Steven A. Meyerowitz & Victoria Prussen Spears, ‘Welcome to the Journal of Robotics, Artificial Intelligence & Law’ [2018] RAIL 5.

⁴² *Perspectives in Law, Business and Innovation* (Titles in this series) (springer.com) consulted on 6 August 2021.

AI technology is also increasingly useful for lawyers and legal researchers.⁴³ A recent survey in the United States revealed that 36% of law firms with 50 or more lawyers, and 90% of mega firms (with more than 1,000 attorneys), are either currently using, or actively exploring the use of, AI in their legal practices.⁴⁴ So far, artificial intelligence is mostly used for e-discovery (to go through huge amounts of information to find data that are relevant for the case), document analysis (where computer programmes analyse lengthy documents) and predictive analysis (where computational statistics give predictions on how courts will decide).⁴⁵ In my own field of legal history, there is Transkribus, “a *comprehensive platform for the automated recognition, transcription and searching of historical documents*”.⁴⁶ During my PhD research (2006–2010), I still had to transcribe hundreds of judgments by typing them in a Word document in order to be able to process them efficiently. Now the computer is able – with some help in the beginning – to do this surprisingly accurately. In the Spring of 2021, the Max Planck Institute for Legal History and Legal Theory (Frankfurt am Main) organised a conference on “*Digital Methods and Resources in Legal History*.”⁴⁷ These are only two examples illustrating the use of artificial intelligence in my own field of legal history.

Change is on the way. The only question is how fast or fundamental this change will be. Compared to the previous industrial revolutions, this one is going much faster. It is evolving at an exponential, rather than linear pace.⁴⁸ Therefore, some predict a complete “*disruption*”, where “*law as we know it*” will disappear and transform into something new. Authors such as Richard Susskind – who already made quite accurate predictions in the 1990s – predict that the legal profession will change more in the coming twenty years than in the previous two hundred.⁴⁹ Until now,

⁴³ Michael Legg & Felicity Bell, ‘Artificial Intelligence and the Legal Profession: Becoming the AI-Enhanced Lawyer’ [2019] 38 U. Tas. L. Rev. 34; See also Michael Legg & Felicity Bell, *Artificial Intelligence and the Legal Profession* (Hart Publishing 2020).

⁴⁴ Willem H. Gravett, ‘Is the Dawn of the Robot Lawyer upon Us? The Fourth Industrial Revolution and the Future of Lawyers’ [2020] 23 Potchefstroom Electronic Law Journal 1 (3).

⁴⁵ *Id.* 17–20.

⁴⁶ Transkribus consulted on 6 August 2021.

⁴⁷ Conference “Digital Methods and Resources in Legal History” | Max-Planck-Institut für Rechtsgeschichte und Rechtslehre (mpg.de) consulted on 6 August 2021.

⁴⁸ Karl Schwab, *The Fourth Industrial Revolution* (World Economic Forum 2016) 8.

⁴⁹ Richard Susskind, *Tomorrow’s lawyers. An Introduction to Your Future* (second edition, Oxford University Press 2017) xvii.

the legal sector remained all in all relatively unchanged, but the growing possibilities of artificial intelligence promise some radical changes.⁵⁰ Benjamin Alarie predicts that we are on our way towards what he calls ‘the legal singularity’, the moment when the AI revolution will hit the legal world in full force.⁵¹ Some futurists even claim we might soon reach the infamous “*Spike*”: a point at which technology will develop too quickly to be understood.⁵²

Others are less speculative and think that it will not be that drastic.⁵³ Harry Surden, for example, asks for a realistic and demystified view of AI.⁵⁴ He explains that many misconceptions arise from a lack of understanding of Artificial Intelligence. Knowing the strengths and limits of AI is crucial. No, robots will not immediately replace judges, but AI can and will help judges with their work.⁵⁵ No, Blockchain will not disrupt the legal system, but it can have some useful applications in the future.⁵⁶

I tend to agree with the latter, based on the experiences of the Third Industrial Revolution. Change will most likely be gradual. The force of tradition will slow down the process and give lawyers the time to adapt. As can be read in a recent English survey of the legal sector: ‘*Skill gaps, fear and mistrust of technology and data concerns fuel conservative approaches*’ and ‘*Importantly, the disruptive potential of such new technologies is greater in the legal services sector as this has traditionally underutilized technology (...) However, the legal services sector generally has been resistant to innova-*

⁵⁰ Dan Hunter, ‘The Death of the Legal Profession and the Future of Law’ [2020] 43 University of New South Wales Law Journal 1199.

⁵¹ Benjamin Alarie, ‘The path of the law: Towards legal singularity’ [2016] 66 (4) University of Toronto Law Journal 443; for a comment on this article, see Alan Macnaughton, ‘Using Machine Learning to Predict Outcomes in Tax Law/The Path of the Law: Towards Legal Singularity’ [2017] 65 (1) Canadian Tax Journal 271.

