

New 'Corpus Juris' from Artificial Intelligence

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Abstract¹

This article explores the legal issues arising out of surging disruptive technologies.

After a general overview of disruptive technologies at large, this article addresses one specific technology – “3D printing” – and conducts a survey of how two sets of legal rules – Product Liability and Intellectual Property – may be suitable to apply to this selected technology. The article then extends scrutiny to attempted personalization of Artificial Intelligence and attribution of liabilities to “learning machines.”

The central point of this article is to survey possible transnational effects of disruptive technologies on normative systems, like creation of customary commercial law and automation of justice.

Based upon the findings of this survey, the article lays down a proposed template chart of implementing international regulation by survey of impacts and analyses how duties of prevention, due diligence, and cooperation may be imposed upon the nations.

Finally, the article addresses possible impacts, domestic and international, over the institutions of the judiciary, the legal profession, and professional ethics.

The conclusion is that international regulation of disruptive technologies is possible if the established fundamental principles of law are passed on to new generations by the old ones who have knowledge and proficiency of the very technologies that threaten the established principles.

¹ Editor's Note: The format for this article is in accordance with standards for legal writing, not for the American Psychological Association.

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Preamble – A Silent Tide

Disruptive technologies are pervading the world, invisible, unnoticed, and the areas affected by the changes are almost countless.

The revolution tends to be noticed mostly regionally, but its risks are global and virtually all areas of society are affected.

Platform Services collect and use data through Internet connections to provide underlying services.² Computer platforms use links with other connected devices to facilitate transactions or services between individuals.³ Emerging new technologies are so differentiated and pervade so many areas of today's living that they do not even have a single common name.

The term 'Internet of Things' (IoT) is commonly used,⁴ but it covers only limited areas of application, mostly products pertaining to the concept of 'smart home,' smart appliances and the like.

The IoT name is also used for 'wearables,'⁵ connected cars (Uber, Lift), Smart Cities,⁶ but also in important social areas like healthcare,⁷ and under this label, the term 'shared economy' also is used.⁸

IoT comprises areas of social life and business that are global, spreading its application and effects to international levels, beyond local.

In the food distribution and retail, for example, WalMart has implemented blockchain platforms for verifying and tracking the produce sold by them from the place of origin to the WalMart retail store.⁹

Another term frequently used as blanket cover of disruptive technologies is Artificial Intelligence (AI), but again this term properly relates to machines capable of 'self-learning' and 'self-determining.' AI, however, is one technology with the most important possible consequences for the world at large.

² Andrew M. Danas, 'Disruptive Technologies and business models: Emerging regulatory issues from the sharing economy' (2018) 10/3 Journal of Multidisciplinary Research, 45.

³ Ibid.

⁴ The credit for inventing the name is shared by Kevin Ashton and Prof. Doctor Henning Kagermann. See, among many others <<https://iot-analytics.com/internet-of-things-definition/>> and <<https://dataflog.com/read/where-does-the-internet-of-things-come-from/524>> and <<https://www.linkedin.com/pulse/digital-transformation-manufacturing-industries-prof-dr-gaddam/>> accessed 4 May 2020.

⁵ Devices installed with sensors and software, which collect data and information about the users, for later extracting insights about the user.

⁶ Monitoring pollution, traffic congestion, shortage of energy supplies, finding free available parking slots, detecting meter tampering issues, general malfunctions and any installation issues in the electricity system, and the like.

⁷ The collected data helping personalized analysis of individuals' health and providing tailored strategies to combat illnesses.

⁸ Danas (n. 3).

⁹ See <www.forbes.com/sites/rogeraitken/2017/12/14/ibm-walmart-launching-blockchain-food-safety-alliance-in-china-with-fortune-500s-jd-com/#6831b3797d9c> accessed 4 May 2020.

Part 1 – Beyond IoT

Beyond their mundane applications, disruptive technologies have made developments of major magnitude and with transboundary reach.

The first coming to mind is *cryptocurrencies*, best known by their most famous names *Bitcoin* and *Ethereum*.

Being established privately and in most cases without the coverage of conventional money (legal tenders), *cryptocurrencies* invite intuitive thoughts of Government regulation, a theme too wide for this article.

A next best example is *ship automation*. Marine engineering, coupled with computer sciences and Artificial Intelligence, has reached advanced stages of designing and building ships capable to navigate and maneuver without a crew and even without remote control by humans.

One essay can be singled out for the complete summation of the technical and legal issues at large. It was co-authored by Daniel Ben-Ari, Yael Frish, Adam Lazovski, Uriel Eldan, & Dov Greenbaum under the title '*Danger, Will Robinson? Artificial Intelligence in the Practice of Law: An Analysis and Proof of Concept Experiment*.'¹⁰

After describing the disruptive technologies at large and Artificial Intelligence in particular, the Authors address the legal implications, beginning from 'market failure' (legal systems grown overloaded), 'market size' also overgrown, more funding for legal startups and tech resources, more data and search engines available, etcetera.

The authors then predict consequences on Judges and 'Physical Courts,' due to algorithms making possible automation of justice, and on lawyers, who may even disappear in some areas of the law. Law Schools would also change for the changed nature of the legal services and of the technical resources required of the lawyers, such as discovery, research, compliance, document generation and analysis. In short, all legal analysis would change.

In conclusion open questions remain on what will happen, but with an optimistic note: that the disruptive technologies will help overcome the overloads of justice and help funding a more efficient and creative legal profession.

Yet, the opening line of the essay is a quote from Elon Musk: 'Artificial intelligence is our biggest existential threat.'¹¹

Other studies and tests are so advanced that international organizations are now paying close attention.

The IMO (International Maritime Organization) is leading with a serious 'scoping exercise' on Maritime Autonomous Surface Ships (MASS).¹²

¹⁰ Daniel Ben-Ari and others, 'Danger, Will Robinson? Artificial Intelligence in the Practice of Law: An Analysis and Proof of Concept Experiment' (2017) 23/2 Richmond Journal of Law & Technology <http://jolt.richmond.edu/index.php/volume23_issue2_greenbaum/> accessed 30 April 2020.

¹¹ <www.bbc.com/news/technology/30290540> accessed on 4 May 2020.

¹² <www.imo.org/en/MediaCentre/HotTopics/Pages/Autonomous-shipping.aspx> accessed 4 May 2020.

The IMO study is expected to bring adjustments and changes to many international regulations¹³ and Conventions.¹⁴ The United Nations itself has paid attention. See the notes of the Economic Commission for Europe, Inland Transport Committee¹⁵ and the 2018 edition of UNCTAD's Review of Maritime Transport.¹⁶

Our essay attempts a deeper look at how the existing legal systems, laws, regulations and principles are affected, now and in future, by the ever-mounting tide of technologies, with particular attention to effects on international laws and legal systems.

We will check how the existing laws and systems may still apply to the new technologies and their revolutions, or whether new laws and systems are needed if the existing systems become inefficient or even disappear.

Before dealing with issues of a wider scope, it will help taking a close look at one specific technology that has a highest potential of disruption at local and international level.

We have selected, for a deeper treatment, the 3D Remote Printing. After a reality check of this technology we will flow into issues of transnational regulation of similar technologies and finally to the ultimate goal of this article: a possible new world of law and legal profession.

Part 2 – 3D Remote Print

2 – What is and How it Works

3D printing allows to create three dimensional solid objects of virtually any shape from a digital model (the computer aided design model). Successive layers of material are laid down and this is why it is also called additive manufacturing.¹⁷

The precision, repeatability, and material range have increased to the point to predict that by the end of the decade, additive manufacturing 'will no longer be considered a 'niche' technology, but a viable tool in the broader mix of manufacturing technologies'¹⁸

¹³ E.g. Safety and maritime security (SOLAS 1974); collision regulations (COLREG 1972); loading and stability (Load Lines 1966); training of seafarers and fishers (STCW 1978, STCW-F 1995); search and rescue (SAR 1979); tonnage measurement (Tonnage Convention 1969); safe containers (CSC 1972); and special trade passenger ship instruments (SPACE STP 1973, STP 1971).

¹⁴ Among the major ones are Convention on Oil Pollution (OPRC 1990), Carriage Of Hazardous Substances (HNS 1996), and Salvage (1989).

¹⁵ Economic Commission for Europe, 'Autonomous shipping in inland navigation: Concepts, opportunities and challenges' paper ECE/TRANS/SC.3/WP.3/2018/1 <www.unece.org/fileadmin/DAM/trans/doc/2018/sc3wp3/ECE-TRANS-SC3-WP3-2018-01e.pdf> accessed 5 May 2020.

¹⁶ United Nation Conference on Trade and Development, 'Digitalization set to revolutionize shipping – new United Nations report' (Press Release 3 October 2018) <<https://unctad.org/en/pages/PressRelease.aspx?OriginalVersionID=472>> accessed 5 May 2020.

