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Artificial Intelligence, Affordances and Fundamental Rights

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ABSTRACT

This paper is about the relationship between AI technology and society in fundamental rights theory. In fundamental rights doctrine, the relationship between technology and society is seldom reflected. Legal practitioners tend to view technology as a black box. For scholars of science and technology studies (STS), similarly, the law is a closed book. Such reductionist or compartmentalised thinking in the law and social sciences must be overcome if a conceptualisation of AI technology in fundamental rights theory is to be successful.

The paper offers a perspective on these issues that is based on a re-interpretation of affordance theory (as originally framed in STS). First, the question "how do affordances come into a technology?" is answered from the viewpoint of Bryan Pfaffenberger's "technological drama". Accordingly, the affordances (the possibilities and constraints of a technology) are shaped in a dialogue between a "design constituency" and an "impact constituency" in which the technology's materiality and sociality are co-determined. Second, this theory is applied to study the co-determination of AI technology. Finally affordance theory is combined with socio-legal theorising that understands fundamental rights as social institutions bundling normative expectations about individual and social autonomies. How do normative expectations about the affordances of AI technology emerge and how are they constitutionalised?

KEY WORDS

Artificial Intelligence, affordance theory, technological drama, normative expectations, constitutionalisation.

Information • Communication • Art • Law Lab

ARTIFICIAL INTELLIGENCE, AFFORDANCES AND FUNDAMENTAL RIGHTS

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1. Introduction

The expansionism of giant platform firms has become a major public concern[1], an object of political scrutiny[2] and a topic for legal research[3]. As the everyday lives of platform users become more and more "datafied"[4], the "power" of a platform correlates broadly with the degree of the firm's access to big data and artificial intelligence (AI). From a constitutional law perspective, a question of primary importance is whether technology-enabled actions of mega platforms interfere with an effective use of fundamental rights online.

However, legal doctrine faces problems in addressing the key conceptual challenges of fundamental rights on the Internet. This is because the classic liberal approach conceives fundamental rights as constitutional norms protecting the individual against the power of the nation state. However, mega platforms such as Facebook and Google/YouTube, that together amass more than 60 per cent of global digital advertising revenues[5] and combine "the functions of conduits, content providers, and data brokers"[6] for billions of people around the world, do not fit the triad of individual, power and state. What is more, classic fundamental rights doctrine does not provide for classifications that would permit conceptually including technologies, physical objects or materialities in general[7].

As organisations that are enabled by networked technologies, platforms raise new fundamental rights questions, which are related to the material preconditions of an effective individual or social enjoyment of fundamental rights. An example highlighted in this text is platforms using AI-driven personalisation technologies in

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[1] *Taming the Titans. Google, Facebook and Amazon are Increasingly Dominant. How Should They Be Controlled?* The Economist (January 20, 2018); Shoshana Zuboff (2015), *Big Other: Surveillance Capitalism and the Prospects of an Information Civilization*, Journal of Information Technology, 30 (1): 75-89, 85.

[2] Council of Europe (2018), *Recommendation CM/Rec (2018) 2 of the Committee of Ministers to Member States on the Roles and Responsibilities of Internet Intermediaries* (March 7, 2018).

[3] Frank Pasquale (2016), *Platform Neutrality: Enhancing Freedom of Expression in Spheres of Private Power,* Theoretical Inquiries in Law, 17: 487-513; Julie E. Cohen (2017a), *Law for the Platform Economy*, UC Davis Law Review, 51: 133–204.

[4] Viktor Mayer-Schönberger and Kenneth Cukier (2013), *Big Data: A Revolution That Will Transform How We Live*, *Work and Think*, London: Murray, chap. 5; Cohen 2017a, 252.

[5] *Why Google and Facebook Prove the Digital Ad Market is a Duopoly,* Fortune (July 28, 2017), http://fortune.com/2017/07/28/google-facebook-digital-advertising/.

[6] Pasquale 2016, 512.

[7] For a discussion, see Julie E. Cohen (2017b), *Affording Fundamental Rights: A Provocation Inspired by Mireille Hildebrandt*, Critical Analysis of Law, 4 (1): 78-90.

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opaque ways to manipulate flows of information. Such practices have been criticised as interfering with subjective individual rights, including data privacy, physical and mental personal integrity and free speech. However, as far as *subjective individual rights* are concerned, the absence of a fundamental rights accountability of platforms is not a problem in my view. One does not need fundamental rights for this; ordinary regulations of state law such as statutes of private law (liability or tort law), penal law, and data protection law will do[8]. The real fundamental rights issue lies at the *trans-individual (discursive) level*. From the perspective of sociological systems theory (which methodologically informs this text), platforms are perceived as expansive social systems entailing the risk of thwarting society's autonomous self-reproduction.[9] Hence, a true fundamental rights question to ask would be whether, for example, the effects of non-transparent online content personalisation affect the autonomy of the political discourse. Research by Cass Sunstein and others suggests that the extended use of AI-powered personalisation technologies by platform firms is reinforcing the already existing trend towards "filter bubbles"[10] and fragmented public spheres[11]. This opens the worrying prospect that communication – including about political issues – is increasingly taking place only between like-minded parties, and requires us to think more deeply about political autonomy and the future of democracy in the digital ecosphere.

In this chapter, I would like to focus on a particular aspect of this topic that is almost entirely overlooked in the current fundamental rights debate. It is about the difficult relationship *between the social and the material* in fundamental rights theory. How does the materiality of technology facilitate or limit the institutionalisation of fundamental rights online? Questions of this kind are caused, for example, by personalisation technologies that may corrode a user's trust in the integrity of the infrastructure she is using for online communication. Smart personalisation technologies put the platform in a position to materially interfere with the communication process and technically manipulate the global flows of social

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[8]   See Council of Europe 2018.

[9]   For their self-reproduction, given historical societies have depended on specific information and communication technologies. See Mireille Hildebrandt (2015), *Smart Technologies and the End(s) of Law: Novel Entanglements of Law and Technology*, Cheltenham, UK; Northampton, MA: Edward Elgar, chap. 8; Christoph B. Graber (2018), *Freedom and Affordances of the Net,* Washington University Jurisprudence Review 10: 221-56, 242-46.

