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DOES TECHNOLOGY DRIVE LAW?

THE DILEMMA OF TECHNOLOGICAL EXCEPTIONALISM IN CYBERLAW

by Meg Leta Jones, JD, PhD

This working paper is a first draft of a paper that will be subject to change following dissemination and peer-review

Abstract

Seemingly plagued by newness, the law, it is often claimed, cannot keep up with new technology. Digital technologies have only reinforced the legitimacy of this now well-established idiom. The sentiment has gone unchecked for decades, even in light of social and historical research that reveals the cultural nature of technology. In the field of law and technology (cyberlaw), the theory of technological exceptionalism is used to measure whether new technologies are transformative enough to uproot existing legal foundations. This article is an attempt to disconfirm technological exceptionalism as a viable theory for cyberlaw research and policymaking by analyzing a number of information and communication technologies often labeled "exceptional," including the printing press, the internet, photographic cameras, computers, and drones. If technologies can be exceptional - if their attributes drive social change and laws - the same linear pattern should appear across cultures where the technology is introduced: a technology enters society and allows for certain activities that place significant strains on social orders, existing law and legal concepts are applied but fall short, and necessary changes are made to account for the new technological capabilities. Because the theory of technological exceptionalism does not hold up - because the story of law and technological change is much more varied, messy, and political - it should be discarded and new theories of and approaches to law and technological change, such as the legal construction of technology, should be pursued.

Keywords:

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Introduction

Are driverless cars new? How new? New enough to need new laws or legal treatment? Why? A room of government and corporate stakeholders, roboticists, and technology researchers grappled with this unstated, undercurrent of a question at a workshop in D.C., an attempt to get moving on ethics and policies for autonomous systems.[1] As one might expect, industry representatives explained the way in which cars were already sold with a great deal of computing power and autonomous functions like parallel parking, cruise control, and reverse braking systems. Others in the room pointed out the potential transformation of the workforce, traffic and public transportation, urban planning, safety and insurance issues, and privacy and security policy. Sometimes a technology so innovative, we are told, that it cannot be proactively regulated, for how are policymakers to understand its technical complexities or know its potential. But at that meeting and in reference to driverless cars, the implications of the answer to the question seemed clear. If driverless cars are not new, they don't really need new regulatory or governance attention. If driverless cars are new, they most certainly need a new legal and ethical approach. These debates are not isolated to cars. Is big data new, the next industrial revolution? What about the internet of things? How new are smart phones? How much newer is the newest iPhone? How do we know or decide that technology is new enough to matter?

Legal scholarship, both in the subfields of law and technology (i.e., cyberlaw) and law and society (i.e., sociolegal studies), has struggled with theorization and analysis of the technological change. Though largely ignored in sociolegal studies, the law's relationship to technology is central to the field of cyberlaw, where it is portrayed as linear: a new technology is presented to society and the law must move quickly to respond to the disorder technology creates. This choice in approach solidifies the pacing problem,[2] the idea that law cannot keep up with technology, a form of technological determinism wherein technology drives social structures and cultural values.[3]

A version of technological determinism in law is the use and analysis of "technological exceptionalism" in cyberlaw. This theory is how one in the field might answer the question, "Are driverless cars new?" Cyberlaw scholar Ryan Calo explains that technological exceptionalism occurs, "when [a technology's] introduction into the mainstream requires a systematic change to the law or legal institutions in order to reproduce, or if necessary displace, an existing balance of values."[4] For Calo, and others like David Post and, to some degree, Lawrence Lessig, "essential qualities" of technology "drive the law and policy conversations that attend them."[5] The task for law scholars, lawyers, stakeholders, and policymakers is then to identify those qualities as they arise and adapt the law accordingly. But, as Tim Wu writes, exceptionalism depends on what you might think it is an exception to.[6]

This article is an attempt to disconfirm technological exceptionalism as a viable theory for cyberlaw research and policymaking by analyzing a number of information and communication technologies often labeled "exceptional" across cultures, including the printing press, the internet, photographic cameras, computers, and drones. If technologies can be exceptional, if their attributes drive social change and laws,