¹⁷ Sabrie Soloman, *Additive Manufacturing -3D Printing & Design: - The 4th Industrial Revolution* (Khanna Book Publishing) 258, 259.

¹⁸ Michael Petch, *100 3D Printing experts predicts the future of 3D printing in 2030*, <<https://3dprintingindustry.com/news/100-3d-printing-experts-predict-the-future-of-3d-printing-in-2030-167623/>> accessed 5 May 2020.

The uses of '3D printing' are almost countless. From little toys to ladies' garments, from shoes to cakes and food, '3D printing' surprises us with production of large ship's propellers, even houses and artificial components of underwater reefs.

The famous Italian pasta producer Barilla developed its own proprietary pasta printer.¹⁹ Chanel created 3D Printed Mascara Brush and 3D Printed Watches.²⁰

Nike started a 3D shoe prototype called Vaporfly with the help of the 2018 Berlin Marathon winner,²¹ soon followed by Adidas and New Balance.²²

In China, the construction company HuaShang Tengda printed by 3D a house that can withstand an 8.0 earthquake,²³ while in Mexico World's First Community of 3D Printed Homes is set to House Mexico's Poorest Families.²⁴

3D printing is not even shy of science fiction. In 2018 NASA was running a 3D printing competition to design 3D homes on Mars.²⁵

However, small 3D printers are available for anyone to take home, being, to say the least, affordable to all at an ALDI UK price of only Lst. 249.99.²⁶

One beneficial utilization of 3D Printing is in the medical field.

A blog of the Federal Drug Administration titled '3D Printing of Medical Devices' informs that 'Medical devices produced by 3D printing include orthopedic and cranial implants, surgical instruments, dental restorations such as crowns, and external prosthetics,'²⁷ proudly showing a picture of models of brain, blood vessel and surgical guide made by remote printing.

FDA is now carefully following 3D Printing for its benefic uses, including its contribution to help in the shortcomings of COVID 19 supplies,²⁸ and is checking the possible serious side effects. Both issues may span across the borders.

First, the medical object printed remotely may have defects that would cause injures or damages. An article on the University of Illinois Journal of Law, Technology and Policy warns about possible product liability from medical products and organs printed remotely.²⁹

¹⁹ <<https://3dprint.com/196681/barilla-3d-print-pasta-winners/>> accessed 4 May 2020.

²⁰ <https://all3dp.com/chanel-creates-first-3d-printed-mascara-brush-better-application/?utm_source=push> <<https://www.wired.co.uk/article/chanel-boy-friend-skeleton-calibre-3-watch>> accessed 4 May 2020.

²¹ <<https://3dprintingindustry.com/news/nikes-3d-printed-elite-shoe-preparing-for-a-wider-release-142527>> accessed 4 May 2020.

²² <<https://digital.hbs.edu/platform-rctom/submission/the-future-at-nike-3d-printing-customized-shoes-at-home>> accessed 4 May 2020.

²³ <<https://inhabitat.com/3d-printed-house-in-china-can-withstand-an-8-0-earthquake>> accessed 4 May 2020.

²⁴ <www.goodnewsnetwork.org/worlds-first-community-of-3d-printed-houses> accessed 4 May 2020.

²⁵ <<https://qz.com/1352914/nasa-is-running-a-3d-printing-competition-to-design-homes-on-mars>> accessed 4 May 2020.

²⁶ <www.aldi.co.uk/3d-printer> accessed 4 May 2020.

²⁷ <www.fda.gov/medical-devices/products-and-medical-procedures/3d-printing-medical-devices> accessed 4 May 2020.

²⁸ See the blog of BBC 'www.bbc.com/news/health-52201696' accessed 4 May 2020.

²⁹ Michael H. Parka, 'For a new Heart, just click print: the effect on medical and products liability from 3D printed organs' (2015) University of Illinois Journal of Law, Technology and Policy, 187.

A more recent article in the *Journal of the Kansas Bar Association* goes further, asking the question '3D Printing and Why Lawyers Should Care.'³⁰

After a preamble on the background of the technology, the Author explains how 3D Printing may produce product liabilities and require regulation in the areas of Aviation, Automotive, Health Care, Construction, Fashion and others.

Our article chooses to focus on two areas of the effects of 3D Printing that are most relevant to the theme of the publication: Product Liability and Intellectual Property.

Before moving into that, there have been two situations that actually happened, worth a short passing note: the remote fabrication of firearms and of a suicide device.

2.1 – 3D-Made Firearms

A 25-year-old Texas libertarian fabricated by means of 3D printing a plastic gun that fired with precision and without counter-effects. He then made blueprints of his CAD design and posted it on his Website.

The transborder implications are evident.

The U.S. Department of State ordered him to take the blueprints out, under a little-known statute, the International Trade in Arms Regulation (ITAR). The libertarian resisted in court on the grounds of violation of both his Second and First amendment constitutional rights, and eventually the Department offered a quiet settlement.³¹

Subsequently, a non-profit organization that designed 3D print firearms and an Association that promoted the right to keep and bear arms, brought action against the U.S. Department of State asking for an injunction against enforcement of a pre-publication approval requirement for technical data published on the Internet. For reasons of balance of harm and public interest, the Court denied the injunction.³²

2.2 – 3D Euthanasia

Then, on another note, an Australian Euthanasia advocate, Philip Nitschke, created a suicide machine that is 3D-printed, allowing users to administer their own death.

The machine is 3D fabricated in the shape of a coffin (even disposable at job done). By pressing a button inside the pod, liquid nitrogen flows into the machine, causing death in minutes, previous painless anesthesia caused by the gas itself, an unregulated substance that can be easily purchased.

The expected legal consequences, especially at international level, are easy to imagine.

The CAD blueprint may be disseminated online from one country where euthanasia is legal and received and used for distant production in a country where it is illegal.

How could printing and using this device be prevented and who could possibly be prosecuted and where? Could there be creation of transboundary crime, like anti-trust actions committed abroad having consequences in the jurisdiction?

³⁰ Bob Lambrechts, '3D Printing and why lawyers should care' (2019) 88/2 *Journal of the Kansas Bar Association* 28.

³¹ <www.wired.com/story/a-landmark-legal-shift-opens-pandoras-box-for-diy-guns> accessed 4 May 2020.

³² *Defence Distributed v. United States Department of State* 838 F.3d 451, (5th Cir. 2015).

We are now ready to address the two classic areas of the law mentioned before: Product Liability and Intellectual Property.

2.3 – Product Liability Issues of 3D Printing

3D printing could have relevant transnational issues in the areas of product liability, as its other name, ‘remote manufacturing,’ readily suggests.

There is no uniform legal treatment at domestic level of nations, let alone international.

In fact, product liability laws vary from nation to nation, although, by way of great generalization, the liabilities for manufacturing and distributing defective products, or dangerous products, or both, are broadly found worldwide.³³

For instance, in the EU, the Product Liability Directive (85/374/EEC)³⁴ introduced a uniform system of no-fault liability for producer of defective products marketed in the European Economic Area and the General Product Safety Directive (2001/95/EC)³⁵ extended the scope of liability to agricultural and fishery products.

In the United States, there is no Federal law of product liability, but on October 13, 1979, the U.S. Department of Commerce, through its Task Force on Product Liability and Accident Compensation, issued the Model Uniform Product Liability Act,³⁶ adopted in some but not all States.³⁷

The different laws of the nations show significant differences in the ways the tort of product liability is treated, for example in determining who is responsible for product liability, whether liability is strict or by negligence, and how the factors that determine liability are defined and applied.

2.3.1 – Factor 1: Who is the Producer?

Under the UK Consumer Protection Act,³⁸ the ‘producer’ of the product is the party primary responsible for product liability.

A party may be considered a ‘producer’ by placing a trademark label on its product, thus holding itself as the manufacturer (the so-called ‘own brander’). Likewise, a distributor may also be deemed a ‘producer’ failing to disclose the identity of the party from which the product was acquired.³⁹

³³ See e.g. Israel (March 1980, based on an early proposed draft of the Directive), Brazil (September 1990), Peru (November 1991), Australia (July 1992), Russia (February 1992), Switzerland (December 1992), Argentina (October 1993), Japan (June 1994), Taiwan (June 1994), Malaysia (August 1999), South Korea (January 2000), Thailand (December 2007), and South Africa (April 2009).

³⁴ Council Directive 85/374/EEC of 25 July 1985 on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products [1985] OJ L 210.

³⁵ Directive 2001/95/EC of the European Parliament and of the Council of 3 December 2001 on general product safety [2001] OJ L 11.

³⁶ 44 Federal Regulation 62,714 (1979).

³⁷ David Frisch, *Lawrence's Anderson on the UCC West* (3rd ed Thomson Reuter 2013) vol 3 § 2-313:29 mentioning Arkansas, Kansas, Louisiana, North Carolina, Connecticut and Ohio.

³⁸ Consumer Protection Act, 1987.