[10] Eli Pariser (2011), *The Filter Bubble: What the Internet is Hiding from You*, New York: Penguin Press; see also Brittainy Cavender (2017), *The Personalization Puzzle*, Washington University Jurisprudence Review 10 (1): 97-121.

[11] Cass R. Sunstein (2017), *#Republic: Divided Democracy in the Age of Social Media*, Princeton, NJ: Princeton University Press.

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knowledge – often without people's awareness[12]. An effective use of communicative freedom online depends, inter alia, on preconditions that are technological. People will only then be effectively able to communicate freely if they have confidence in the integrity of the communicative process.

This thesis is supported by empiric evidence. As a consequence of the 2013 Snowden revelations, a wider public became aware that the US National Security Agency (NSA) was systematically monitoring all communication on the Internet[13]. As a broad study has shown for the case of Wikipedia, users' realisation of the widespread surveillance practices, in which Google, Facebook, Twitter, Apple, Microsoft and their like cooperated secretly with the NSA[14], led to a "chilling effect"[15]. The "chilling effect" theory generally describes how certain state acts may deter people from exercising their free speech rights[16]. Here, the concept is used more specifically to refer to a situation where users who lose trust in the integrity of the Internet's technical infrastructure self-censure their Internet-mediated communication.

Although technology has become more important as a condition for the effective enjoyment of communicative freedom, fundamental rights doctrine has a hard time adequately conceptualising the constraints and opportunities of materialities.[17] The current discussion about the relationship between law and technology is unsatisfactory not only in legal doctrine but also in the relevant branches of the social sciences. Legal practitioners tend to treat technologies as a black box when analysing cases or designing solution strategies. Accordingly, they are blind with regard to technologies as constraints and opportunities for effective fundamental rights enjoyment. Scholars of science and technology studies (STS) in turn have provided

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[12] International Panel on Social Progress (2016), *Chapter 13 – Media and Communications*, (August 20, 2016), 66.

[13] Glenn Greenwald (2014), *No Place to Hide: Edward Snowden, the NSA, and the U.S. Surveillance State*, New York: Metropolitan Books/Henry Holt.

[14] Although Google, Apple, Yahoo, Microsoft, Facebook and AOL denied having given NSA consumer data for surveillance purposes, Rajesh De, the NSA general counsel, testified in a hearing of the Privacy and Civil Liberties Oversight Board (an independent agency within the US Government) on 19 March 2014 that "all communications content and associated metadata harvested by the NSA under a 2008 surveillance law occurred with the knowledge of the companies – both for the internet collection program known as Prism and for the so-called 'upstream' collection of communications moving across the internet." *US Tech Giants Knew of NSA Data Collection, Agency's Top Lawyer Insists*, The Guardian (March 19, 2014).

[15] Jonathan W. Penney (2016), *Chilling Effects: Online Surveillance and Wikipedia Use*, Berkeley Technology Law Journal 31 (1): 118-82, 126.

[16] The seminal text on the chilling effect doctrine in US First Amendment adjudication is still Frederick F. Schauer (1978), *Fear, Risk and the First Amendment: Unraveling the Chilling Effect*, Boston University Law Review 58: 685-732. See also Leslie Kendrick (2013), *Speech, Intent, and the Chilling Effect*, William & Mary Law Review 54 (5): 1633-91.

[17] For a discussion, see Hildebrandt 2015 and Cohen 2017b.

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sophisticated analyses on the relationship between the material and the social. Meanwhile they have mostly been treating law and regulation as a closed book rather than considering their built-in dynamics, which is unsatisfactory as well.

Adopting a legal sociology perspective, this chapter seeks to take the debate about law and technology further and situate AI-driven technologies in a framework of affordance theory and fundamental rights. In a first step it will argue for a conceptualisation of affordances in the light of Bryan Pfaffenberger's technological drama before asking whether such a theoretical perspective can also be employed to analyse AI. The current debate about AI creates an image of AI technology as something impenetrable. The chapter argues that this is mostly ideology and that normative expectations regarding the functionality of AI technologies can emerge from civil society to some extent. Finally, a sociological systems theory-inspired perspective of fundamental rights is introduced, understanding such rights *sociologically* as those institutions of society where normative expectations about the protection of individual and social autonomies are bundled.

2. THE PROMISE OF AFFORDANCE THEORY

2.1   THE CONCEPT OF AFFORDANCE

Over the last couple of years the notion of "affordance" has increasingly been used in law, society and technology scholarship to conceptualise the constraints or opportunities for social action that are built into a technology. The notion was originally coined by the perceptual psychologist James Gibson in 1979[18]. For Gibson, animals are equipped to perceive information in their environment selectively, in function of the information's relevance for the animal's survival. Within this scheme, the environment's affordances (opportunities or invitations) are considered to be functionally relevant information for the living system[19]. Ten years later the concept was appropriated and popularised by Donald Norman, a designer[20]. According to Norman[21], the term "affordance" refers to the design aspects of an object, "primarily

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[18]   See James J. Gibson (1979), *The Ecological Approach to Visual Perception*, Boston, MA: Houghton Mifflin, and Ian Hutchby (2001), *Technologies, Texts and Affordances*, Sociology 35: 441-56, 447.

[19]   See Leah A. Lievrouw (2014), *The Materiality of Mediated Knowledge and Expression*, in *Media Technologies: Essays on Communication, Materiality, and Society*, edited by Tarleton Gillespie, Pablo J. Boczkowski, and Kirsten A. Foot, 21-51, Cambridge, MA: MIT Press, 48.

[20]   See Donald A. Norman (1988), *The Psychology of Everyday Things*, New York: Basic Books; Lievrouw 2014, 48.