1 National Science Foundation and U.S. Department of Homeland Security Policy for Autonomy Workshop, Washington, D.C., Jan. 7-8, 2016.
2 Gary E. Marchant, Braden R. Allenby, & Joseph R. Herkert eds., The Growing Gap Between Emerging Technologies and Legal-Ethical Oversight: The Pacing Problem (2011).
3 Merritt Roe Smith & Leo Marx eds., Does Technology Drive History? The Dilemma of Technological Determinism (1994).
4 Ryan Calo, **Robotics and the Lessons of Cyberlaw**, 103 Calif. L. Rev. 513, 551-552 (2015).
5 **Id**.
6 Tim Wu, **Is Internet Exceptionalism Dead? in** The Next Digital Decade: Essays on the Future of the Internet 179 (Berin Szoka & Adam Marcus eds., 2010).

the same linear pattern should appear across cultures where the technology is introduced: a technology enters society and allows for certain activities that place significant strains on social orders, existing law and legal concepts are applied but fall short, and necessary changes are made to account for the new technological capabilities. This theory does not hold across cultures, technologies, or time periods - a great deal of variation and messiness is found when looking at the same technology in different times and places.

The cultural construction of technology is overwhelmingly overlooked or flat out rejected by cyber exceptionalism and sociolegal studies. For instance, renowned legal and society scholar Lawrence Friedman distinguishes the law's inability to be seamlessly transported across cultures with technology's ability to do so: "An automobile is an automobile is an automobile, whether it is in Tokyo or Moscow or Buenos Aires or New York. A cell phone is a cell phone; a computer is a computer. There is no such thing as a Chinese cultural cell phone, or a Brazilian style of computer."[7] But, Sheila Jasanoff explains from a science and technology studies (STS) perspective:

The world is not a single place, and even "the West" accommodates technological innovations such as computers and genetically modified foods with divided expectations and multiple rationalities. Cultural specificity survives with astonishing resilience in the face of the leveling forces of modernity. Not only the sameness but also the diversity of contemporary cultures derive, it seems, from specific contingent accommodations that societies make with their scientific and technological capabilities.[8]

Like the fields of communications and media studies of the 1920s through the 1980s driven to uncover the "effects" of media and the "impacts" of computer mediated communications,[9] cyberlaw scholars largely investigate how a "new" technology affects or impacts society and in turn law. Unlike the fields of media studies, communication, information science, and STS, the relatively new and innovative subfield of cyberlaw has not moved beyond technological determinism to similarly embrace the cultural construction of technology. STS and related fields have encouraged mutual-shaping approaches like co-production[10] in an effort to acknowledge and appreciate both the material nature of technology and the social construction of technology, but technological determinism continues to dominate the way in which legal scholars and policymakers assess technological change across society and within law and policy-making arenas and processes.

When Merritt Roe Smith and Leo Marx asked "Does Technology Drive History?" in their 1994 collection, they were confronting a resurgence of technological determinism, which had fallen out of favor for STS scholars and given way to uncovering and understanding the social aspects of science and technology.[11] The answer, though complicated and evolving, is no. Technology is not the locus of historical agency. In this article, I argue that technology does not drive law either. Technology is not the locus of legal agency. When testing the theory of technological exceptionalism, no technology has even been exceptional. We must figure out a new way to answer the question, "Are driverless cars new?" Because, technological exceptionalism is not up to the task. Instead of analyzing whether technologies are or will be exceptional and in addition to analyzing how the law can and should respond to exceptional or conservative technological

7 Lawrence Meir Friedman, Private Lives: Families, Individuals, and the Law, 12 (2004).
8 Sheila Jasanoff, **Ordering Knowledge, Ordering Society, in** States of Knowledge: The Co-Production of Science and the Social Order, 14 (Sheila Jasanoff ed., 2004).
9 Leah A. Lievrouw, **Materiality and Media in Communication and Technology Studies: An Unfinished Project, in** Media Technologies 21, 21 (Tarleton Gillespie, Pablo J. Boczkowski, and Kirsten A. Foot eds., 2014).
10 Jasanoff, **supra** note 8.
11 Merritt Roe Smith and Leo Marx, Does Technology Drive History? (1994).

advances, this article argues that cyberlaw research should consider the way in which technologies, practices, and social arrangements are constructed within certain legal contexts: the legal construction of technology.