³⁹ Rod Freeman, Sarah-Jane Dobson and Carol Roberts, ‘Product liability in the United Kingdom (25 October 2018) <www.lexology.com/library/detail.aspx?q=43717760-3790-4979-8002-352c5fcf84b5> accessed 4 May 2020.

The importer of a product manufactured outside the European Union (and arguably at the end of Brexit, manufactured outside the United Kingdom) will also be considered a producer.⁴⁰

In the United States, the *Restatement (Second) of Torts* is followed, attaching liability to any person 'engaged in the business of selling products for use or consumption'⁴¹ The *Restatement (Third) of Torts: Products Liability* established the 'casual' or 'occasional seller' exception, stating that strict liability 'applies only to manufacturers and other commercial sellers and distributors who are engaged in the business of selling or otherwise distributing the type of product that harmed the plaintiff.'⁴²

The Internet blog by Herbert Smith Freehills supplies more practical list of possible parties responsible:⁴³

- the manufacturer or supplier of the 3D printer;
- the manufacturer or supplier of the 3D printing material (essentially, the 'ink' in the printer);
- the printer's owner;
- the person who designed or sold the original object upon which a 3D printing design is based;
- the person who created or shared the CAD blueprint of the object;
- the person who created the object using the printer; and
- the person who sold the 3D-printed object.

It is plainly evident that any or all of these prospective responsible parties may be located in different nations in different parts of the world, with the consequence that it will be difficult to pinpoint one or all the possible parties liable, assuming that a valid jurisdiction can be established. It would be just as difficult, if not more, to determine where any of the possible parties have 'minimum contacts' for personal jurisdiction.

2.3.2 – Factor 2: What Is a 'Product' for the Purposes of Product Liability for Defective Object?

Under U.S. law, namely *the Restatement (Third) of Torts, Products Liability*, a 'product' is considered to be a piece of tangible personal property, distributed commercially, expected to reach, as it ultimately does, the user or consumer without substantial change.⁴⁴

The CAD rendering for the object may arguably be considered a product, although no definite case law is available. There are precedents, however, holding that the computer code 'such as a 3D printing CAD blueprint' is not a product.⁴⁵

⁴⁰ Legal 500, 'United Kingdom: Product Liability' <www.legal500.com/guides/chapter/united-kingdom-product-liability/> accessed 4 May 2020.

⁴¹ Joseph G. Falcone, Laura Paliani, Tony Dempster, Emerging legal issues in 3D printing and product liability, Law (2016) <www.lawjournalnewsletters.com/sites/lawjournalnewsletters/2016/09/01/emerging-legal-issues-in-3d-printing-and-product-liability-2/?slreturn=20180715070801> accessed 5 May 2020.

⁴² Ibid.

⁴³ Ibid.

⁴⁴ Ibid.

⁴⁵ Ibid. citing to *United States v. Aleynikov* 676 F.3d 71, 76 (2d Cir. 2012).

On the same line, other cases decided that a CAD blueprint for '3D printing' may be considered not a tangible piece of property, but rather intangible content.⁴⁶

Finally, the CAD rendering may undergo substantial change when converted into an object, thus it may not be considered a 'product' itself.⁴⁷

In the UK, the term 'product' is limited to tangible movable items, thus it would not include CAD renderings for 3D-printed objects.⁴⁸

2.3.3 – The Effects

Under the existing general rules of product liability, '3D printing' may have significant effects on claims for manufacturing defect, design defects, warning of defects, all in turn requiring new judicial and legislative approaches to address issues.

However, a number of issues remain not clear, as highlighted on 7 May 2018 by the European Commission.⁴⁹

2.4 – 3D Printing and IP

Unlawful uses of 3D printing are also able to infringe the (already existing) intellectual property rights, such as copyright, design, patents, and trademarks.

To copy an object protected by IP rights without permission amounts to an intellectual property rights infringement.

The method by which the infringing item is produced does not affect the applicability of IP law. Trademarks are infringed if an item is 3D printed with a third party's trademark exactly as it would have been hand-manufactured and the same applies to patent or designs or copyrighted item.

As long as the 3D printed item is produced for commercial purposes, the IP protection can be granted by the existing law. Similarly, the 3D printing process need a CAD (computer-aided design) file which, as long as IT contains something artistic or creative, is able to be protected by copyright.

However, in a number of jurisdictions, IP protection is subject to private and non-commercial and fair use exception with the consequence that if items are being produced for non-commercial purposes by individuals for personal use, they may not be considered infringing.

Will the users be removed from any form of liability? This issue seems relevant. The availability of 3D printers to private consumers or hobbyists has the potential to proliferate infringements 'away from control in the future.'⁵⁰

⁴⁶ Ibid. citing to *Winter v. G.P. Putnam's Sons* 938 F.2d 1033, 1036 (9th Cir. 1991), and *Sanders v. Acclaim Entm't Inc.*, 188 F. Supp. 2d 1264, 1277'79 (D. Colo. 2002).

⁴⁷ Ibid., citing to *K-Mart Corp. v. Midcon Realty Grp. Of Conn., Ltd.*, 489 F. Supp. 813 (D. Conn. 1980) (architect's design not subject to product liability law).

⁴⁸ Ibid.

⁴⁹ European Commission, 'Evaluation of Council Directive 85/374/EEC of 25 July 1985 on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products' (Commission Staff Working document 7.5.2018) <<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018SC0157&from=EN>> accessed 4 May 2020.

⁵⁰ John Hornick, '3D printing away from control' (2014) *Intellectual Property Magazine* 26.

Will the existing IP rights laws be able to grant protection of **private use** of 3D printers or their protection will become *de facto* ineffective?

Just like the product liability issues, the answer seems not to be so straightforward and certain once it comes to private use of technology. A ‘reworking of the law’⁵¹ seems to be a good start but the adoption and implementation of new business models could be a more efficient ‘way forward.’⁵²

2.4.1 – IP and Artificial Intelligence

In past decades, copyright in computer-generated works was less controversial because machines were just considered tools such as brushes or pens.

The framework now has changed drastically because AI is able to produce articles, novels, music, photos, video games, artworks, generate 3D printing, and develop inventions without the involvement of any human person.

Algorithms allow machines to (i) learn from inputs found on-line or received by the programmers, (ii) analyze and elaborate inputs, and (iii) generate completely new works by neural network processes like the human ones.

In 2017, Yale Professor Shlomit Yanisky-Ravid published an intriguing essay on IP protection of works generated by machines,⁵³ with reference to a computer project launched one year before by ING and the J. Walter Thompson agency in Amsterdam, along with Microsoft, TU Delft, Mauritshuis, and Rembrandthuis.⁵⁴

The 2016 project was composed of a team of data scientists, engineers, and art historians who analyzed Rembrandt’s painting techniques, style and subject matter, and transferred that knowledge to a software program that could generate a new work using the latest in 3D printing technology.

The ‘Next Rembrandt’ was a computer-generated 3-D printed painting consisting of more than 148 million pixels and created using deep learning algorithms and facial recognition techniques, based on 168,263 painting fragments from Rembrandt’s works.⁵⁵

Noting that the established principle of authorship is seriously challenged by artificial intelligence, the essay of Professor Yanisky-Ravid wondered whether we may continue to consider machines as mere tools when *de facto* they are becoming creators.

The essay proposed ‘the adoption of a new model of accountability for works generated by AI systems: the AI Work Made for Hire (WMFH) model, which views the AI system as a creative employee or independent contractor of the user. Under this proposed model, ownership, control, and

⁵¹ Dinusha Mendis, ‘The Clone Wars’: Episode 1 - the Rise of 3D Printing and Its Implications for Intellectual Property Law - Learning Lessons from the Past? [2013] European Intellectual Property Review 155, 168.

⁵² Dinusha Mendis, ‘The Clone Wars’: Episode 1 - the Rise of 3D Printing and Its Implications for Intellectual Property Law - Learning Lessons from the Past? [2013] European Intellectual Property Review 155, 168.

⁵³ Shlomit Yanisky Ravid, ‘Generating Rembrandt: Artificial Intelligence, copyright, and accountability in the 3A Era – The human like authors are already here – A new model’ [2017] Michigan State Law Review 659, available <https://ir.lawnet.fordham.edu/faculty_scholarship/956> accessed 30 April 2020.

⁵⁴ Steve Schlackman, ‘Who holds the Copyright in AI Created Art’ <<https://alj.artpreneur.com/the-next-rembrandt-who-holds-the-copyright-in-computer-generated-art/>> accessed 4 May 2020.

⁵⁵ <<https://thenextrembrandt.pr.co/130454-the-next-rembrandt>> accessed 27 April 2020.

responsibility would be imposed on the humans or legal entities that use AI systems and enjoy its benefits.⁵⁶

The essay does not stop there but adds a notation of wider scope:

‘Since AI systems are copyrightable algorithms, the Article reflects on the accountability for AI systems in other legal regimes, such as tort or criminal law and in various industries using these systems.’⁵⁷

But beyond the proposals of Professor Yanisky-Ravid, the question remains who is the legitimate owner of the copyright in this new piece? The software programmers? Nobody? Answers could be many as the legislative IP panorama is territorially fragmented.