[21]   Norman 1988, 8.

those fundamental properties that determine just how the thing could possibly be used." While Norman was mostly interested in a user's perception of the technological design, for Gibson it was the specific environment that made certain things possible or impossible for a living system. In the "The End(s)", Mireille Hildebrandt used the term "affordance" in the sense of Gibson to underpin her pluralistic understanding of information and communication infrastructures[22]. Like Gibson, who emphasised the relative independence of an environment's affordances from a living system's perception thereof, Hildebrandt underscored that it is more important what a technology affords than what is perceived by an agent[23].

Hildebrandt originally applied the term "affordance" to technologies, emphasising the relative and relational aspect in a technology's design and subsequent uptake[24]. In response to some of "The End(s)'" reviewers who had criticised the absence of a comprehensive theory of affordance in the book, Hildebrandt recently extended the concept beyond material technologies to include also "affordances of the law"[25]. What at first sight may appear as a sensible approximation to Julie Cohen's[26] understanding of fundamental rights as affordances has a considerable downside, in my view. The downside is that "affordance" thus lost its edge for conceptualising the relationship between the social and the material in the design and reception of a digital technology. If not only a material object but also a discourse or social system can have its affordances, the concept tends to become watered down. In the following I would thus like to redefine the concept of "affordance" with a focus on the *possibilities and constraints of a technology*. Informed by Pfaffenberger's "technological drama", the process through which affordances come into a technology will be reconstructed as a dialogue between a "design constituency" and an "impact constituency" in which a technology's materiality and sociality are co-determined[27].

In his 1990 book "Technology and the Lifeworld", Don Ihde conceptualised technology as "multistable", arguing that what a technology is depends on how it is socially embedded[28]. Basing his view on a similar understanding of technology and applying it to the concept of affordance, Pfaffenberger argued two years later that a

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[22] Hildebrandt 2015, 169-70.

[23] Hildebrandt 2015, 170.

[24] Hildebrandt 2015, 169-71.

[25] Mireille Hildebrandt (2017), *Law as an Affordance: The Devil is in the Vanishing Point(s)*, Critical Analysis of Law 4 (1): 116-28.

[26] Cohen 2017b, 78-90.

[27] Bryan Pfaffenberger (1992), *Technological Dramas*, Science, Technology and Human Values 17 (3): 282-312, 283, 296.

[28] Don Ihde (1990), *Technology and the Lifeworld: From Garden to Earth*, Bloomington; Indianapolis: Indiana University Press, 144; see also Hildebrandt 2015, 171.

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technology's affordances are "inherently multiple"[29]. According to Pfaffenberger there is always flexibility — not only in the design of a technology but also in its uptake. The flexibility in the design of a technology results from design constituencies being able to choose the politics/values that a certain technology embodies when it is created. But there is also flexibility in the way the impact constituency can interpret a technology.

An Internet-related example that supports this flexibility thesis is the hashtag. The hashtag was suggested by Twitter's impact constituency in 2007 as a means of structuring discourse on the microblogging platform[30]. In a tweet from 23 August 2007, Chris Messina asked the Twitter community, "[H]ow do you feel about using # (pound) for groups. As in #barcamp [msg]?"[31]. This was the birth of the hashtag on Twitter, the "hash" being the # sign and the "tag" a specific keyword such as "netneutrality". While the hashtag sign had been used before, inter alia as annotation referring to channels of Internet Relay Chat (IRC)[32], the innovative element of Messina's contribution was to convince the Twitter community of its usefulness as a means of indexing microblogs and grouping conversations[33]. Adding the hashtag #netneutrality to a tweet allows the marking and contextualising of communication through metadata that relates the post to a new or ongoing Twitter discussion about net neutrality[34]. Messina[35] described the advantage of the hashtag as representing "a solid convention for coordinating ad-hoc groupings and giving people a way to organize their communications in a way that the tool (Twitter) does not currently afford." The hashtag's innovation consisted in the possibility of structuring a conversation on Twitter without the need to follow a particular twitterer. This is an example of user innovation that greatly improved Twitter's significance for public

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[29] Pfaffenberger 1992, 284.

[30] See Alex Leavitt (2014), *From #FollowFriday to YOLO: Exploring the Cultural Salience of Twitter Memes*, in *Twitter and Society*, edited by Katrin Weller, Axel Bruns, Jean Burgess, Merja Mahrt and Cornelius Puschmann, New York: Peter Lang, 54-137, 137.

[31] Chris Messina (2007a), *(@chrismessina) Twitter* (August 23, 2007), Accessed January 22, 2018, https://twitter.com/chrismessina/status/223115412.

[32] See Liz Gannes (2010), *The Short and Illustrious History of Twitter #Hashtags* (April 30, 2010), Accessed January 22, 2018, https://gigaom.com/2010/04/30/the-short-and-illustrious-history-of-twitter-hashtags/.

[33] See Alexander Halavais (2014), *Structure on Twitter: Social and Technical*, in *Twitter and Society*, edited by Katrin Weller, Axel Bruns, Jean Burgess, Merja Mahrt, and Cornelius Puschmann, New York: Peter Lang, 29-42, 36.

[34] See Axel Bruns and Jean E. Burgess (2011), *The Use of Twitter Hashtags in the Formation of Ad Hoc Publics*, *Proceedings of the 6th European Consortium for Political Research (ECPR), General Conference*, University of Reykjavik, August 24-27, 2011, http://eprints.qut.edu.au/46515.

[35] Chris Messina (2007b), *Twitter Hashtags for Emergency Coordination and Disaster Relief* (October 22, 2007), accessed January 22, 2018, https://factoryjoe/2007/10/22/twitter-hastags-for-emergency-coordination-and-disaster relief/.

communication and which was later officially incorporated into the platform's architecture by Twitter Inc.[36]. It demonstrates how an impact constituency may be able to respond to a technology's affordances. Although things have prescriptive capacities[37] enlisting users into a certain role, they do not have innate regulatory aims. Rather than having built-in agency (or politics)[38], there is plasticity in the design of material things[39]. But how exactly should we envisage the process through which affordances come into a technology?

