

ARTICLE

# Bring in the Sceptics: Using Science and Technology Studies in law

Sam Wrigley 

Faculty of Law, University of Helsinki, Helsinki, Finland  
Email: [samuel.wrigley@helsinki.fi](mailto:samuel.wrigley@helsinki.fi)

## Abstract

Understanding the interactions between law, technology and society writ large is a very important task for legal analysis. However, the relationship between these areas can be very complex, resulting in a complex web of interactions and feedbacks. Fortunately, Science and Technology Studies (‘STS’) offers a varied toolkit which can help us to understand how these fields overlap.

In this article, I first providing a brief primer regarding STS and its core ideas. The article then considers some high-level legal discussions (particularly those relating to the concept of technology neutral law, and of Lawrence Lessig’s four modalities of regulation) and considers how STS may help to compliment or expand upon those debates. The article then examines how STS may assist with some current legal discussions, focusing on issues that arise from certain types of automated decision-making, as governed by the GDPR, Article 22. Finally, I provide some starting points for those wishing to incorporate STS into their own work, including some of STS’s limitations for law. I conclude that STS can be a very powerful tool for legal scholars, which can help to reinforce existing approaches and to produce analyses which reflect a fuller range of legal, technical and social nuances.

**Keywords:** data protection law; STS; technology

## I. Introduction

There are some branches of legal scholarship, such as legal dogmatics, which argue that the primary focus of the legal field should remain on an internal view of law.<sup>1</sup> This is not to say that such branches deny that law overlaps with other fields. Rather, they may argue that an analysis of law ‘does not need anything outside of the law to be carried out’ – that ‘as soon as it starts to adopt an external (economic, sociological, historical, etc) viewpoint, there is no longer a legal approach to the problem in question’.<sup>2</sup> However this is not the only possible approach to law. Indeed, some branches of legal scholarship, sometimes described as socio-legal approaches, actively welcome an external perspective into legal analysis.<sup>3</sup> Ultimately, there is a time and place for both branches of legal scholarship, and

---

<sup>1</sup> For an interesting exploration of legal dogmatics, being a branch of legal thought often associated with this perspective, see Jan M. Smits, “What is Legal Doctrine? On the Aims and Methods of Legal-Dogmatic Research” in Rob van Gestel et al, *Rethinking Legal Scholarship: A Transatlantic Dialogue* (Cambridge University Press 2017).

<sup>2</sup> *Ibid*, 210–11.

<sup>3</sup> For a discussion of socio-legal approaches, see, for example, Mathieu Deflem, *Sociology of Law* (Cambridge University Press 2008).

finding the best methodological basis for any particular task will undoubtedly depend on what one is actually looking at and what one actually wishes to do.

Nevertheless, for those working in law and technology, understanding the overlaps and interactions between law, society and technology would seem to be very important. Amongst other things, such an understanding is key to implementing, evaluating or interpreting laws within the context of their regulatory purposes, helping to draw out the relationship between the law, its effects on the world around it, and the effects that the world has on the law. For example, when it comes to the legal regulation of automated decision-making, understanding this overlap helps to understand (and therefore successfully regulate) the technology which makes such decisions, identify other forces which affect the functioning and effects of automated decision-making alongside law (and therefore which factors might need to be accounted for during the regulatory process)<sup>4</sup> and how the effects of law will both change and be changed by the effects of those other forces (and therefore informing how the effect or implementation of the law will be changed by, and how it will change, these other forces). Understanding and incorporating these interactions is also incredibly helpful for accurately identifying, understanding and addressing the various risks and risk-management strategies related to law and technology – without such understanding, it may be very difficult to understand why things actually occurred as they did, how “external” factors affect the various risks, and whether management strategies will actually have the effect intended. It is, therefore, no surprise that some have made a life’s work analysing these interactions, or that this issue has led to its own field of research: Science and Technology Studies (“STS”).<sup>5</sup>

Put simply, STS as a field is particularly interested in the way that technology and society feed into and interact with each other, with changes in one influencing and changing the other. To do this, STS explores a number of interesting concepts and methodologies, many of which could be used to great effect in the legal field. In some ways, embracing an STS approach in law may be a relatively easy task, with many of STS’s methods, concepts and principles being quite familiar to legal scholars.<sup>6</sup> There are, for example, many empirical legal approaches which use case studies,<sup>7</sup> while critical legal studies has a long-standing relationship with scepticism.<sup>8</sup> Meanwhile, some areas of law make the overlap between law, society and technology particularly apparent, such as the regulation of certain automated decisions under the General Data Protection Regulation (“the GDPR”),<sup>9</sup>

<sup>4</sup> This can often require an extremely complex and fast-moving mapping, particularly for new or developing technologies. See, for example, work on identifying “technical, societal, institutional and legal methods and tools which provide concrete support to AI practitioners” in responsible AI development: Virginia Dignum, “Responsible Artificial Intelligence – from Principles to Practice,” [arXiv:2205.10785](https://arxiv.org/abs/2205.10785) [cs.CY].