To just give some examples, in the UK the author of computer-generated literary, dramatic, musical or artistic work shall be taken to be the person by whom the arrangements necessary for the creation of the work are undertaken.⁵⁸ Conclusions could however be different in other countries.

The U.S. copyright law only protects ‘the fruits of intellectual labor’ that ‘are founded in the creative powers of the mind.’⁵⁹ The U.S. Copyright office refuses ‘to register a claim if it determines that a human being did not create the work.’⁶⁰ This attitude is based on the rationale that works produced by machine or mere mechanical process ‘operate randomly or automatically without any creative input or intervention from a human author.’⁶¹

It is self-evident that there are no straightforward solutions.

If ownership is given to the AI programmer as a reward and incentive for her/his effort and investment, why the programmer would be rewarded for the final output created by the AI? Furthermore, if copyright is not attributed to the programmer, which could be his or her incentive?

According to the resolution adopted by the International Association for the Protection of Intellectual Property (AIPPI) during the World Congress held in London in September 2019, AI generated works should be eligible for protection by copyright only where there is human intervention in the creation of the work and if other protection requirements are met.⁶² However, it has been concluded that ‘AI generated works may be eligible for protection through a related right, even where there is no human intervention.’⁶³

Doubts could be raised also in the patent field. Inventorship has always been recognized to humans and not to machines. But who is inventor of a ‘patent protected invention’ created by AI intelligence? In 2019, a great challenge arose to the above widely recognized position when the

⁵⁶ Yanisky Ravid (n 53).

⁵⁷ Ibid.

⁵⁸ Section 9 (3), Copyright, Designs and Patents Act.

⁵⁹ *Feist Publications, Inc. v. Rural Telephone Service Co., Inc.* 499 US 340 (1991).

⁶⁰ *Burrow-Giles Lithographic Co. v. Sarony*, 111 U.S. 53, 58 (1884) quoted by U.S. Copyright Office, *Compendium of US Copyright Office Practices*, ‘Copyrightable Authorship: What Can Be Registered’ (2014) <www.copyright.gov/comp3/cover.html> accessed 30 April 2020.

⁶¹ Ryan E. Long, ‘Artificial Intelligence Art- Who owns the copyright’ (2018) The Center for internet and society <<https://cyberlaw.stanford.edu/blog/2018/05/artificial-intelligence-art-who-owns-copyright-0>> 23 April 2020.

⁶² Jan Bernd Nordemann, ‘AIPPI: No copyright protection for AI works without human input, but related rights remain’ (2019 Kluwer Copyright Blog) <http://copyrightblog.kluweriplaw.com/2019/11/21/aippi-no-copyright-protection-for-ai-works-without-human-input-but-related-rights-remain/?doing_wp_cron=1588233876.4784700870513916015625> accessed on 30 April 2020.

⁶³ Ibid.

Artificial Inventor Project team submitted two patent applications at EU and UK level⁶⁴ indicating as inventor DABUS (a type of AI connectionist).⁶⁵

Both the European Patent Office (EPO)⁶⁶ and the UK IP Office⁶⁷ rejected these applications on the grounds that the inventor designated in the application had to be a human being and not a machine.⁶⁸ The international standard of inventorship continues to be associated to natural persons. AI systems or machines cannot have rights that come from being an inventor such as the right to be mentioned as the inventor or to be designated as an inventor in the patent application.⁶⁹

Part 3 – On to Personhood

3.1 – Machine Learning

Granting IP protection to art created not by a human but by a machine is a small step to a giant leap: the ‘machine learning,’ or ‘self-learning/self-determining’ machines or, as many like to call them, robots or robotic machines.

It is difficult to give a simple and precise description of Machine Learning, because, in spite of the intuitive assessment, the concept is made of many expanded components: the machine has the capacity of doing research, observing the world external to it by using sensors, storing the data so acquired, then of processing them and reaching conclusions by itself, ultimately of taking actions autonomously based upon the experience so acquired.

In fact, even the Government Authorities that got involved with the issue had a hard time finding and using a clear-cut definition.

A Study of October 2016 made by the EU Directorate-General For Internal Policies proposed the following definition:

‘a robot, in the broad sense, should fulfil several conditions, and consist of a physical machine which is aware of and able to act upon its surroundings and which can make decisions. Only some robots may also have the ability to learn, communicate and interact, and may even have a degree of autonomy.’⁷⁰

⁶⁴ Patent applications EP 18 275 163 and EP 18 275 174 filed with the EPO and GB1816909.4 and GB1818161.0 filed with the UK Patent Office.

⁶⁵ Ryan Abbot, ‘The Artificial Inventor Project’ (2019) 6.
<www.wipo.int/wipo_magazine/en/2019/06/article_0002.html
> accessed 22 April 2020.

⁶⁶ EPO decision of 27 January 2020 on EP 18 275 163 and EPO decision of 27 January 2020 on EP 18 275 174.

⁶⁷ UK Intellectual Property Office, Decision No. BL O/741/19 issued 04 December 2019.

⁶⁸ www.epo.org/news-issues/news/2020/20200128.html

⁶⁹ EPO Decision of 27 January 2020 on EP 18 275 163 and EPO Decision of 27 January 2020 on EP 18 275 174.

⁷⁰ EU Directorate-General For Internal Policies, ‘European Civil Law Rules in Robotics’ (2016 Study for the Jury Committee) <[www.europarl.europa.eu/RegData/etudes/STUD/2016/571379/IPOL_STU\(2016\)571379_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2016/571379/IPOL_STU(2016)571379_EN.pdf)> accessed 5 May 2020.

3.2 – From Machine to Person

The Study⁷¹ is worth even more attention for it added scrutiny of the recommendations of the JURI Committee on civil law rules on Artificial Intelligence.⁷²

On 31 May 2016, the JURI group delivered a draft report that included a motion for a European Parliament resolution, which was to create a new category of individuals, specifically for robots: electronic persons.

The Study takes a negative stance to the Resolution, explaining the reasons given.

Paragraph 31(f) called upon the European Commission to explore the legal consequences of ‘creating a specific legal status for robots, so that at least the most sophisticated autonomous robots could be established as having the status of electronic persons with specific rights and obligations, including that of making good any damage they may cause [to third parties], and applying electronic personality to cases where robots make smart autonomous decisions or otherwise interact with third parties.’⁷³

The Study concluded that the idea of autonomous robots having a legal personality should be disregarded, for the idea is as unhelpful as it is inappropriate,⁷⁴ giving well-argued reasons:

‘Doing so risks not only assigning rights and obligations to what is just a tool, but also tearing down the boundaries between man and machine, blurring the lines between the living and the inert, the human and the inhuman.

Assigning person status to a non-living, non-conscious entity would therefore be an error since, in the end, humankind would likely be demoted to the rank of a machine.

Robots should serve humanity and should have no other role, except in the realms of science-fiction.’⁷⁵

Among mounting criticism,⁷⁶ the Resolution was never adopted, and the idea appears to be dead. A recent Study by the Panel for the Future of Science and Technology of the European Parliamentary Research Service issued in March 2020 at Section 2.2.4, reports without negative comments the mounting criticism.⁷⁷

3.3 – Of Machines and Torts

⁷¹ Ibid.

⁷² Ibid. Referring to Initiative – Article 46 of the EP’s Rules of procedure. The JURI Committee had set up a working group already in 2015 for drawing ‘European’ civil law rules and that, on 31 May 2016 the group delivered a draft report.

⁷³ EU Directorate-General for Internal Policies, ‘European Civil Law Rules in Robotics’ (2016 Study for the Jury Committee) <[www.europarl.europa.eu/RegData/etudes/STUD/2016/571379/IPOL_STU\(2016\)571379_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2016/571379/IPOL_STU(2016)571379_EN.pdf)> accessed 5 May 2020.

⁷⁴ Ibid.

⁷⁵ Ibid.

⁷⁶ Janosch Delcker, ‘Europe Divided over Robot ‘Personhood’ (2018) Politico <www.politico.eu/article/europe-divided-over-robot-ai-artificial-intelligence-personhood/> and ‘Open Letter to the European Commission on the Artificial Intelligence and Robotics’ <<http://www.robotics-openletter.eu/>> accessed 6 May 2020.

⁷⁷ European Parliamentary Research Service, ‘The ethics of artificial intelligence: Issues and initiatives.’ (2020) <[www.europarl.europa.eu/RegData/etudes/STUD/2020/634452/EPRS_STU\(2020\)634452_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2020/634452/EPRS_STU(2020)634452_EN.pdf)> accessed 6 May 2020.

Regardless of issues of 'status,' there is a general consensus that the law should be adjusted to address issues of 'civil liability' of intelligent machines.