2.2 HOW DO AFFORDANCES COME INTO A TECHNOLOGY?

A persuasive answer to that question is given by Pfaffenberger's theory of the technological drama, re-constructing the process through which affordances come into a technology as a "discourse of technological 'statements' and 'counterstatements'" [40] . Pfaffenberger's theory explains how the social and the material interact when technologies are designed and received by different constituencies. The drama reconstructs the design and uptake of an artefact as recursive interactions between different constituencies in which the materiality and sociality of a technology are co-determined. According to Pfaffenberger, "the reciprocal construction of political aims and artifacts" is "coupled with the deliberate fabrication of controlled social contexts"[41]. As ideal-types, three processes or acts can be distinguished in a technological drama, including technological regularisation, technological adjustment and technological reconstitution.

The drama starts with technological regularisation — that is, the creation of a technological artefact by the design constituency. The newly designed artefact has no meaning until it is interpreted by the design constituency in a discursive process. At this stage, meaning is implanted into the artefact in such a way that some of its

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[36]   See Axel Bruns and Jean E. Burgess 2011, 2.

[37]   See Bruno Latour (1992), *Where are the Missing Masses? The Sociology of a Few Mundane Artefacts*, in *Shaping Technology/Building Society: Studies in Sociotechnical Change*, edited by Wiebe E. Bijker and John Law, Cambridge, MA: MIT Press, 225-58, 232-40.

[38]   See Langdon Winner (1980), *Do Artifacts Have Politics?* Daedalus 109: 121-36.

[39]   Trevor J. Pinch and Wiebe E. Bijker (1987), *The Social Construction of Facts and Artifacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other*, in *The Social Construction of Technological Systems*, edited by Wiebe E. Bijker, Thomas P. Hughes and Trevor J. Pinch, Cambridge, MA: MIT Press, 17-50.

[40]   Pfaffenberger 1992, 285.

[41]   Pfaffenberger 1992, 291.

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technical features embody a political aim[42]. This is the process that Pfaffenberger describes as the establishment of a cultural mythos that is a dominant view in society about what a certain technology is and what it can do. Through the establishment of the mythos, the design constituency tries to define alternative interpretations away[43]. Irrespective of the design constituency's efforts to take "logonomic control"[44] of the artefact's social context, ambiguities will always subsist.

Remaining ambiguities can be exploited by the impact constituency in the second act of "technological adjustment". At this stage the impact constituency constructs alternative interpretations and tries to establish a "counter mythos" of what the technology is or can do. The call to use the hashtag on Twitter for the purpose of discourse structuring is an example illustrating a process of technological adjustment. While such a process does not involve a change in the technology, the ensuing stage of technological reconstitution consists of a material redesign of the technology through the impact constituency.

Regarding reconstitution, the drama's third act, an example is the emergence of technology allowing users to block advertisements on the websites they visit[45]. Ad-blocking technology was created as a "counterartefact" [46] with the purpose of technically reconstituting the functionality of behaviour-tracking cookies. According to Helen Nissenbaum[47], the advertising industry's lobbying backed the introduction of the so-called "third-party" cookie by decision RFC 2965 of the Internet Engineering Task Force in 1997. The "third-party" cookie turned out to be particularly invasive on people's privacy as it allows websites to follow people even when they visit new websites. Ad-blocking technology can be seen as a technical answer to "third-party" cookies. While Adblock Plus, a creation of Eyeo, an Internet company, is the most widely used ad-blocker, many other companies are also producing such software. The meaning and value of the counterartefact, however, does not come from such companies but from those who are negatively affected by the original technology — in the case of ad-blocking, the myriad users who feel annoyed by intrusive online advertisements.

Pfaffenberger postulates that the fabrication of a counterartefact can sometimes shift from technological reconstitution to regularisation, the first act of a new

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[42]   Pfaffenberger 1992, 291.

[43]   Pfaffenberger 1992, 295.

[44]   Pfaffenberger 1992, 296.

[45]   *Online Advertising: Block Shock: Internet Users are Increasingly Blocking Ads, Including on Their Mobiles*, The Economist (June 6, 2015), https://www.economist.com/news/business/21653644-internet-users-are-increasingly-blocking-ads-including-their-mobiles-block-shock.

[46]   Pfaffenberger 1992, 304.

[47]   Helen Nissenbaum (2011), *From Preemption to Circumvention: If Technology Regulates, Why Do We Need Regulation (and Vice Versa)?* Berkeley Technology Law Journal 26: 1367-86.

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technological drama. Evidence for the truth of this thesis is again the ad-blocking case. As ad-blocking makes online publishers lose money, several such companies, including Axel Springer, Spiegel online and Süddeutsche Zeitung sued Eyeo in the German courts.[48] In what can be seen as a (new) act of technological adjustment, Eyeo then offered a compromise, authorising net publishers who were willing to pay Eyeo six per cent of their revenues, to integrate a tag on their websites that let selected ads show up[49]. Hence the technology changed from blocking any advertising to selecting ads that — for whatever reason — were not considered as bad. Eyeo for their part were busy explaining this move through the creation of a counter myth of their software, arguing on their website that:

> [W]e have learned that most users wouldn't mind seeing better, more informative ads. In fact, the majority of people we've talked to are keenly aware that advertising plays a pivotal role in keeping content online free. Trouble is, most Internet ads are still low on quality and high on annoyance, and the two sides – users and advertisers – rarely come together. That's where we come in. We find ourselves uniquely positioned to broker a compromise that makes the Internet better for all parties. We aim to make the entire ecosystem more sustainable by encouraging true innovation and non-intrusive ad standards, on the one end, and a better user experience on the other.[50]

The counter mythos that Eyeo was suggesting focuses on a trade-off between information and annoyance. The success of this suggestion is, however, doubtful as it is easy to see that Eyeo is a company that wants to make money, and the introduction of whitelists is essential to secure their business model. It is no surprise therefore that the drama continues and the suggested mythos is rejected by websites that are not willing to pay a fee. While some of these websites have developed software that blocks users who block their ads, others ask their audience to voluntarily accept ads as a contribution to high-quality news reporting[51].