⁵² Damien Broderick, *The Spike: How Our Lives Are Being Transformed by Rapidly Advancing Technologies* (Tor/Forge 2001).

⁵³ Frank Pasquale, ‘A Rule of Persons, Not Machines: The Limits of Legal Automation’ [2019] 87 Geo. Wash. L. Rev. 1.

⁵⁴ Harry Surden, ‘Artificial Intelligence and Law: An Overview’ [2019] 35 GA. St. U. L. REV. 1305.

⁵⁵ Matthias Van Der Haegen, ‘Quantitative Legal Prediction: the Future of Dispute Resolution?’ in Jan De Bruyne and Cedric Vanleenhove (eds), *Artificial Intelligence and the Law* (Intersentia 2021) 73; Tania Sourdin, ‘Judge v. Robot: Artificial Intelligence and Judicial Decision-Making’ [2018] U.N.S.W.L.J. 1114.

⁵⁶ Kelvin F.K. Low & Eliwa Mik, *Pause the Blockchain Legal Revolution* (Cambridge University Press 2019).

tion, and slow to adopt new technologies relative to other highvalue sectors due to a combination of traditional practice and risk aversion'.⁵⁷

Meanwhile, at the universities, there is growing attention for legal tech and the legal implications of artificial intelligence.⁵⁸ Helsinki University offers an interesting example, with its Legal Tech Lab, founded in 2017.⁵⁹ In 2018, former Dean Kimmo Nuotio wrote: “*Law and digitalisation’ is becoming a catch-word in the legal circles. It is a merger, and we all read our own meanings into it. Law and digitalisation sounds like future. Law, as we know it, will change when we learn to use modern tools in processing it. It will change. The question is rather: How will it change? Universities should be places where the future is being made, or if not made, at least being discussed and theorized. Faculties of law tend to be somewhat traditional, as is the legal profession. It feels good to get rid of some of the dust*”.⁶⁰ The Finnish initiative bears many resemblances with the 1968 Stockholm *Arbetsgrupp*. It also gathers people from inside and outside the university who are enthusiastic about the new technological advances; it organises conferences and delivers publications.

At Uppsala University, the light now has also switched on. This book is a good example. It certainly does not come too early. It is clear that the faculty urgently needs to incorporate artificial intelligence and legal tech into its curriculum. The digital revolution is ongoing, and it will not go away. It will only increase in strength and magnitude, so we better be prepared.

6 Conclusion

There is a complex relationship between law and the industrial revolutions. History teaches us a few lessons. To start with, law has always quickly conquered the new uncharted territory. With each industrial

⁵⁷ Chay Brooks, Christian Gherhes & Tim Vorley, ‘Artificial Intelligence in the Legal Sector: Pressures and Challenges of Transformation’ [2020] 13 Cambridge Journal of Regions, Economy and Society 135 (148) and (135).

⁵⁸ About possible visions for the future of law school, see: Arthur Dyeve, ‘Fixing Europe’s Law Schools’ [2017] 25 (1) European Review of Private Law 151; H.H. Arthurs, ‘The Future of Law School: Three Visions and prediction’ [2014] 51 (4) Alberta Law Review 705.

⁵⁹ Legal Tech Lab | University of Helsinki, consulted on 13 August 2021.

⁶⁰ Riikka Koulu & Jenni Hakkarainen, *Law and Digitalisation: Rethinking Legal Services* (Legal Tech Lab 2018) 11.

revolution, law has been used to regulate and facilitate new technology. Liability law, for instance, successively dealt with the damages caused by steam engines (First Industrial Revolution), workplace accidents (Second Industrial Revolution), computer licenses (Third Industrial Revolution) and now self-driving cars (Fourth Industrial Revolution).

The marriage between law and technology has each time also led to new areas of law, with its own specialised journals, professors and disciplines. Modern patent law, for instance, is a child of the First Industrial Revolution, while modern social law (labour law and social security law) and “*law and informatics*” originate from the Second and Third, respectively.

At first sight, the Fourth Industrial Revolution is repeating the previous patterns, with only one fundamental difference. Until now, the Industrial Revolutions have not really changed the DNA of “law” itself (legal practice, legal teaching, legal research). The Third Industrial Revolution has had some impact, but the changes only came slowly, gradually and naturally, thanks to the force of tradition and the adaptability of lawyers. It seems that the Fourth Industrial Revolution might have a much more fundamental impact. Some even predict that this might change the character of law itself. Whatever lessons we try to take from the previous industrial revolutions, in the end, there is only one certitude: we will have to live long enough, so that time will tell.