Technological Determinism in Law

Technological exceptionalism does not have a set definition. In fact, it is probably a term many use differently. I will describe a certain type of technological exceptionalism and hope readers will distinguish their own use from the one offered. Ryan Calo offers this definition: technological exceptionalism occurs, "when [a technology's] introduction into the mainstream requires a systematic change to the law or legal institutions in order to reproduce, or if necessary displace, an existing balance of values."[12] It involves at least two elements: 1) a dramatic technological change that 2) necessitates systematic legal change. This is the broad, working definition of the theory for the purposes of this article.

Theories of technological change not only shape the way in which we see social, policy, and legal problems but also the way in which we approach describing, analyzing, and solving such problems. Other fields hold different theories of novelty and technological change that shape their research processes. For instance, Christophe Lécuyer in innovation studies has analyzed the way Silicon Valley attracted and foster new ideas, technical know-how, and investment dollars through mastering manufacturing, design, and management.[13] Clayton Christensen's theory of disruptive innovation where one technology comes along and creates a new market and value network in such a way that displaces a legacy technology continues to be taught in business schools.[14] English professor Michael North explains that novelty has been considered a quaint idea in art and fashion since Andy Warhol displayed soup cans.[15] A focus on invention and Eureka moments has been discouraged in favor of resilient existing technologies and collaborative efforts by David Edgerton in the history of technology[16] and celebrated public historian Walter Isaacson.[17] Media historian Lisa Gitelman and communications scholar Carolyn Marvin emphasize the importance of historicizing contemporary technologies by examining novelty in its relative social context and focusing on use as opposed to innovation.[18]

Cyberlaw's working theory of novel technological change is technological exceptionalism. This has not been the only theory. In the 2007 symposium edition of Minnesota Journal of Law & Technology, Gaia Bernstein explained:

For a brief time during the 1970s, different winds were blowing in legal academia. Lawrence Tribe in a book entitled Channeling Technology through Law, discussed the "Technological Assessment" approach. Technology assessment undertakes a broader approach to the evaluation and regulation of new technologies that does not focus on specific technologies. Yet, in the decades to follow, the legal approach to new technologies did not follow this lead, instead it remained technology-specific.[19]

12 Ryan Calo, **Robotics and the Lessons of Cyberlaw**, 103 Calif. L. Rev. 513, 551-552 (2015).
13 Christophe Lécuyer, Making Silicon Valley: Innovation and the Growth of High Tech, 1930-1970 (2005).
14 Clayton Christensen, The Innovator's Dilemma (1997).
15 Michael North, Novelty: A History of the New (2013).
16 David Edgerton, The Shock of the Old: Technology and Global History since 1900 (2011).
17 Walter Isaacson, The Innovators: H ow a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution (2015).
18 Lisa Gitelman, Always Already New; Carolyn Marvin, When Old Technologies Were New.
19 Gaia Bernstein, Toward a General Theory of Law and Technology: Introduction, 8 Minn. J. L. Sci. & Tech. 441 (2007) (citing See Laurence H. Tribe, Channeling Technology Through Law (1973); Laurence H. Tribe, **Legal Frameworks for the Assessment and Control of Technology**, 9 Minerva 243 (1971).

Until recently the debate around technological exceptionalism has been not **whether** it exists, but **when** it exists. When is a technology so new and so different that it will drive significant legal change? When is a technology so novel that the law, as established, breaks and cannot account for it?

Giving the theory of technological exceptionalism its own focus and finding one's footing within this conversation matters, because it shapes how socio-technical legal problems are imagined and shaped and how they are answered. If you think that technology creates problems, you can probably conceive of how technology solves problems. Alternative theories and methods will be revisited at the end of the article, but the article's (eventual) sole goal is to disconfirm technological exceptionalism, not to offer a replacement theory and associated methods.