For Pfaffenberger[52] "the drama can drop out of the technology." This would be a stage of "designification" which can be reached when, because of unforeseen technological or social reasons, the recursively intertwined dynamics come to an end. For Nissenbaum[53] this would be a dangerous stage because people would then be

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[48] See, for example, German Supreme Court (Bundesgerichtshof), Case No. I ZR 154/16, 19. April 2018.
[49] *Adblock-Plus-Macher reichen Medienhäusern die Hand*, Neue Zürcher Zeitung (14. September 2016).
[50] See Eyeo: Our Mission, available online at https://eyeo.com/.
[51] The Economist 2015.
[52] Pfaffenberger 1992, 308.
[53] Nissenbaum 2011, 1379.

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"inclined to accept that technology is neutral" and "forget that there are values or politics involved in technology at all."

In sum, Pfaffenberger's theory paves the way to a conceptualisation of affordances as being co-determined in recursive practices of material design and social interpretation[54]. The question addressed in the next section is whether affordance theory can also be applied to analyse the co-determination of AI technologies. The success of such an endeavour seems unlikely as AI is generally viewed to be impenetrable.

3.   AI AND AFFORDANCE THEORY

3.1   WHAT IS AI?

These days everybody is talking about AI and we are in the midst of AI hype. An article in Forbes even declared 2017 the year of AI[55]. But what is AI? According to the OECD[56], there is no universally accepted definition of AI. Yarden Katz, a Harvard neuroscientist and AI philosopher, argues that AI is a messy concept, standing for a "confused mix of terms – such as 'big data', 'machine learning' or 'deep learning' – whose common denominator is the use of expensive computing power to analyse massive centralised data"[57].

While the hype is recent, the term AI is more than 60 years old[58]. It was coined in 1955 in a research project that a group of four young mathematicians and computer scientists, including John McCarthy, Marvin Minsky, Nathaniel Rochester and Claude Shannon, proposed for the 1956 summer workshop at Dartmouth College[59]. According to the workshop mission statement the term AI referred to computers fulfilling certain tasks that normally only humans could do and the hypothesis was

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[54]   For a similar view, see Lievrouw 2014, 48.

[55]   *Why 2017 is the Year of Artificial Intelligence*, Forbes (February 27, 2017), https://www.forbes.com/sites/forbestechcouncil/2017/02/27/why-2017-is-the-year-of-artificial-intelligence/#25d709ba57a1.

[56]   OECD Publishing (2017), *OECD Digital Economy Outlook 2017*, http://dx.doi.org/10.1787/9789264276284-en, 295.

[57]   Yarden Katz (2017), *Manufacturing an Artificial Intelligence Revolution* (November 27, 2017), https://ssrn.com/abstract=3078224.

[58]   Ryan Calo (2017), *Artificial Intelligence Policy: A Primer and Roadmap*, UC Davis Law Review 51: 399-435, 401.

[59]   John McCarthy, Marvin Minsky, Nathaniel Rochester and Claude Shannon (2006), *A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence* (August 31, 1955), AI Magazine 27 (4): 12-14.

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that "every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it"[60].

In early euphoria some AI enthusiasts predicted that in no more than a generation machines would be as intelligent as human beings. In a 1970 interview Marvin Minsky told Life magazine

> In from three to eight years we will have a machine with the general intelligence of an average human being. I mean a machine that will be able to read Shakespeare, grease a car, play office politics, tell a joke, have a fight. At that point the machine will begin to educate itself with fantastic speed. In a few months it will be at genius level and a few months after that its powers will be incalculable.[61]

These lofty predictions turned out to be wrong and instead of AI flourishing, what followed were many years of what became known as the "AI winter"[62].

It is only recently that AI has attracted increasing media attention. For the OECD[63] the publicity is mainly due to breakthroughs in machine learning, which are enabled by the "availability of big data and cloud computing". Katz[64] relates the hype to a "re-branding" of the "somewhat nebulous" meaning of AI. He has reconstructed how the approaches to the meaning of AI changed from "symbolic and logic based" perspectives in the 1970s to placing neural networks and statistical tools in the foreground in the 1980s. "It seems", Katz observes, "that the term 'AI' can be made to fit nearly any cutting-edge computation offered by computer scientists." This claim is confirmed by the current association of AI with the latest breakthroughs in the realm of machine learning and big data. For Katz, AI's conceptual malleability is a key consideration explaining how the concept's meteoric rise from "zero to hero" was possible, establishing it as the epitome of the next technological revolution. Another important consideration relates to business interests of the major platforms, including Google, Apple, Facebook and Amazon, which are the driving forces behind the media attention on AI. Google, Facebook, Amazon, Microsoft and IBM

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[60]   McCarthy et al. 2006, 12.

[61]   Brad Darrach, *Meet Shaky, the First Electronic Person - The fearsome Reality of a Machine with a Mind of its Own*, Life (November 20, 1970), 58D.

[62]   *AI: 15 Key Moments in the Story of Artificial Intelligence*, BBC iWonder n.d., http://www.bbc.co.uk/timelines/zq376fr.

[63]   OECD 2017, 296.

[64]   Katz 2017, 3.

have engaged in a partnership on AI[65]. Katz[66] maintains that the current AI hype has actually been manufactured by the giant platform firms and that the rejuvenation of the AI brand is closely linked to profit motives of "surveillance capitalism". According to Shoshana Zuboff, "surveillance capitalism" is "a new form of information capitalism aiming to predict and modify human behaviour as a means to produce revenue and market control"[67].

3.2 IDEOLOGY OF AI SUPREMACY[68]

The claim that the current AI hype has been manufactured should be read together with recent critique by Katz and others that the talk about AI supremacy is mostly ideology. Arguably, the platform corporations want to make us believe that machine intelligence is outperforming human intelligence. Such claims, Katz contends, are based on a narrowly empiricist epistemology that ignores the historical context of human life[69]. Katz criticises the tech industry for creating a myth about AI technology as something impenetrable and inevitable. Referring to Karl Marx's concept of "commodity fetishism", Jack Balkin makes a similar point[70]. In "Capital" Marx coined the term "commodity fetishism" to criticise people treating commodities as if they had inert value whereas in reality the commodity's value is a social construct[71]. According to Balkin[72], AI fetishism serves the purpose of producing effects making society believe that AI technologies substitute for human beings[73].