<sup>5</sup> John Law, “STS as Method” in Ulrike Felt et al (eds), *The Handbook of Science and Technology Studies* (4th edn, MIT Press 2016), 31. More generally, see, for example, the works of Sheila Jasanoff, Donna Haraway, or a range of STS-related journals and their various contributors, such as those listed by The University of British Columbia, “Current Major STS Journals” <<https://sts.arts.ubc.ca/resources/current-content-of-major-sts-journals/>> accessed 20 July 2023. Other such lists of STS-related journals are also available online.

<sup>6</sup> See, for example, the survey in Ryan Calo, “The Scale and the Reactor” (9 April 2022) <<https://ssrn.com/abstract=4079851>> (accessed 12 May 2022).

<sup>7</sup> Aikaterini Argyrou, “Making the Case for Case Studies in Empirical Legal Research” (2017) 13 (3) *Utrecht Law Review* 95.

<sup>8</sup> For a discussion of critical legal studies, see, for example, Andrea Bianchi, *International Law Theories: An Inquiry into Different Ways of Thinking* (Oxford University Press 2016) chapter 7.

<sup>9</sup> Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) [2016] OJ L119/1 (“the GDPR”).

Article 22.<sup>10</sup> Indeed, some authors have already discussed the idea that traditional socio-legal approaches can be used alongside, and complimented by, STS approaches, which “demonstrate the intricate ways in which technological design embeds human values and ideologies either inadvertently or by choice.”<sup>11</sup> This paper will endorse and complement these existing contributions, elaborating on the ways in which STS can assist those working in legal areas which interact with technology, and encouraging those who do so to explore and embrace STS’s themes and methodologies.

Before embarking on this discussion, it is important to note that this article does not pretend to lay out a step-by-step guide for the reader to implement any particular STS approach into their legal research. Rather, it presents readers with STS’s concepts and advantages, and explores some of the ways in which these can help to address difficulties in legal research. It is therefore hoped that this contribution will help to persuade the reader to explore STS scholarship directly, learning from those who have spent their careers investigating their research methodologies, and to bring those approaches into their own analysis or research.

## II. STS: a brief primer

STS has been described as “an evolving interdisciplinary field with porous boundaries,”<sup>12</sup> with different authors understanding the concept in different ways.<sup>13</sup> Nevertheless, within this broad collection or discipline, we can draw a few defining characteristics to address the question “What is STS?”

As already indicated, STS is a field which, inter alia, explores the idea that technology is inextricably linked with society and politics.<sup>14</sup> Indeed, one of the key elements for STS scholars is to examine “the dialectical relationship between the social shaping of technology and the technical shaping of society.”<sup>15</sup> A second element of STS has been summarised by Law: “*STS attends to practices*” [emphasis in original].<sup>16</sup> In particular, Law points out that STS “almost always” uses case studies to “evoke, illustrate, disrupt, instruct, and help STS” in its examination of “how theories, methods, and materials are used in practice in specific social, organizational, cultural and national contexts.”<sup>17</sup>

One way in which STS looks at these issues is by considering the social shaping of technology – the idea that the development of technology is not fixed, but instead can be negotiated, as different groups and interest nudge its path in one way or another.<sup>18</sup> This idea is inextricably linked to the concept of co-production, which is described as the

<sup>10</sup> Article 22 states that data subjects, ie the natural persons to whom a piece of personal data relates, “shall have the right not to be subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her.”

<sup>11</sup> See, for example, Riikka Koulu, “Crafting Digital Transparency: Implementing Legal Values into Algorithmic Design” [2021] 8 (1) *Critical Analysis of Law* 81, 82–3.

<sup>12</sup> Janet Vertesi et al, “Engaging, Designing and Making Digital Systems” in Felt et al (eds) (n 1), 169.

<sup>13</sup> Law (n 5) 31. For two among many instructive overviews of some approaches and methods in STS, see, for example, Sheila Jasanoff et al (eds), *Handbook of Science and Technology Studies* (Revised edn, Sage 2001); and Michela Cozza, *Key Concepts in Science and Technology Studies* (Studentlitteratur 2020).

<sup>14</sup> See, for example, Langdon Winner, “Do Artifacts Have Politics?” [1980] 109 (1) *Daedalus* 121.

<sup>15</sup> Sally Wyatt, ‘Technological Determinism Is Dead: Long Live Technological Determinism’ in Edward J. Hackett et al (eds) *The Handbook of Science and Technology Studies* (3rd edn, MIT Press 2007) 176.

<sup>16</sup> Law (n 5) 31.

<sup>17</sup> *Ibid.*, 32. For a discussion of use of case studies, including the methodology’s strengths and weaknesses, and some ideas of how those weaknesses can be addressed within STS methodology, see, for example, Anne Beaulieu et al, “Not Another Case Study: A Middle-Range Interrogation of Ethnographic Case Studies in the Exploration of E-science” (2007) 32 (6) *Science, Technology & Human Values* 672.