What if an 'intelligent machine' commits 'insider trading,' a tort that carries also a criminal sanction, not only in the United States?

Scholarly ideas have focused, correctly, on how could damages may be recovered and from whom. In fact, the major problems with 'personalization' of machines is that machines do not have money in bank accounts (may we add sarcastically, not yet?) that tort victims may attach for enforcement.

Many scholarly exercises focus on attaching compulsory insurance to Artificial Intelligence machines, the most common idea being some form of mandatory insurance for strict liability.

But also, on contractual liability, intelligent machines may be able to engage in negotiations and to conclude contracts, once again autonomously. This means that the machines may also be able to set contractual rules, and eventually standard contractual rules.

The conclusion, at this point, is that machines, either by themselves or as instruments of a 'human agent,' have the capacity and propensity to affect the law of torts, contract and of rulemaking at international level, beyond local effects. Indeed, it may be difficult to determine what is 'local' for an 'agent' that is electronic and remotely controlled by a 'human agent.'

Part 4 – The Transboundary Effect

Having established that AI may have legal consequences across the borders of nations, questions arise whether there are legal remedies and where they could be enforced.

The study of transnational law unfolds in two disciplines: the *jurisdiction to prescribe* and the *jurisdiction to adjudicate*, the first dealing with the substantive law that should apply to human actions and disputes, the second with the way the disputes are resolved. We may call the first 'substantive law' and the second 'procedural law.'

Both disciplines rest on a common basic predicate: the locality of sovereignty.

International law is the will of the Sovereign to waive its powers delegating them to a wider system by international Conventions, which become the supreme law of the land. The result is the creation of:

- worldwide substantive laws, like the ones on Civil Aviation, Salvage at Sea and the like, and of
 - procedural laws, like the New York Convention on Arbitration.
- Artificial Intelligence has the propensity to affect both.

By causing changes in the domestic legal systems, Artificial Intelligence may change the way the international community will perceive common values in need of protection, by-passing the principle of locality. The analysis that follows is therefore applicable both ay domestic and international level.

The international as well as the domestic communities may control the negative effects of Artificial Intelligence by implementing those four components of any kind of lawmaking:

prevention, impact, due diligence, and cooperation.

4.1 – Prevention

The International Law Commission of the United Nation submitted to the General Assembly Draft Articles on Prevention of Transboundary Harm from Hazardous Activities.⁷⁸

The Articles apply to ‘activities not prohibited by international law which involve a risk of causing significant transboundary harm through their physical consequences’⁷⁹ and their scope is to make it mandatory for ‘the State of origin to take all appropriate measures to prevent significant transboundary harm or at any event to minimize the risk thereof.’⁸⁰

The rules are mostly seen as instruments for environmental protection, but in fact the rules apply to any transboundary harm of a ‘physical’ nature.

The Commentary to Article 1 clarifies that the significant trans-boundary harm must have been caused by the ‘physical consequences’ of activities,’ and adds that ‘It was agreed by the Commission that [...], it should exclude transboundary harm which may be caused by State policies in monetary, socio- economic or similar fields.’⁸¹

Therefore, physical harm caused transnationally by 3D Printing seems to fall squarely within the provision of the Articles, except that, again, it may be difficult to establish which is the ‘State of Origin’ of the act of 3D Printing, therefore, what State is responsible for taking preventive measures.

Also, as seen before, there may be acts, not only by 3D Printing, but that may also cause ‘significant transboundary damages’ that are not physical, such as violation of Intellectual Property, Antitrust laws and so on.

It seems to be desirable that International Institutions work at expanding the scope of the Articles, to include all significant harms not connected with physical actions.

4.2 – Impact

‘Transboundary Consequences’ are a synonym of ‘Impact.’ The scope of the “United Nations Articles” is to prevent impact, a word that deserves attention beyond the intuitive meaning.

A good reference for assessing the meaning and scope of the word ‘impact’ is the *International Association for Impact Assessment* (IAIA), organized in 1980 to bring together researchers, practitioners, and users of various types of impact assessment from all parts of the world, with more than 1,700 members from 120 nations, representing many disciplines and professions.⁸²

In the words of the IAIA, ‘impact assessment, simply defined, is the process of identifying the future consequences of a current or proposed action, aimed at generating informed decision-making regarding policies, programs, plans and projects, and advocates its expanded use for the betterment of society and the environment.’⁸³

⁷⁸ International Law Commission of the United Nations ‘Draft articles on Prevention of Transboundary Harm from Hazardous Activities, with commentaries’ (2001) 2 Yearbook of the International Law Commission, <https://legal.un.org/ilc/texts/instruments/english/commentaries/9_7_2001.pdf> accessed 6 May 2020 (‘ILC Articles’).

⁷⁹ ILC Articles, art. 1.

⁸⁰ ILC Articles, art. 3.

⁸¹ ILC Articles, commentary (16).

⁸² <www.iaia.org/about.php> accessed 5 May 2020.

⁸³ Ibid.

The IAIA reaches beyond the environmental issues that have been the most common use of the assessment rules. The IAIA principles and practice are indeed valuable for any transboundary event, like the ones we are dealing with in this article.

The Introduction to the IAIA's Strategic Plan 2019-2020 - 2021 confirms that AIA's purpose is 'the betterment of society through the encouragement of improved policymaking processes concerning the analysis of the future consequences of present decisions.'⁸⁴

Along with this mission statement, we find a remarkable essay by Professor Tseming Yang titled '*The Emergence of the Environmental Impact Assessment Duty as a Global Legal Norm and General Principle of Law.*'⁸⁵

Professor Yang took inspiration from a global survey of legal principles by Rudolf Schlesinger published in the *American Journal of International Law* half a century ago. The objective of the survey was the identification of a 'common core' of legal norms among the family of nations, in order to produce global principles of law.

Regretting that its ultimate goal was never realized, in spite of the initial enthusiasm, the essay describes the process, methodology and results of the survey, that is, the Environmental Impact norm having been so widely adopted to become a General Principles of Law for international environmental law.

The essay then draws the conclusion that the EIA should be a model for the creation of 'general principles of law recognized by civilized nations,'⁸⁶ beyond the limited area of environmental law.

From the mission of the IAIA and the inspired conclusions of Professor Tang we can make a progress in our analysis of the legal consequences of Artificial Intelligence at large.

The impact of Artificial Intelligence should be measured by addressing the effects of all AI actions as violations of 'general principles of law recognized by civilized nations,'⁸⁷ and not just as physical and visible events.

Naturally these general principles must exist and be individuated, or otherwise must be made afresh, which takes us to the next step, the question whether there are norms appropriate and efficient for issues of Artificial Intelligence, and more specifically of international application.

⁸⁴ <www.iaia.org/downloads/Strategicplansummary.pdf> accessed 5 May 2020.

⁸⁵ (2019) 70 *Hastings Law Journal* 525 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3202454##> accessed 5 May 2020.

⁸⁶ *Ibid.*

⁸⁷ *Ibid.*

Part 5 – Of Normative Systems

The answer is a qualified yes. At least at domestic levels, many nations and multinational entities like the European Union, have rules on IoT and related technologies.⁸⁸

Not much is found at international level, at least not a full body of laws specific to IoT and Artificial Intelligence.

In fact, an essay has noted that ‘cyberspace incidents are not controlled by effective and specific treaty-based rules because states and nonstate actors tend not to regulate their behavior to take advantage of such situations.’⁸⁹

Another essay⁹⁰ has added a very interesting ontology point of view: the American Uniform Commercial Code (UCC) is a normative system that may be used as successful model for regulating issues of e-commerce.

‘The UCC’ reads the essay ‘was derived from the Law Merchant and Lex Mercatoria, codifications of actual practice rather than normative codes drafted by inexperienced legislators.’⁹¹

5.1 – A New Customary Legal System?

It follows that all disruptive technologies used in the world of trade and commerce are natural candidates for the creation of a cyber customary law. In fact, international regulation of disruptive technologies could be achieved in only two ways: either International Conventions or creation of rules of custom.

The world of trade and commerce has an impeccable track record for creating customary rules.

The INCOTERMS and the Uniform Custom and Practice for Documentary Credit (UCP 600) are among the most successful stories of customary law. Unlike International Conventions, not even statutory law, the international community is using the collections of rules that the ICC made and has kept them ever since virtually unchallenged.

The pedigree of customary law goes back to the *Lex Mercatoria* of the Middle Ages, one more reason for being optimistic about the possibility that Artificial Intelligence at large will, in time, brew its own customary rules, that the ICC may once again celebrate.

Lex Mercatoria actually seems to have grown out of its own ‘tribunals,’ the famous ‘piepowder’ adjudicators,⁹² and this is a reminder that the Artificial Intelligence would have the capacity of programming mechanisms of dispute resolution that would operate automatically, like the very machines self-learning and self-deciding that will be sitting in the metaphorical virtual benches set up by the cyber society.