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[65] *Partnership on AI Formed by Google, Facebook, Amazon, IBM and Microsoft*, The Guardian (September 28, 2016), https://www.theguardian.com/technology/2016/sep/28/google-facebook-amazon-ibm-microsoft-partnership-on-ai-tech-firms.

[66] Katz 2017, 13.

[67] Shoshana Zuboff (2015), *Big Other: Surveillance Capitalism and the Prospects of an Information Civilization*, Journal of Information Technology 30 (1): 75-89.

[68] Tamar Sharon and Dorien Zandbergen (2016), *From Data Fetishism to Quantifying Selves: Self-Tracking Practices and the Other Values of Data*, New Media and Society 19 (11): 1695-1709, use the term "data fetishism".

[69] Katz 2017, 8.

[70] Jack Balkin (2017), *The Three Laws of Robotics in the Age of Big Data*, Ohio State Law Journal 78: 1217-41, 1225.

[71] Karl Marx (1989), *Das Kapital: Kritik der politischen Ökonomie*, Vol. 1, Berlin: Dietz, (English translation: Karl Marx (2011), *Capital: A Critique of Political Economy*, Translated by Samuel Moore and Edward Aveling, Mineola, NY: Dover Publications).

[72] Balkin 2017, 1224.

[73] While the focus is on myth creation about AI and its critique, this section does not intend to deny that there are many useful applications of AI (for example in the realm of medicine or for the prediction of natural disasters etc.).

Using the word "mystic" to describe the commodity's fetish character, Marx[74] alluded to a religious charging of material objects. Today, a religious transfiguration of AI can be observed, for example, in Anthony Levandowski's "Way of the Future", a new religion of artificial intelligence, whose activities focus on "the realization, acceptance, and worship of a Godhead based on Artificial Intelligence (AI) developed through computer hardware and software"[75].

The AI myth is so strong that nobody dares to question it. What is more, the hype has eclipsed critical evaluation within science. As an explanation, Katz refers to the fact that the big tech companies are hiring the most influential AI scientists and are thus preventing independent research on the subject[76]. A more critical view on AI, however, would show its limitations. While a combination of machine learning and big data supposedly allows AI to identify patterns in large data sets[77], Katz, for example, has denounced the shortcomings of image recognition algorithms producing large numbers of absurd mismatches between images and verbal descriptions of these images[78]. Others have pointed to a deep gap between what is marketed and what is possible, for example in the identification of criminals at a football stadium[79] or the performance of a deep learning-based system playing Attari[80], or have ridiculed an AI program that was trained on articles from The Economist's science and technology section to produce a piece of its own[81].

In 2016, AlphaGo, one of Google's AI-based computer programmes, managed to win against Lee Sedol, the world's top Go player[82]. Is this the ultimate proof of AI supremacy? Rolf Pfeifer, a leading robotics scholar at the University of Zurich explains that computers such as AlphaGo may outperform humans in very narrow and specific tasks whereas human intelligence can only be understood in relation to an individual's (natural, physical and social) environment. Human beings are constantly acting and every action stimulates a large number of sensors. This is

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[74]   Marx 1989, 85.

[75]   See Mark Harris (2017), *Inside the First Church of Artificial Intelligence*, Wired (November 15, 2017), https://www.wired.com/story/anthony-levandowski-artificial-intelligence-religion/.

[76]   Katz 2017, 4.

[77]   OECD 2017, 296.

[78]   Katz 2017, 9.

[79]   *Facial Recognition Wrongly Identified 2,000 People as Possible Criminals When Champions League Final Came to Cardiff*, Wales Online (May 5, 2018), https://www.walesonline.co.uk/news/wales-news/facial-recognition-wrongly-identified-2000-14619145.

[80]   Brenden Lake, Tomer D. Ullman, Joshua B. Tenenbaum and Samuel J. Gershman (2017), *Building Machines that Learn and Think Like People*, Behavioral and Brain Sciences 40: 1-72.

[81]   *From our AI Correspondent. Computer Says...*, The Economist (December 23, 2017).

[82]   Garry Kasparov (2017), *Deep Thinking: Where Machine Intelligence Ends and Human Creativity Begins*, New York: Public Affairs, 75.

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completely different from feeding an algorithm with data. AlphaGo, for example, does not even know that it is playing Go[83].

The second point in Katz's critique of AI ideology refers to the mystification of AI indecipherability. AI indecipherability or impenetrability is the impression that platform firms create when they talk about algorithms that are arguably so complex that they are not even understood by the programmers themselves[84]. Katz warns that the blanket acceptance of indecipherability is a gift to systems of power: "If AI systems outperform us (and hence must be used), yet are indecipherable, then who can be held accountable?"[85]. When it is believed that computers are more intelligent than humans, this implies either that we cannot do anything or that the technology itself (or the firm controlling it) will resolve the problem.

3.3   AI AND SOCIETAL RESPONSE

The critical voices of Katz, Balkin and others counteract the building of an ideology of AI supremacy. AI supremacy is an ideology wanting to make us believe that AI technology is a substitute for human beings since it is more effective and faster than humans and outstrips human decision-makers. Balkin calls this the "substitution effect" of AI[86]. According to Balkin, the substitution effect includes the treatment of AI technology as if it were alive[87]. As an effect of this substitution the responsibility for social costs of AI is shifted to the technology rather than to those who design and operate it. Balkin argues that this does not make sense from a governance perspective. In order to protect the public interest, we do not need laws for AI (algorithms or robots, for example) but we do need laws for those who design, implement and use the technology[88].