<sup>18</sup> See, for example, Robin Williams and David Edge, “The social shaping of technology” (1996) 25 *Research Policy* 865.

mapping and/or analysing of the ways that science and society interact and work together,<sup>19</sup> “explicitly foreground[ing] this two-way dynamic.”<sup>20</sup> When translating this concept into research, co-production can be employed in a range of methodological approaches and topics,<sup>21</sup> and can attempt to, inter alia, “provide normative guidance, or at least facilitate our critical interpretations” of such interactions.<sup>22</sup>

Going beyond this, STS also challenges the idea that scientists can act with so-called aperspectival objectivity.<sup>23</sup> This idea that scientists can be purely objective has also been described as the “God trick” – the concept that scientists are supposedly “seeing everything from nowhere” and observing the system without actually being part of it.<sup>24</sup> By rejecting this, STS also rejects the idea that those who research, design and develop technology could build something which is truly neutral. Instead, STS argues that a person’s work will always be influenced, whether consciously or otherwise, by their own views, beliefs, experiences and other societal factors which surround them. Another important concept is that of framing – the idea that, even before we get to actual scientific analysis or discussion, the initial act of deciding what is or is not important enough to investigate (and therefore, amongst other things, how scientific knowledge develops) is a fundamentally social or political question.<sup>25</sup>

This removal of objectivity does not simply apply to things that people create; STS also suggests that things which are defined in a certain way or observed as being true in one context may not be so when found or placed in a different context – the idea of multiplicity.<sup>26</sup> Along similar lines, STS has produced a number of interesting insights relating to boundary work, including an exploration of the edges of categorisation or structure. For a prime example of this, we may turn to Star’s work on “Boundary Objects,” described as things (including both physical objects and abstract ideas or structures) which sit in “a shared space, where exactly that sense of here and there are confounded.”<sup>27</sup> Under both of these ideas, much as with the God trick, STS rejects ideas of pure objectivity; rather, STS asks us to consider how changes in perspective can also change seemingly-fundamental “truths” about an object, and that the conceptual boundaries which we use to define or categorise things are not as firm as they may seem.

In practice, work within STS can take a number of forms. Some authors, for example, have focused on the concept of actor-network theory, “a method for mapping how every object or actor is shaped in its relations” without considering the “given form” that those

<sup>19</sup> See, for example, Sheila Jasanoff, “The idiom of co-production” in Sheila Jasanoff (ed) *States of Knowledge: The Co-production of Science and Social Order* (Routledge 2006).

<sup>20</sup> Sheila Jasanoff, “Future Imperfect: Science, Technology and the Imaginations of Modernity” in Sheila Jasanoff and Sang-Hyun Kim (eds), *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power* (University of Chicago Press 2015) 3.

<sup>21</sup> For a discussion and examples of such approaches, see, for example, Jasanoff, “The idiom of co-production” (n 19). See also Jasanoff and Kim (eds), *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power* (University of Chicago Press 2015) more generally for examples of how co-production has played out in different fields or practices.

<sup>22</sup> Sheila Jasanoff, “Ordering Knowledge, Ordering Society” in Jasanoff (ed) *States of Knowledge: The Co-production of Science and Social Order* (n 19) 17.

<sup>23</sup> See, for example, Lorraine Daston, “Objectivity and Escape from Perspective” [1992] 22 (4) *Social Studies of Science* 597.

<sup>24</sup> Donna Haraway, “Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspectives” [1988] 14 (3) *Feminist Studies* 575, 581.

<sup>25</sup> Sheila Jasanoff, “Constitutions of Modernity: Science, Risk and Governable Subjects” in Maria Weimer and Anniek de Ruijter (eds) *Regulating Risks in the European Union: The Co-production of Expert and Executive Power* (Hart Publishing 2017) 20–1.

<sup>26</sup> Law (n 5) 43–7.

<sup>27</sup> Susan Leigh Star, “This Is Not A Boundary Object: Reflections on the Origin of a Concept” (2010) 35 (5) *Technology & Human Values* 601, 602–3.

things may have in another context.<sup>28</sup> Under this approach, pre-existing relationships or approaches are effectively discarded; “society and nature, humans and nonhumans, people and technology – essential divisions have simply disappeared.”<sup>29</sup> Another strand of STS is the sociology of scientific knowledge, which “advance[s] the thesis that sociologically and historically informed conceptions of scientific practice should replace logical-empiricist epistemology.”<sup>30</sup> This approach engages directly with the idea of scepticism, emphasising claims that sociological principles must influence our scientific conclusions and doubting claims that scientists can identify a one, true answer based on an objective reality.<sup>31</sup>