⁸⁸ See e.g. (2018) 3/3 Journal of Multidisciplinary Research, Special Issue: The Internet of Things.

⁸⁹ Akiko Takano, ‘Due Diligence Obligations and Transboundary Environmental Harm: Cybersecurity Applications’ (2018) MDPI Open Access Journal <www.mdpi.com/2075-471X/7/4/36/pdf> accessed 5 May 2020 citing Andrea Zimmermann ‘International law and Cyber Space’ (2014) European Society of International Law (ESIL) Reflection 3: 1–6.

⁹⁰ John Bagby, Tracy Mullen, ‘The Legal ontology of sales law application to ecommerce’ (2007) 15 Artificial Intelligence and Law 155 <<https://doi.org/10.1007/s10506-007-9027-3>> accessed 30 April 2020.

⁹¹ Ibid., 1.

⁹² See, e.g., Charles Gross, ‘The Court of Piepoweder’ (1906) 20/2 The Quarterly Journal of Economics 231-249.

This scenario, not impossible, would by-pass the traditional legal system, creating a ‘Jus Mercatorium’ administered by a new ‘Curia Mercatoria,’ independent from constitutionally empowered institutions.

Does it mean that Artificial Intelligence may eventually phase out not only the substantive law but also the constitutionally empowered Judiciary?

5.2 – A Contagion: Automatic Institutional Justice

Once again, this showing of aggressive expansion of Artificial Intelligence may tempt a cautionary positive answer that few examples, not well known, may support.

In August 2018, the Government of the European Republic of Estonia engaged its Chief Data Officer, Mr. Ott Velsberg, to create artificial intelligence and machine learning services for Estonia’s 1.3 million citizens.

Among the many projects of Mr. Velsberg, there is one to create a ‘robot judge’ to adjudicate small claims disputes under €7,000.00 for the purpose of clearing backlog of cases. The project is still in its infancy, a pilot test focusing on contract disputes. The parties would upload briefs, documents, and information, and the ‘robo-judge’ will issue its decision automatically, without human intervention. However, an appeal to a ‘human’ Judge is still secured.⁹³

If you are still skeptic or sarcastic, you may want to know that the same thing is happening in China.

Visit a Canada blog entitled ‘*Robot justice: China’s use of Internet courts,*’ reading:

In December 2019, China has announced that millions of legal cases are now being decided by ‘Internet courts’ that do not require citizens to appear in court. The ‘smart court’ includes non-human judges, powered by artificial intelligence (AI) and allows participants to register their cases online and resolve their matters via a digital court hearing.

The Chinese Internet courts handle a variety of disputes, which include intellectual property, e-commerce, financial disputes related to online conduct, loans acquired or performed online, domain name issues, property and civil rights cases involving the Internet, product liability arising from online purchases and certain administrative disputes.

In Beijing, the average duration of a case is 40 days; the average dispositive hearing lasts 37 minutes; almost 80 per cent of the litigants before the Chinese Internet courts are individuals, and 20 per cent corporate entities; and 98 per cent of the rulings have been accepted without appeal.⁹⁴

⁹³ <www.wired.com/story/can-ai-be-fair-judge-court-estonia-thinks-so> accessed 6 May 2020.

⁹⁴ Tara Vasdani, ‘Robot Justice: China’s use of Internet Courts’ <www.thelawyersdaily.ca/articles/17741/robot-justice-china-s-use-of-internet-courts> accessed 4 May 2020.

5.3 – And Even Automatic Justice May Not Be Enough

In 2007, Professor Thomas Schultz published an essay, at one time ingenious and provocative. The proffered idea was that the Internet may promote ‘private spheres of normativity’ that the Author considers as private legal systems more so than the Lex Mercatoria.

The idea was not imagination but came out of critical analysis of the ‘user policies’ of E-Bay that include a self-sufficient dispute resolution mechanism. The Author saw this mechanism as a ‘normative system,’ looking at least likely to a law.⁹⁵

Professor Mark Verstraete, in an essay disagreeing on smart contract as alternative to traditional contract law,⁹⁶ and Professor Barak D. Richman, disapproving calling the private adjudication systems as law, instead of litigation cost economizers⁹⁷ as we should call them, supplied a bland criticism of Professor Schultz’s idea.

Nevertheless, private adjudication systems keep existing and blooming.

Part 6 – International Regulation

6.1 – Mission Impossible?

The eluding nature of the everchanging disruptive technologies seems to suggest a qualified positive answer.

Each technology needs to receive regulation specific to the needs it is used for and the persons, assets and interests that may be affected by the specific technology. For example, intellectual property should receive specific IP rules, Anti-trust likewise, and so on.

The problem with international regulation is that the realities of the various Nations may and do vary in terms of society, economy, traditions, cultures, public policies and so on, to the extent that any attempt of establishing ‘uniform’ regulations may be, to say the least, difficult.

In particular, the level of technical advancement and adaptation to advanced technologies varies from nation to nation. We find a negative note about how ‘*AI can stop the shifting of manufacturing to the developing economies by eliminating their ‘cheap labor’ comparative advantage. Where such shifting of manufacturing still occurs due to other cost savings, investment strategies, or business goals, foreign investors’ use of AI in the Third World may ‘ghetto’ the native work force while fortifying the host country’s ‘privileged few’ - those who are chosen to share in the knowledge base of foreign technology producers.*’⁹⁸

The essay goes on adding a touching literary note:

⁹⁵ Thomas Schultz, ‘Private Legal Systems: what cyberspace might teach legal theorists’ (2007) 10 YALE Journal Law & Technology 151.

⁹⁶ Mark Verstraete, ‘The Stakes of smart contracts’ (2019) 50 Loyola University Chicago Law Journal 743 < https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3178393> accessed 5 May 2020.

⁹⁷ Barak D Richman, ‘Norms and Law: Putting the Horse Before the Cart’ (2012) 62 Duke Law Journal available at <<https://ssrn.com/abstract=2189490>> accessed on 12 April 2020.

⁹⁸ Wendy N. Duong, ‘Ghetto’ing workers with hi-tech: exploring regulatory solutions for the effect of artificial intelligence on ‘third world’ foreign direct investment’ (2008) 22 Temple International & Comparative Law Journal 63.

*The poet-philosopher Paul Valery has exclaimed that the human race now lives under a 'regime of surprise' Meaning that '[t]omorrow's society will consist solely of the extremely rich and robots [. . .]. The rest of us will all have perished in the dark alleys of the global economy!'*⁹⁹

*Her gloomy vision is exactly the reason why any regulatory solutions for the future must be based on the individual and humanism as the foundation of law, just as Paul Valery has stated: 'The value of the person remains ultimately the essential foundation of every material creation and organization.'*¹⁰⁰

Here is where our positive answer to the 'mission impossible' question becomes 'qualified.'

6.2 – A 'Uniform Qualified' Regulation Is Possible

A mission of finding a worldwide uniform regulation may be possible by aiming at the proper target: 'The value of the person,' and aiming at the proper solution: 'the individual and humanism as the foundation of law,' by implementing a transnational system of assessment of transboundary impacts from which to forge international consensus.

6.2.1 – By Assessing General Principles of Law

The United Nations are already working at this goal, though not with a specific reference to Artificial Intelligence.

At the Seventy-first Session of the International Law Commission held at Geneva, 29 April–7 June and 8 July–9 August 2019, the Special Rapporteur, Marcelo Vázquez-Bermúdez, presented the 'First Report on General Principles of Law.'¹⁰¹

The Commission was and is studying how to identify 'General Principles of Law' as 'recognized' by 'civilized nations' as already found in part by the International Court of Justice, in National Legal Systems and in the international legal system.

This road seems to be in good hands and may be expanded into investigation of how the new world of disruptive technologies should be monitored and adjusted for compliance with general principles of law.

6.2.2 – By Establishing Positive Obligations for the Nations

The essay of Akiko Takano mentioned above¹⁰² supplies an in-depth commentary on the responsibilities of Nations to prevent transboundary harm caused by nonstate actors, drawing from the obligations of due diligence with regard to transboundary harm in international water law and their possible application to cybersecurity.

⁹⁹ Ibid.

¹⁰⁰ Ibid.

¹⁰¹ Marcelo Vázquez-Bermúdez, United Nations Report of the International Law Commission A/CN.4/732<<https://legal.un.org/docs/?symbol=A/CN.4/732>>accessed 5 May 2020.

¹⁰² Takano (n 89).

The essay reminds us that, together with the sovereign powers on the nations' own resources, responsibilities come along with duties to ensure that activities within the nations' jurisdiction do not cause harm to the environment of other Nations.