From the perspective of affordance theory and the technological drama, these critical writings can be interpreted as challenges to the mythos that the AI design constituency is striving for. They remind us that there is flexibility not only in the design of AI technology but also in its reception. The affordances of AI are shaped by

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[83]   *Das ist immer noch ein Hype*, Tages Anzeiger (8. Januar 2017), https://www.tagesanzeiger.ch/wissen/technik/das-ist-immer-noch-ein-hype/story/20650392; see Elena Esposito (2017), *Artificial Communication? The Production of Contingency by Algorithms*, Zeitschrift für Soziologie 46 (4): 249-65, 261.

[84]   See David Weinberger (2018), *Don't make AI Artificially Stupid in the Name of Transparency*, Wired (January 28, 2018), https://www.wired.com/story/dont-make-ai-artificially-stupid-in-the-name-of-transparency/.

[85]   Katz 2017, 16.

[86]   Balkin 2017, 1224.

[87]   Balkin 2017, 1224.

[88]   Balkin 2017, 1226.

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the institutional logic in which these technologies "are designed, implemented, and used"[89]. The critical voices contribute to technological adjustment and confront attempts of the big platform firms to impose their view on society and establish a cultural mythos about AI technology. Balkin's contribution is notable as it claims that law and regulation – rather than playing no part in the technological drama – can contribute to hammer out an AI mythos that would be promoting the public interest. For Balkin, a way to achieve that would be to impose certain public interest duties on operators of AI technology to make sure that they do not "pollute", that is, "unjustifiably externalize the costs of algorithmic decision-making onto others"[90].

The potential of the societal response to AI technology is not limited to the act of "technological adjustment" and can extend to "technological reconstitution". An example to mention here is Gobo, a technology developed by the MIT Media Lab[91]. Gobo lets you decide which of your Twitter or Facebook posts are prioritised or minimised[92]. Gobo retrieves posts from people that a user follows on Twitter and Facebook and analyses them by employing simple machine-learning based filters. Two sliders are available to the user to filter out unwanted posts from her feed or filter in posts that she probably does not read every day. For example, posts can be filtered out that contain rude, viral or advertising information. In the same way she would also be able, for example, to filter out all posts from men and display a "women only" news feed. The second slider, called "politics", instead of filtering out allows filtering in of posts from media outlets that the user, because of her profile, would normally not see[93].

Gobo can be conceived as a technological response to online content personalisation on Twitter and Facebook as it involves a change in the operation of personalisation algorithms. It can be associated with the act of reconstitution because it affects the technology's material design. While Gobo is still strongly invested in the existing infrastructure of the platforms, a more radical tool to mention would be Diaspora, a social network developed by four students at NYU in 2010[94]. Diaspora allows secure sharing of information between friends by storing the data on decentralised servers (rather than on centralised ones as in the case of Facebook, for

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[89]   Zuboff 2015, 85.

[90]   Balkin 2017, 1238.

[91]   See MIT Media Lab, *Project Gobo*, at https://www.media.mit.edu/projects/gobo/overview/.

[92]   See David Talbot (2017), *The Robots are Coming*, Boston Magazine (November 12, 2017), http://www.bostonmagazine.com/news/2017/11/12/ai-research-boston/.

[93]   Ethan Zuckerman (2017), *Who Filters Your News? Why We Built gobo.social*, https://medium.com/mit-media-lab/who-filters-your-news-why-we-built-gobo-social-bfa6748b5944.

[94]   *Diaspora: NYU Students Develop Privacy-Based Social Network*, Huffington Post (December 6, 2010), https://www.huffingtonpost.com/2010/05/11/diaspora-nyu-students-dev_n_571632.html; I am grateful to Yarden Katz for pointing this out.

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example). A further example of AI reconstitution would be de-identification software, which has been developed by Privacy Analytics, a small Israeli start-up.[95] The software can be employed by webpages to slightly distort images of people's faces so that they cannot be identified by facial recognition algorithms. These examples of AI reconstitution show the creative potential of hacking. According to Zuboff[96] "[h]acking intends to liberate affordances from the institutional logics in which they are frozen and redistribute them in alternative configurations for new purposes."

The examples of Gobo, Diaspora and de-identification software show that a social response to AI technology is possible in principle and that it is possible not only as technological adjustment but also as technological reconstitution. As "The End(s)" rightly emphasises, the problem is that many affordances of "pre-emptive computing" (which would be a synonym for AI as I have been using the term so far) are hidden[97]. Hildebrandt distinguishes between material settings at the level of hardware and software, which determine the technology's potential uptake, while its functionalities are shaped in its actual uptake. With regard to AI, one therefore needs to caution that the extent to which affordances can be reconstituted depends on the question of whether the technology's potential uptake can also become the subject of a process of co-determination in which impact constituencies can play a role despite asymmetries of power and knowledge. While this is a question that goes beyond the scope of this chapter, in the next section I ask more generally how one should understand – from a legal sociology perspective – the relationship between the emergence of social expectations about a technology's affordances and fundamental rights. The analytic framework underlying this reflection is provided by Niklas Luhmann's theory of social systems.

4. AFFORDANCES AND FUNDAMENTAL RIGHTS

From a systems theory perspective, the first step in shedding light on the relationship between affordances and fundamental rights is to recall that the function of the law (as a system of society) is to generalise and stabilise normative expectations. Normative expectations are those expectations in society which are not changed when they are disappointed. Normative expectations are distinct from cognitive expectations which are adapted if the expectation is not fulfilled. To perform its function, the legal system selects those expectations within society that

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95   See Privacy Analytics' webpage at https://privacy-analytics.com/software/.

96   Zuboff 2015, 85.

97   Hildebrandt 2015, 170.

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are normative ones and makes sure that they apply society-wide (generalisation) and become fixed (stabilisation).

Normative expectations are not limited to the behaviour of human actors or social systems but include affordances of technology. When people interact with technology they themselves develop cognitive and normative expectations about the technology. As we have seen above, this also applies broadly to AI technologies as their affordances are generally co-determined in recursive practices of material design and social interpretation. Accordingly, the social response to material design is an expression of cognitive or normative expectations. If such expectations are normative they imply that a certain interpretation of a technology's functioning would be considered as a must.