The various strands of STS are not limited to academic work. For example, Vertesi and others have mapped different ways in which STS tools and concepts have been directly used to influence design choices, with researchers, developers and designers attempting to actively approach problems from an STS (rather than a purely technical or engineering) perspective.<sup>32</sup> These approaches have also been used to assess risk management strategies, promoting a full and comprehensive perspective which incorporates the warnings inherent in a lack of certainty and objectivity.<sup>33</sup> Given its variable form, the utility of STS for legal academics, commentators and actors may vary, depending on what exactly it is that they are trying to do at the time. Indeed, beyond and alongside those discussed here, other interpretations, influences and approaches can be seen within STS,<sup>34</sup> and other legal scholars have provided differently structured breakdowns or primers which focus on different elements to those raised above.<sup>35</sup> Equally, it is important to note that some legal publications have already placed themselves directly within the context of STS,<sup>36</sup> or have discussed ways in which STS can assist with legal analysis.<sup>37</sup>

A number of ideas can be drawn from this brief primer. First, a core lesson of STS is that we must carefully consider how technology and society (including law) interact with, support, alter or otherwise influence each other. Secondly, STS contains many ideas and methods that may be relevant for legal work, some of which will be explored in more detail below. Thirdly, by incorporating legal work explicitly or consciously into STS, it is possible to increase the multi-disciplinary nature of the works and access to a wide range of important and interesting scholarship and material.

### III. Bringing STS into law: exploring high-level questions

Having now set out some basics of STS, it is possible to explore how those concepts and approaches might help to expand upon or develop some existing legal discussions or concepts. This section will take two examples to explore how it can do so within relatively abstract or high-level legal discussions. These are, first, the discussion around the concept

<sup>28</sup> Law (n 5) 41–2.

<sup>29</sup> *ibid.* For substantive discussion on the idea, see, for example, John Law and Annemarie Mol, “Notes on materiality and sociality” [1995] 43 (2) *The Sociology Review* 274.

<sup>30</sup> Michael Lynch and David Borgen, “Sociology’s Asociological ‘Core’: An Examination of Textbook Sociology in Light of the Sociology of Scientific Knowledge” (1997) 62 (3) *American Sociological Review* 481, 483.

<sup>31</sup> Jeff Kochan, *Science as Social Existence: Heidegger and the Sociology of Scientific Knowledge* (OpenBook 2017), chapter 1.

<sup>32</sup> Vertesi et al (n 12).

<sup>33</sup> See, for example, Sheila Jasanoff, *Risk Management and Political Culture* (Russel Sage Foundation 1986).

<sup>34</sup> See, for example, Peter Dear and Sheila Jasanoff, “Dismantling Boundaries in Science and Technology Studies” (2010) 101 (4) *Isis* 759.

<sup>35</sup> See, for example, the summary provided in Calo (n 6) 3–9.

<sup>36</sup> See, for example, Alessandra Arcuri, “Three dimensions of accountability for global technocracy” in Alessandra Arcuri and Florin Coman-Kund (eds), *Technocracy and the Law: Accountability, Governance and Expertise* (Routledge 2021), or the collection of papers contained in Weimer and de Ruijter (eds) (n 24).

<sup>37</sup> See, for example, Calo (n 6).

of “technology neutrality” in law and, secondly, Lawrence Lessig’s four modes of regulation.

The first of the two examples, “technology neutral” law, has been described by Hildebrandt and Tielmans as law where the “legal effect *should not* depend on the particular technology that is used by the addressees of the law” [emphasis in original].<sup>38</sup> At first glance, laws which subscribe to this goal might seem antithetical to an STS perspective, aiming for a consistent legal result regardless of the technological context. On a deeper inspection, however, this topic easily embraces STS’s themes: Rather than asking us to divorce law from technology, technology neutrality encourages us to embrace the overlap, recognising their inevitable interactions so that we can try to examine and shape the way that technology responds to law (and vice versa). Certainly, this analysis could also be had without engaging in STS. Nevertheless, there are some interesting overlaps between the existing conversation, and the themes and methodologies put forward by STS.<sup>39</sup>

One such overlap would be the idea of scepticism, which may invite us to consider whether legal actors and regulators can ever actually gain enough objectivity and independence from the technological concept that they would be able to implement or interpret laws in a technologically neutral way. To discuss this, we could examine one possible interpretation of technology neutral law, being law that sets out a particular endpoint or result, while leaving users or companies to choose the technological means for reaching that goal.<sup>40</sup> This approach clearly requires a separation of the route and the endpoint, considering only the latter without allowing the former to influence our decision making. However, even if we could consciously separate the two, we may find that our idea of that endpoint or result is unconsciously influenced by our existing understanding of society, technology and law, unintentionally making that goal easier to achieve for certain technological approaches.

A non-STC approach may argue that this problem requires a proper examination of our internal biases and understandings, and demand a methodology which restricts us to an appropriately objective and neutral description of the law’s goals. Scepticism, on the other hand, not only helps to foreground these implicit assumptions, it also emphasises that these subjectivities can never be entirely removed. An STS scepticist may say that, no matter how hard we try to exclude our existing understanding of the world, we will never be able to describe a truly neutral end goal, or create regulation which is truly neutral as to the choice of technology chosen to reach that goal. While it does not provide an entirely novel “solution,” this insight, and STS’s existing literature around the God Trick, can therefore help to improve our wider understanding and critique of both technology neutral law as a whole and of specific attempts to implement that goal within individual laws.