6.2.3 – Due Diligence

Compliance of this 'do not harm' principle is an obligation of due diligence, whose features may be difficult to identify, yet recognized authoritatively in the works of the International Court of Justice,¹⁰³ the Stockholm and Rio Declarations and the Draft Articles on the Prevention of Transboundary Harm from Hazardous Activities.¹⁰⁴

Professor Takano goes on to say that the Nations must establish domestic and transboundary procedures in order to meet their due diligence obligations, and that this scheme is applicable also in the cyberspace. In fact, recent National practices found customary international law as being applicable, in principle, to cyberspace with some adaptation to the specific characteristics of cyberspace, still lacking a major intergovernmental governance structure.

The essay then draws the conclusion that the Nations may be imposed duties of 'cyber-diligence' to take preventive action by sharing information and security and analyzes how these obligations may be extended to non-state actors and whether in that case the nations may have an 'absolute obligation.'¹⁰⁵

6.2.4 – Cooperation

Takano's essay concludes that there is on an obligation of cooperation among Nations, beyond that of due diligence, cyberspace being global thus requiring a global regime.¹⁰⁶

Another recent valuable essay by Professor Neil Craik, published by Cambridge University Press for the British Institute of International and Comparative Law, takes over the theme of international cooperation.¹⁰⁷

The Author correctly argues that the duty of cooperation cannot be ignored because the duty of prevention alone, without notice and consultation, would be undermined,¹⁰⁸ and supplies ample material on procedures of cooperation, like timing of notifications,¹⁰⁹ duty to give reasons¹¹⁰ and remedies for breach.¹¹¹

¹⁰³ Ibid.

¹⁰⁴ Ibid.

¹⁰⁵ Ibid.

¹⁰⁶ Ibid.

¹⁰⁷ Neil Craik, 'The duty to cooperate in the customary law of environmental impact assessment' (2019) British Institute for British Institute of International and Comparative Law <www.cambridge.org/core/services/aop-cambridgecore/content/view/AB1F146A96DB6DAE9B38DE669E20ADCE/S0020589319000459a.pdf/duty_to_cooperate_in_the_customary_law_of_environmental_impact_assessment.pdf> accessed 5 May 2020.

¹⁰⁸ Ibid.

¹⁰⁹ Ibid.

¹¹⁰ Ibid.

¹¹¹ Ibid.

6.2.5 – Conclusions on International Regulations

Linking these essays with the idea proposed by Professor Yang and the global survey of legal principles published by Rudolf Schlesinger,¹¹² we have identification of ‘common core’ global principles of law and a system to protect and enforce them, all applied to Artificial Intelligence.

Most of all, the 2001 Draft Articles on Prevention of Transboundary Harm from Hazardous Activities¹¹³ keeps being a landmark of reference for any attempt to draw international regulatory schemes of Artificial Intelligence.

The draft has specific mention of the duties of due diligence,¹¹⁴ cooperation,¹¹⁵ emergency procedures,¹¹⁶ all dealt with abundance of explanation.

Part 7 – Artificial Intelligence and the Legal Systems

No matter how many different types of legal systems exist around the world, Artificial Intelligence appears to be able to penetrate them all.

If we may classify the systems in two large generic groups, we have democratic and non-democratic systems. The damages and disruption of Artificial Intelligence being used by or taking control of non-democratic systems are terrifying and way beyond the scope of this article.

Let us examine what could happen to democratic systems fallen under the influence of Artificial Intelligence.

7.1 – The Judiciary

Paradigmatically, democratic legal systems are based on the balance of three ‘powers’: Legislative, Executive and Judiciary. All three make law their own way and Artificial Intelligence would interfere with each power in a different way. To stay within the stream of this article, we address the Judicial power only.

The reason is that the Judicial power is the one with the ultimate power to say what the Law is. The famous American Supreme Court case *Marbury v Madison* is the quintessence of any democratic legal system.¹¹⁷

It follows that the Artificial Intelligence may become the ultimate maker of the law by grabbing control of the Supreme Court, if not of the whole Judiciary.

Some even saw a positive side of this hypothesis. An essay by Michelle Hildebrandt¹¹⁸ asked the question whether artificial legal intelligence may challenge the conceptual foundations of the law, and found that instead it may benefit legal certainty, predictability and openness.

¹¹² Yang (n 85).

¹¹³ ICLILC Articles (n. 78).

¹¹⁴ *Ibid.*, General Commentary, Article 2; Article 3, Commentary 7, 8, 9; 10, 11 and 13.

¹¹⁵ *Ibid.*, Article 4, Commentary.

¹¹⁶ *Ibid.*, Article 16 and 17.

¹¹⁷ *Marbury v. Madison*, 5 U.S. (1 Cranch) 137 (1803). The US Supreme Court unanimously stated that the power to say what the law is belongs to the Supreme Court.

¹¹⁸ Mireille Hildebrandt, ‘Law As Computation in the Era of Artificial Legal Intelligence. Speaking Law to the Power of Statistics’ (2017) <<https://ssrn.com/abstract=2983045>> accessed 5 May 2020.

The Author even argues that it would be Artificial Intelligence to be enriched by its attempt to understand and model the legal reasoning. The ‘endeavors’ of Artificial Intelligence will reciprocally engage and enrich the Law, supplying a better understanding of the modes of reasoning and the underlying assumption. The Law would benefit from practical computational tools and models.

The Author concludes that the relationship between AI and law is one of true synergy, the shared specialty of AI and law adding value to both.¹¹⁹

However, this wishful thinking does not account for the emerging attempts of automatic justice, as seen in Estonia and China,¹²⁰ that raise questions about the future of a ‘human’ judiciary.

We find useful food for thought in a recent essay published by Conrad Flaczyk in the Canadian Journal of Law and Technology, dealing with counterbalancing the undesirable risks introduced by new technologies like blockchain, artificial intelligence, and smart contracts with the use of ‘equitable’ legal tools.¹²¹

Equity may be what will save the ‘human Judiciary’ from being hijacked by Artificial Intelligence.

Citing to Gary Watt,¹²² the essay shares the basic truth: ‘*Without equity, the law’s story becomes all rules and no justice*’ and, adding a quote from Justice Dickson, agrees that ‘*The great advantage of ancient principles of equity is their flexibility: the judiciary is thus able to shape these malleable principles so as to accommodate the changing needs and mores of society, in order to achieve justice.*’

A concise and simplistic definition of equity is the power of Judges to decide outside the boundaries of the written and inflexible law, in other words going around or even against the written law, delivering a judicial product that is ‘irrational.’

Artificial Intelligence machines, no matter how self-learning and deciding, are programmed to give ‘rational’ decisions.

Hopefully there will always be a human judge delivering equity, even if using the help of powerful research tools.

Conversely, will there always be a ‘human’ lawyer?

7.2 – The Legal Profession

Legendary Professor Richard Susskind published a book titled ‘*The End of Lawyers?*’¹²³ The book is a partial sequel to the one that made his legal theories famous, the ‘*Future of Law*’ in 1996. It was 2008, and the subtitle of ‘*The End of Lawyers?*’ was: ‘*Rethinking the Nature of Legal Services.*’

Susskind argued that in the future many legal services may be provided through new systems of technological innovations and that the demand for legal advice delivered by law firms will diminish considerably, and as a result, there will be fewer ‘traditional’ lawyers.

¹¹⁹ Edwina L. Risslanda, ‘Artificial Intelligence and Law: Stepping Stones to a model of legal reasoning’ (1990) 99 Yale Law Journal <<https://digitalcommons.law.yale.edu/cgi/viewcontent.cgi?article=7293&context=ylij>> accessed 5 May 2020.

¹²⁰ See (n. 93) and (n. 94).

¹²¹ Conrad Flaczyk, ‘Technology, the changing nature of disputes, and the future of equitable principles in Canadian contract law,’ (2017) Canadian Journal of Law and Technology 144.

¹²² Gary Watt, *Equity Stirring: the story of justice beyond law* (Hart 2009) 45.

¹²³ Richard Susskind, *The End of Lawyers?* (Oxford University Press 2008).

A commentary took this as a prediction of an end of lawyers. 'If consumers can find what they need to know on the Internet, will they still need lawyers? Perhaps lawyers will have to assume an entirely new role.'¹²⁴

More precisely, Susskind predicted that 'Law will be gradually transformed from an advisory service to an information service as lawyers package their conventional work product in electronic form.'¹²⁵

A new role, not death, of the legal profession was actually what Susskind meant, and made it clear with a sequel in 2013 and second edition 2017: '*Tomorrow's Lawyers*' with subtitle '*An Introduction to Your Future*.'¹²⁶

Chapter 12, titled '*The Future of Law Revisited*,' confirms that his findings of 1996 had largely come true in the 20-year span projected in the book. The coming of technology and internet actually challenged and changed the nature of legal service and the nature of legal process.

Repeating the guess game of 2008 in 2013 and 2017, Susskind predicted that in years to come, '*conventional lawyers will not be as prominent in society as today.*'

Clients will not be inclined to pay expensive legal advisers for work that can be undertaken by less expert people, supported by smart systems and standard processes.