As mentioned before, the problem is that some of the affordances of AI technologies are hidden[98]. A question for further research therefore is whether existing socio-legal theories about the constitutionalisation of normative expectations can be extended to AI and smart technologies. A perspective that I recommend as a basis for further work is Gunther Teubner's theory of societal constitutionalism[99]. Building on that theory, I have argued in earlier work for the example of Net Neutrality that normative expectations about the design of the Internet emerge from the middle of society before they are eventually juridified and, if specific conditions are met, may become constitutionalised as a fundamental right[100]. As Net Neutrality also covers highly complex affordances of the Internet that a non-expert user cannot perceive, an extension of that theoretical approach to pre-emptive computing does not seem to be a priori excluded.

According to Teubner[101], normative expectations are likely to emerge from a specific sub-system of society. Which is the sub-system of society where normative expectations about AI technologies are likely to emerge? In my above-mentioned research I have argued that normative expectations about Net Neutrality emerge from the economic sub-system of society. Considering the huge economic interests of giant platform companies that are involved in the development of AI technologies, my guess is that normative expectations regarding AI technology will arise from the economic system.

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[98]   Hildebrandt 2015, 170.

[99]   Gunther Teubner (2012), *Constitutional Fragments: Societal Constitutionalism and Globalization*, Translated by Gareth Norbury, Oxford: Oxford University Press.

[100] Christoph B. Graber (2017), *Bottom-up Constitutionalism: The Case of Net Neutrality*, Transnational Legal Theory 7 (04): 524-52.

[101] 2012, 103-104.

Teubner[102] argues that the economic system is internally differentiated into an organised professional sphere (corporations and other formal organisations) and a spontaneous sphere (consumer organisations and other civil society segments). Both spheres are driving the evolutionary process in the economic system but their mutual interplay is a democratic challenge[103]. A problem from a social policy perspective is that the organised sphere does not receive direct input from the spontaneous sphere[104]. Accordingly, social pressure often seems to be the only way to irritate the organised sphere and trigger internal structural adaptation. Regarding AI and smart technologies, a considerable problem here is the above-mentioned asymmetry of power and knowledge that exists between those who design and operate the technology (the design constituency – particularly the corporations that are able to hire the most brilliant and most expensive software developers) and those heterogeneous segments of civil society that are in one way or another affected by the technology (the impact constituency). Corporations have an advantage in this situation as their knowledge about the effects of the technologies allows them to anticipate consumer reactions and always be one step ahead of everybody else.

Juridification is the second stage within Teubner's theory of social constitutionalism[105]. Juridification means that normative expectations are brought into the form of a legal norm in a social process that is structured by a distinct legal authority. As a consequence of being reformulated in the language of the law by a court or similar legal authority they will be contrafactually stabilised and become part of the legal system. At the stage of juridification, socially harmful ways of how a technology can be interpreted may be defined away, or the creation of an environment may be supported that is more hospitable towards other technologies which have the same effect but better balance the interests of all parties[106]. Finally, a constitutionalisation of normative expectations in the form of a fundamental right (as institution of the law) would require a reflexive process where the juridified norms would be observed by means of a binary code constitutional/non-constitutional[107]. As we can learn from the ongoing debate about Net Neutrality, a constitutionalisation process is likely to take decades just for the second stage (juridification) to be accomplished[108]. The third stage (constitutionalisation in a narrow sense) would require, in theory, the participation of a "constitutional court" (at national, supra-

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[102]   Teubner 2012, 88-96.

[103]   Teubner 2012, 90.

[104]   Teubner 2012, 91-92.

[105]   Teubner 2012, 104.

[106]   For a similar suggestion, see Nissenbaum 2011, 1367-86.

[107]   Teubner 2012, 110-11.

[108]   Graber 2017, 524-52.

national or international level) recognising a (formal) fundamental rights protection of certain individual or social autonomies with regard to the implications of AI technologies.[109] At the moment there is no empirical evidence that refers to the dynamics of juridification or constitutionalisation of AI technology; as the technology and its applications are still very new this is no surprise.

What is the part of government regulation in all this? My thesis is that social policy and regulation can contribute to providing for discourse conditions that are favourable for society's autonomous production of normative expectations regarding AI technologies. The problem of hidden affordances of AI technologies has already been mentioned. A further challenge is that the generation of normative expectations about pre-emptive technologies needs time. AI and smart applications thereof are relatively new and most people lack practical experience of interaction with these technologies. Hence, they will not have settled expectations about what these technologies are and what they do. Considering these difficulties I would like to conclude with the following recommendations:

1) The debate about AI in society should be as inclusive as possible. AI should not be developed in geographically or sectorally siloed environments, and a top-down approach to drafting "AI ethics guidelines" would not be sufficient[110].

2) Financial support of *independent* scientific research about the social implications of AI technology is crucial; furthermore intermediaries (such as quality mass media, expert bloggers, specialised websites etc.) are needed who can "translate" expert knowledge about the social implications of "pre-emptive computing" into a "language" that non-expert users will also understand.

3) There is a challenge also for the education system; it is important that young people at all levels of education get an understanding of the new technologies and their impact on human life [111] . This includes legal education [112] , where interdisciplinary approaches to law, technology, philosophy and ethics should feature in programmes and courses.

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[109] To avoid misunderstanding, I would like to stress that the spontaneous processes of constitutionalisation will not replace the formal ones. Rather than mutually exclusive, the relationship between the spontaneous and formal processes of constitutionalisation should be viewed as mutually stimulating. For details see Graber 2017, 548-53.

[110] European Commission (2018), *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of Regions, Artificial Intelligence for Europe*, COM (2018) 237 final (April 25, 2018), 4 and 14-17.

[111] European Commission 2018, 13.

[112] Richard Susskind (2017), *Tomorrow's Lawyers: An Introduction to Your Future*, 2nd edition, Oxford: Oxford University Press.

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4)   We need to examine how access to data could be diversified so that AI can contribute to the public good[113] .

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[113]   European Commission 2018, 11.