Another STS concept which may be useful here is the concept of situatedness. As noted above, STS attends to practice, with a focus on specific case studies instead of general propositions. Following this idea, STS may encourage us to narrow our examination from “How will the law produce the same result in all cases?” to “What result occurs when the law and the technology interact in this specific case?” Such investigations may also be combined with methodologies that involve co-production; we could, for example, use in-depth case studies promoted by STS to investigate how a law will play out in specific

<sup>38</sup> Mireille Hildebrandt and Laura Tielmans, “Data protection by design and technology neutral law” (2013) 29 (5) *Computer Law & Security Review* 509, 516.

<sup>39</sup> It is interesting to note that in this regard that Hildebrandt has been held out as an example of a legal scholar who has provided valuable “STS-inflected insights”: See Calo (n 6) 2.

<sup>40</sup> Winston Maxwell, “Technology neutrality in internet, telecoms and data protection regulation” (2015) 21 (1) *CTRL* 1, 1.

circumstances and, in doing so, consider how the technology and the law interact with each other. By requiring us to focus on these specifics, STS can then, in turn, help to inform our wider legal analysis, feeding back into our discussions about the effectiveness and desirability of different forms of and attempts at technology neutral law.

It is interesting at this point to move to the second example, that of Lessig's modalities of regulation. In *Code 2.0*,<sup>41</sup> Lessig sets out four different methods of regulation: law, architecture, norms and market.<sup>42</sup> An example which he uses to illustrate this is the regulation of smoking – whether or not one is able to smoke may be governed by, among other things, laws which say whether or not you can smoke, whether social norms prevent you from smoking in certain areas, whether the market allows you to actually afford cigarettes in the first place, and the technological design (ie the architecture) of the cigarettes and how that design affects their usability.<sup>43</sup> When thinking about regulation, says Lessig, we must recognise that a change in one of the modalities will affect the others and the regulation as a whole, meaning that “[a] complete view . . . must consider these four modalities together.”<sup>44</sup>

Lessig himself places his work within the New Chicago School,<sup>45</sup> but his argument clearly engage with STS-related themes and discussions. In an article discussing his four modalities, for example, Lessig explicitly considers how computer code changes law and vice versa<sup>46</sup> and emphasises how important it is to question the way that these modalities interact.<sup>47</sup> Although framed differently, then, Lessig's discussion and ideas would seem to be directly in line with Law's description of STS as something which examines “how theories, methods, and materials are used in practice in specific social, organizational, cultural and national contexts.”<sup>48</sup>

There are here some important caveats that must be made. In particular, while *Code 2.0* is filled with many examples and close examination of cases, Lessig's conclusions are drawn at or extrapolated to a very general or abstracted level. His work therefore arguably lacks the situatedness of STS. Equally, since it is not placed within STS, Lessig's discussion is unsurprisingly built separately from existing STS scholarship, methods and discussions. For example, in his chapter on Privacy, Lessig identifies “two distinct threats to the values of privacy that the Internet will create,” being digital surveillance and increased aggregation of data.<sup>49</sup> Lessig then maps out some possible approaches, notes that “there is no single solution to policy problems on the Internet” and then suggests some possible approaches that could help to address these problems.<sup>50</sup> Yet, while Lessig's discussion is undoubtedly narrowed to the problems that he addresses, a core part of his solution comes down to an abstracted, general proposal, ie, the introduction of a property right for personal data, supported in various ways by the various modalities of regulation.<sup>51</sup> Interestingly, Lessig also notes that he rejected a similar regime for the protection of intellectual property, arguing that the specific elements of the two are dissimilar enough to warrant the change in approach.<sup>52</sup> His arguments for doing so are interesting, but it

<sup>41</sup> Lawrence Lessig, *Code 2.0* (PDF edition, Basic Books 2006).

<sup>42</sup> *Ibid*, ch 7.

<sup>43</sup> *Ibid*, 122–3.

<sup>44</sup> *Ibid*, 123.

<sup>45</sup> Lawrence Lessig, “The New Chicago School” [1998] 27 *Journal of Legal Studies* 661.

<sup>46</sup> Lawrence Lessig, “The Law of the Horse: What Cyberlaw Might Teach” (1999–2000) 113 *Harvard Law Review* 501, 522–34.

<sup>47</sup> *Ibid*, 538–48.

<sup>48</sup> Law (n 5) 31–2.

<sup>49</sup> Lawrence Lessig, *Code 2.0* (n 41) 223.

<sup>50</sup> *Ibid*, 223–32.

<sup>51</sup> *Ibid*, 228.

<sup>52</sup> *Ibid*, 230–2.

would have been interesting to see how this argument develops in light of STS' scholarship around situatedness.