This prediction does not signal the end of lawyers entirely, but it does point to a need for fewer traditional lawyers.¹²⁷

The take of our article is that the survival of the legal profession may be assured by the same factors that assure survival of the Judiciary.

Lawyers, like the 'equity' Judges, do often go around the written law, not to breach it but to find a creative way for alternative credible arguments in aid of the client's case. Rarely, it may be a breach of the written law, occasionally, a circumvention by means of genuine convincing arguments.

In fact, when the case is decided and there is a winner and a loser, does it mean that the loser's lawyer was a liar? The truth is that in a healthy process there is no true and false, but only best and worst arguments.

This creative function of lawyers is precisely why they exist. Susskind may be right foreseeing that the clients of the future will seek a different kind of assistance, yet any client will always need from Lawyers the support of being on their side.

If Judges were allowed to do that then lawyers will no longer be needed, but impartiality is the foundation of the Judiciary; therefore, human judges and human lawyers will keep existing together, regardless of Artificial Intelligence's invasion.

At least, until robots remain capable of only rational decisions. The flexibility and compassion of human Judges and the circumvention by ingenious creativity of human lawyers are in the DNA of human nature.

Changes, there will be. Susskind's conclusion of his second edition was the following:

In years to come, I predict that conventional lawyers will not be as prominent in society as today. Clients will not be inclined to pay expensive legal advisers for

¹²⁴ Stephen P. Gallagher, Leonad, E. Sienko, Jr., 'Yesterday's strategies rarely answer tomorrow's problems' (2004) 76/7 New York State Bar Association Journal 40.

¹²⁵ Ibid.

¹²⁶ Richard Susskind, *Tomorrow's Lawyers: An Introduction to Your Future* (2nd Ed Oxford University Press 2017).

¹²⁷ Ibid., 153.

work that can be undertaken by less expert people, supported by smart systems and standard pro-cesses.

This prediction does not signal the end of lawyers entirely, but it does point to a need for fewer traditional lawyers.

At the same time, when systems and processes play a more central role in law, this opens up the possibility of important new forms of legal services for those lawyers who are sufficiently flexible, open-minded, and entrepreneurial to adapt to changing market conditions.’¹²⁸

7.3 – Ethics

New forms of legal services, new jobs, but there will be more.

In the first place, the rules of Ethics. The American Bar Association Model Rules are representative of what is expected of Lawyers all over the world.¹²⁹

Rule 11 (Competence) reads: ‘A lawyer shall provide competent representation to a client. Competent representation requires the legal knowledge, skill, thoroughness and preparation reasonably necessary for the representation.’

The day when most disputes will require solution of issues loaded with disruptive technologies, how could a Lawyer fulfill the Competence duty without being proficient in, and above, the disruptive technologies?

Rule 12 on Diligence reinforces Rule 11. Same for Rule 14 (Communications) and 16 (Confidentiality).

Even more deeply come the issues of Bar Admission, and even before admission come the issues of preparation, that is the Law Schools. If the duty of Competence requires expertise of disruptive technologies, the Bar Exam may one day include a session on technologies.

In order to pass this part of the Bar, the candidate should have received education not just in the technologies but especially in the legal applications of the technologies.

It follows that if Susskind is right (and we agree that he is), we will have not just new tomorrow’s lawyers but also new tomorrow’s Law Schools and Bar Associations.

The final conclusion of Susskind is an inspired call to a new mission for the future lawyers:

‘I implore you, tomorrow’s lawyers, to take up the mantle of the benevolent custodians; to be honest with yourselves and with society about those areas of legal endeavor that genuinely must be preserved for lawyers in the interests of clients. But you should work in the law in the interests of society and not of lawyers. It is not the purpose of law to keep lawyers in business.

The purpose of lawyers is to help to support society’s needs of the law.’¹³⁰

Conclusions

Artificial Intelligence presents indeed many threats, but also supplies a huge amount of help and benefits.

¹²⁸ Ibid.

¹²⁹ American Bar Association, Text of the Model Rules of Professional Conduct <www.americanbar.org/groups/professional_responsibility/publications/model_rules_of_professional_conduct/model_rules_of_professional_conduct_table_of_contents/> accessed 5 May 2020.

¹³⁰ Susskind, (n 127) 195.

The immense capacities to search, store, and process data can be invaluable for professionals, researchers, and lawmakers alike.

Self-learning machines are already capable of collecting data from all jurisdictions of the world, none excluded, recording legal decisions and, by using self-learning, classifying them for values pursued, in the backdrop of ethnical, social, and cultural systems, able to identify common policies and social attitudes.

Intelligent machines also are capable to understand data in any language, and to translate them from any language to another. The legal community of the whole world would then have equal availability of a worldwide 'survey' of the law, understood in any language, and instantly comparative.

If lawmakers (intending International Organizations, scholars, judiciaries, and professionals) learn how to profit from this windfall of benefits, a new law may dawn on the global world.

In the early years, circa 500, Roman Emperor Justinian created a new body of laws by surveying and sifting through legal decisions in order to find legal principles from real life, rather than from pre-conceived ideas and rules.

The *Corpus Juris Civilis* was born, and with the help of Artificial Intelligence this may rise again, giving the world a global 'common law.'

For example, the path of Artificial Intelligence through the Law and vice versa appears to be well defined in the realm of commerce and trade. As it happened since the Middle Ages, the community of trade is likely to develop and safeguard its own customary rules.

A new 'Jus Mercatorium' will bloom out of practice and observation of usages, making a body of substantive law: 'Lex Mercatoria,' together with its own mechanisms of dispute resolution: 'Curia Mercatoria.'¹³¹

Certain laws specific to special domains, like intellectual property and anti-trust, also likely will find international solutions through International Conventions, and multinational bodies like the United Nations and the European Union will find ways to preserve and improve general principles of law and basic human rights.

But all this may be in jeopardy if the participation of the most active components in the making and maintaining the law is lost, that is: the legal profession and a '*Marbury v. Madison*' judiciary.

In the end, it is only the amazing creativity and healthy passion of the lawyers that make principles and human values live and thrive, by accepting and defending selected cases for ultimate disposition by a Constitutional Judiciary that has a healthy feeling of equity in its DNA.

Of all the dangers of the invading disruptive technologies, the gravest is a change or disappearance of the legal profession and of a human judiciary equipped with equity, a thing that may happen for change of mental attitudes induced by the evolution and revolution of technologies.¹³²

On this line, private justice by arbitration should be appreciated and used for its undeniable merits but should be at the same time carefully monitored in order not to lose the accountability of

¹³¹ Possibly, almost certainly, arbitration.

¹³² Guido Boella, Leon van der Torre, 'Attributing Mental Attitudes to Normative Systems' Proceedings of Conference: The Second International Joint Conference on Autonomous Agents & Multiagent Systems, AAMAS 2003, July 14-18, 2003, Melbourne, Victoria, Australia < www.researchgate.net/publication/221454490_Attributing_mental_attitudes_to_normative_systems> accessed 6 May 2020.

the judiciary system. Artificial Intelligence may thrive in a dispute resolution system that is totally in the uncontrolled hands of those who should be instead monitored by society's control with the means of prevention, impact, due diligence, and cooperation.

Today's lawyers are capable of transmitting values to the lawyers of tomorrow by procuring convincing arguments or authoritative judgments upon honest protection of their clients' rights and desires and by holding themselves as 'officers of society' and not just wards of the clients.

To do this, the lawyers, as well as the international lawmakers and Judges at large, should be able to step up to the times, become proficient in the new technologies, in other words 'speak the same technological' language that will be the norm of the new generations, who may be disinclined to learn old rules, under the influx of new mental attitudes.

The mental attitudes fostered by the technologies will be as disruptive as the technologies themselves and can be controlled only using the same technologies that threaten the established values.

Successful action at home would eventually be recognized as a model by the international community, as just seen above. In fact, Artificial Intelligence itself would 'self-learn' common aspirations of humanity at large.

The job can be done. Paraphrasing the adage, old dogs will have to learn new tricks if they want the young dogs learn the old.

If that happens, we could safely say that:

The future was yesterday, and the past will be tomorrow.

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Discussion Questions

1. The existing legal systems attempt to deter socially detrimental conduct by punitive damages that “human actors” often do not heed. Would the Artificial Intelligence “machine learning” process draw law-abiding rules of conduct that it will use automatically? Why or why not? Then, would it be desirable to leave at least contractual and commercial decisions to Artificial Intelligence machines? Why or why not?
2. This article theorizes that Artificial Intelligence may create worldwide uniform laws. Could the same happen for the enforcement of those laws, like the formation of uniform process enforcement units, acting locally under central command of an international virtual law court? Why or why not? What about protection of due process and human rights?
3. Will the boundless resources of language translation and virtually unlimited data storage capacity of Artificial Intelligence “level the field” between solo practitioners and mega law firms, and make the use of supporting jobs (paralegals, secretaries, etc.) no more indispensable with consequences on the job markets and education systems? Why or why not?

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