This lack of engagement with STS has been described as something of a missed opportunity. Calo, for example, has suggested that “clearly law and technology has been sounding similar notes to STS for years without listening to its music.”<sup>53</sup> Lessig's work, and the legal discussion and debate which followed it, are an example of this, with Calo describing the discussion as one which “would benefit from core insights of STS”<sup>54</sup> and asserting that “cyberlaw took decades to wind up where STS would have started.”<sup>55</sup>

Calo's interpretation is persuasive, but I would perhaps place a more positive interpretation on the missing insights. Similarly to the discussions on technical neutrality, works like Lessig's show that it is possible to provide interesting and nuanced discussions of the interactions between law, other societal elements and technology without being explicitly placed within STS scholarship or methodologies. Nevertheless, by then placing these works alongside STS, we can then continue to develop our ideas in new and interesting ways. For example, we may develop our understanding of law by analysing the interactions between Lessig's four modalities of regulation within the framework of STS's work on co-production, or by considering how situatedness might develop, support or rebut Lessig's various arguments relating to property rights, personal data and copyright. Alternatively, we may consider how the idea of multiplicity changes our understanding of those modalities and the way that they interact, or even consider whether work with boundary objects challenges the distinction between those modalities in the first place. Further, as noted in the primer, STS is an “interdisciplinary field with porous boundaries”;<sup>56</sup> collecting existing legal works, analysing them through the frames, methods and concepts of STS, and placing them into this multidisciplinary environment may allow for future works to address similar topics, or help reach a wider research and distribution. Being able to take advantage of and engage with that wider culture and base provided by STS is therefore advantageous, even for works which already address the overlap between law, society and technology.

#### **IV. Attending to practice: STS, automated decision-making, and legal or similarly significant effects**

Having looked at the above examples, it is now time to examine how STS may interact with some of the live questions and issues surrounding automated decision-making. As above, I will not attempt to resolve the issues raised, but rather will examine the potential role of STS in the legal discussion.

As a brief introduction, the GDPR, Article 22 is entitled “Automated individual decision-making, including profiling” and, as the name would suggest, is designed to provide protection for data subjects<sup>57</sup> in certain situations where decisions are made through an automated process. This protection takes two forms. First, there is a general ban on subjecting data subjects to certain types of automated decisions, with exceptions that only allow this to happen under limited conditions. Secondly, where an automated decision which falls under this article is permitted, data subjects are given extra protections to ensure that they have sufficient information about the decision and decision-making process and that their fundamental rights are being properly protected.

<sup>53</sup> Calo (n 6) 10.

<sup>54</sup> *Ibid.*

<sup>55</sup> *Ibid.*, 13.

<sup>56</sup> Vertesi et al (n 12) 169.

<sup>57</sup> The GDPR, Art 4(1) defines a data subject as “an identified or identifiable natural person” to whom personal data relates.

It is at this stage important to emphasise that (despite the name and some of the rhetoric surrounding it) Article 22 does not cover all automated decision-making. Indeed, the conditions for its application are actually relatively narrow. In particular, para (1) states that “The data subject [ie the individual to whom personal data relates] shall have the right not to be subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her.” Readers of this provision can immediately see that there are a number of (potentially quite ambiguous) qualifiers in this language, including that a decision must be made “solely” by the automated process, and that its effects must be sufficiently significant.

This section will focus on the limitation that the decision should not produce legal, or similarly significant, effects on the data subject. A restriction of this kind is sensible; conceptually speaking, there are no limits on how trivial (or, indeed, how important) an automated decision can be, and the number of automated decisions that could happen every day is so high as to effectively be unlimited. A particularly broad law would, then, be difficult to design well and likely be even harder to enforce. Interpreting the term “legal effect” may pose relatively little trouble to lawyers; the topic would seem to engage directly with the internal content of law, and we do not necessarily need to engage external perspectives to arrive at a satisfactory answer. More interesting, perhaps, is what qualifies as a decision with an effect that is similarly significant to a legal effect.

To interpret this latter term, a doctrinal analysis of the law might point to the GDPR’s recitals, which give some examples of decisions that might fall under Article 22. These include “automatic refusal of an online credit application or e-recruiting practices without any human intervention,”<sup>58</sup> which the Article 29 Working Party placed into the category of a similarly significant effect.<sup>59</sup> The Working Party further laid out a number of possible categories of decisions, including those which “affect someone’s financial circumstances . . . [or] access to health services; . . . deny someone an employment opportunity or put them at a serious disadvantage; . . . [or] affect someone’s access to education.”<sup>60</sup> However, there are still a number of open questions as to what kind of effects may qualify.

STS may be particularly useful for investigations into this ground. To explore this potential, one could take a situation that falls outside of the GDPR’s pre-defined examples: That of online targeted advertising. Targeted advertising can be described as the delivery of adverts to specific people because those people have certain characteristics or features, typically where the advertiser believes that those characteristics or features will make them more receptive to the advert in question. Targeting may be based on a single piece of personal data, or may be based on a more comprehensive profile. Equally, targeting may be used for something as simple as “We predict that this person might buy this product and so they will receive an advert, whereas we predict that that person will not and so they will not receive one,” or as sophisticated as “We predict that this person will be most receptive to this type of language and so will receive an advert with this wording, while we predict that person will be most receptive to that type of language and so will receive an advert with that wording.”<sup>61</sup>

<sup>58</sup> The GDPR, recital 71.

<sup>59</sup> Art 29 Working Party, *Guidelines on Automated individual decision-making and Profiling for the purposes of Regulation 2016/679*, WP 251 rev.01 (6 February 2018) 21. These Guidelines were later endorsed by the European Data Protection Board, which replaced Art 29 Working Party: European Data Protection Board, *Endorsement 1/2018* (25 May 2018).

<sup>60</sup> *Ibid.*, 22 (reformatted from bullet list).

<sup>61</sup> For more information about targeted advertising, see, for example, Tom Dobber et al, “The regulation of online political micro-targeting in Europe” (2019) 8 (4) *Internet Policy Review*, <https://doi.org/10.14763/2019.4.1440>; and Jacob B Hirsh, Sonia K Kang, Galen V Bodenhausen, “Personalized persuasion: Tailoring persuasive appeals to recipients’ personality traits” (2012) 23 (6) *Psychological science* 578.

The Article 29 Working Party has suggested that such online adverts would generally not have a sufficiently significant effect and so would normally fall outside of the GDPR, Article 22, unless special circumstances mean that the advert is particularly significant. This could depend on, for example, “the intrusiveness of the profiling process...; the expectations and wishes of the individuals concerned; the way the advert is delivered; or [the] using [of] knowledge of the vulnerabilities of the data subject targeted.”<sup>62</sup> The Working Party further noted that a decision could have a sufficiently similar effect for some individuals or groups and not for others – and that whether the effects were sufficiently significant did not necessarily need to be as a result of the controller’s actions.<sup>63</sup> Such advertising is therefore interesting for our purposes as it represents a grey area, where the same advert may have vastly different legal consequences, depending on to whom and in what context it is deployed.

This kind of analysis can be handily enhanced by the inclusion of STS. For example, the idea that the effects are significant for one group and not for another is very familiar to STS.<sup>64</sup> By adopting STS’s relational view of the world, and borrowing from its existing methodologies, it is therefore possible to examine the practices of an automated decision-making process within their social context, identify the effects within that context and determine whether or not the GDPR, Article 22 should apply. In particular, the use of STS can help to provide both the tools and the language for investigating and expressing these variable effects, which can then be imported into the legal process when we decide whether or not the processing was lawful.

Within this discussion, it is also interesting to highlight the issue of targeted political advertising. As with the advertising discussed above, such adverts are typically targeted to individuals, based on profiles, and provide customised or individualised content to specific people. However, the use of such adverts in the political sphere has proven particularly controversial, in part due to concerns about the potential manipulation of the democratic process.<sup>65</sup> Whether or not these adverts actually have such consequences, free participation in the democratic process is an extremely important part of European Union governance. If, therefore, it is found that an automated decision has a real and sufficiently large impact on the exercise of one’s democratic rights and responsibilities (eg voting in an election), this would indeed qualify as an effect which is similarly significant to a legal effect. This then leads us to wonder at what point is this article engaged by online political advertising – and what would be the consequences of setting that point at any one particular level.

STS may assist with this analysis, given its familiarity with navigating between law, politics and science (each of which will feature heavily in a topic such as targeted political advertising). Moreover, the fact that STS favours case studies, and particularly case studies that help to illuminate “how theories, methods, and materials are used in practice in specific social, organizational, cultural and national contexts,”<sup>66</sup> will be helpful at analysing the impact of such adverts. Indeed, given the immense complexity and seemingly unique circumstances surrounding different elections, we may find cases particularly helpful for seeing how targeted political advertising actually works in practice – and how the law might affect the role that it plays.

<sup>62</sup> Art 29 Working Party (n 59) 22 (reformatted from bullet list).

<sup>63</sup> *Ibid.*, 22.

<sup>64</sup> Law (n 5) 43.

<sup>65</sup> See, for example, European Commission, *Commission Staff Working Document Impact Assessment Report Accompanying the document Proposal for a Regulation of the European and of the Council on the transparency and targeting of political advertising*, SWD(2021) 355 final (Brussels, 25 November 2021) and Jonathan Heawood, “Pseudo-public Political Speech: Democratic Implications of the Cambridge Analytica Scandal” (2018) 23 *Information Polity* 429.

<sup>66</sup> Law (n 5) 32.

Another important element from STS is that of framing. Both political and targeted advertising are regulated by a number of legal fields, each prioritising different elements and imposing different rules. By placing this balancing act within the context of framing, STS can help us to identify the consequences of the different ways that rights and interests are selected, weighed and presented, and help us to ensure that our legal approaches clearly explicate, evaluate and justify our choices.

Finally, we may benefit from STS' insights into the social shaping of technology and the idiom of co-production. It may, for example, be very easy to focus law's regulatory effects on particularly visible targeting and tailoring technologies, or on certain platforms that enable profiling and advert delivery. However, the lessons of co-production may encourage us to take a broader perspective, considering how wider societal elements or movements may co-produce the impacts that we wish to avoid. The lessons learned from STS would, then, lead us to properly round out our legal discussion, prompting us to ask, among other things, how this co-production affects our regulatory goals, when and how certain regulatory tools should be used, and how many of the factors that contribute to the issue are actually appropriate for legal regulation.

## V. STS and law: a word of caution

It is hoped that the above will have persuaded the reader of three things. First, that STS is an interesting field with valuable ideas. Secondly, that STS's themes can already be seen in existing legal analysis and debate, even if has not always been explicitly invoked. And thirdly, that there are live legal issues which would benefit from the use of STS's tools, methods and approaches. The best source for such tools, methodologies and approaches will be those works written directly within STS itself.<sup>67</sup> This section, however, will briefly explore a few points which may prevent law from simply embracing STS wholesale.

Calo has drawn out two limitations of STS (which he described as "opportunities for law to share back"<sup>68</sup>): The fact that law has a "relative comfort with normativity" that is absent from STS, and "law's pragmatism, and especially the facility of legal scholarship to navigate levers of power"<sup>69</sup> Calo further notes that, when using STS methodology, two things are required: "The first is to acknowledge the normative character of law, and hence the normative nature of legal change . . . The second is to arrive at a level of complexity and stability that makes it possible to operationalize knowledge. This will require a certain amount of oversimplification and muddling through . . . sometimes act[ing] 'as if' the world were simpler and more stable than it is."<sup>70</sup>

To these, I would add, if not a new consideration, then at least an expansion: That while STS may focus on situatedness, and while situatedness may be important for considering individual cases, law is (and to some extent must always be) restricted to a wider scale than STS scholarship would perhaps prefer. This particularly ties in with Calo's second point – that law will require a certain level of oversimplification and muddling to allow it to become operationalised – but the actual break from situatedness itself is worth emphasising. While the way that the law is applied may vary on the facts in question, and some laws may be written in a way that is more flexible than others, legal certainty and the rule of law demand some level of universality.

This is important, both when implementing and when designing law, and law must be drawn such that it can reliably create the desired effect across a range of factual scenarios

<sup>67</sup> See, for example, Felt et al (eds) (n 5) or Jasanoff, *States of Knowledge: The Co-production of Science and Social Order* (ed) (n 19) as excellent starting points for such an investigation.

<sup>68</sup> Calo (n 6) 17.

<sup>69</sup> *Ibid*, 17–18.

<sup>70</sup> *Ibid*, 25.

and backgrounds (albeit with the size of that range varying from law to law). Certainly, STS methodologies may help with resolving multiplicity and highlighting situatedness, and a particularly purist view may dislike the idea of using STS methodologies to derive or support rules that will be applied more generally. Nevertheless, it is important to remember that, while certain STS approaches are useful in some areas of law or aspects of legal analysis, they may be less so in others. While engaging with STS, it is therefore important that we do so with an eye to compromising and co-operating with both its tenants and with those who have spent their life developing its methodologies. Ideally, law should work together with STS, adapting STS methodologies where necessary to produce results that are usable in law, and making sure that we do so in a way that does not sacrificing their value or reliability.

## VI. Conclusion

Given the complex interactions between law, social issues and technology, analyses of the law often risk being incomplete without at least a consideration of how these fields affect each other. It is, therefore, unsurprising that legal scholarship has already begun to tackle this overlap. However, legal scholarship is not the only field where this overlap has been studied. In particular, STS has made significant and fascinating strides in examining the overlap between society and technology, and I have argued in this paper that its concepts and methodologies could be used to great effect in law.

As has been noted in this article, the use of STS does not require those in law to reinvent or disengage with the existing legal discussions; rather, it allows us to expand and fill out our current discussions, and helps us to ensure that our relevant legal debates gain a full and complete perspective. In line with this idea, this paper has highlighted a number of themes and approaches which are common in STS and which may be worth particular consideration in law, such as case studies, scepticism, co-production, and actor-network theory. Even if they are not imported wholesale, each of these could be extremely useful or powerful in legal analysis. It is therefore hoped that those working in law and technology will consider the relevance of STS for their own work – and perhaps how their existing understandings and methodologies could be enhanced or expanded by incorporating some of these approaches.

**Data availability statement.** N/A.

**Acknowledgments.** This article would not exist without Päivi Leino-Sandberg, who provided many helpful comments throughout the writing process, and Miikka Hiltunen, who was invaluable in helping me to navigate the world of STS. I would also like to thank the participants of the participants of the third INDIGO project workshop in Barcelona on 10<sup>th</sup> December 2021 for providing feedback on the very first version draft of this article. All errors and deficiencies remain entirely my own.

**Financial support.** This paper was written as part of the INDIGO Project, which is financially supported by the NORFACE Joint Research Programme on Democratic Governance in a Turbulent Age and co-funded by AEI, AKA, DFG, FNR, and the European Commission through Horizon 2020 under grant agreement 822166. The funder had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

**Competing interests.** The author has no conflicts of interest to declare.