As a specific term, technological exceptionalism is tied tightly to internet policy and the field of cyberlaw itself. In what is referred to as "the law of the horse debate," Frank Easterbrook famously analogized internet law, as a field of study, to the law of the horse. Easterbrook took issue with devising a field around an object, instead preferring legal fields be categorized as broad concepts and issues that touch all objects: contracts, liability, jurisdiction, etc.[20] The response for early practitioners and scholars of cyberlaw was to point out that the internet was completely different across all those fronts, it needed its own special treatment.[21] Perhaps because cyberlaw was defending a position of exceptional novelty to maintain its relevance, earlier work, such as that from Lawrence Tribe, on the subject of law and technological change have only be rediscovered and utilized recently, in a period of reflection for the field.
The debate has moved from the virtual to the physical, now revolving around the internet of things and robotics. Calo explains that law is finally catching up with the internet, but "technology has not stood still."[22] He argues that robotics will be the next transformative technology and that its essential qualities are more exceptional than those of the internet. Calo builds his argument by first establishing that it is the internet's essential qualities of connection, collaboration, and control gave rise to the field of cyberlaw and "end up driving a particular conversation across a wide swath of cyberlaw issues."[23] He then explains that robotics has distinct essential qualities, distinction from the internet's characteristics, of social valence (evocation of anthropomorphization), emergence (adaptive behavior), and embodiment (ability to physically act on the world), which will require its own and special legal treatment.[24] Jack Balkin responded to Calo's article, writing he does "not think it is helpful to speak in terms of 'essential qualities' of a new technology that we can then apply to law."[25] In this article, the argument furthers Balkin's response by utilizing work and methods in STS and the history of technology.

My argument, bluntly put, is that **none** of the interpretations American law has made in theory, doctrine, analogical reasoning, or overarching policies **must necessarily** have followed from the technology's essential qualities. The contemporary American legal community has understood these ICT or cyber technologies through sense-making as academically trained users, political actors with vested interests, cultural entities within institutional structures, and motivated agents of change in a particular time. New technologies' distinctions from legacy technologies are as political as they are technical. Novelty is constructed and as construction is performed the method and politics of this interpretation should not be overlooked.

20 Frank H. Easterbrook, **Cyberspace and the Law of the Horse**, 1996 U. Chi. Legal F. 207 (1996).
21 See e.g., Lawrence Lessig, **The Law of the Horse: What Cyberlaw Might Teach**, 113 Harv. L. Rev. 501 (1999).
22 Ryan Calo, **Robotics and the Lessons of Cyberlaw** 103 Cali. L. Rev. 513, 515 (2015).
23 **Id**., at 525.
24 **Id**.
25 Jack M. Balkin, **The Path of Robotics Law**, 6 Cal. L. Rev. 45, 45 (2015).

In the early days of cyberlaw you could be accused of being an exceptionalist or not but little ink was spilled on what that meant and why it mattered. One reason that theories of technological change matter to the field of cyberlaw is that theories shape the way in which we identity, shape, approach, and answer questions and problems. If technology is the driving force of law, law will always follow technology. Thus, the methodological approach looks something like this: a technological advancement is assessed; the social outcomes or problems are detailed; existing law is applied; shortcomings are listed; and legal changes are recommended. This approach lends itself to what is sometimes called "the pacing problem" – the tenet that law cannot keep up with technology.[26] By accepting the pacing problem and chasing new technologies with legal solutions, law and technology scholars, as well as policymakers, unnecessarily accept a degree of irrelevance.

Law is far from the only field that has struggled to theorize and characterize the relationship between technology and society. Philosophy, history, and social sciences have all fallen prey to describing simplified timelines with neat causal connections between inventions and large scale social change. This perspective has become unkindly labeled "technological determinism" by scholars studying technology across fields from communication, information, sociology, history, and cultural studies. Technological determinism is a two part concept. The first is that the relationship between technological advancement and society are separate, that technological change is a march of improvements and progress independent of social, economic, or political forces.[27] The second part of technological exceptionalism is that technological changes causes or determines social change.[28] Those that embrace technological determinism in this sense tie technological progress tightly to social progress and may quickly identify technological solutions to social problems. This often comes in the form of technological solutionalism, criticized in detail by Evgeny Morozov in **To Save Everything Click Here**,[29] and technofix, described earlier in 1980 by Kirkpatrick Sale's **Human Scale**.[30] However, this strand of technological determinism can also result in severe pessimism.

The first aspect of technological determinism is its focus on the function of a technology - what it does, what it is capable of doing. This aspect is criticized for limiting the concept of technology, for trying to understand a complex concept in a simple way. Norman Balabanian criticized this approach to technology in his 1993 article "The Neutrality of Technology: A Critique of Assumptions," wherein he compares the simplification of technology to the simplification of the term society: "A society is not simply a collection of people, but also the interrelationship among them. In the same way, technology means not simply a collection of machines, but the relationships among them, their uses, and their relationship between them and people."[31] "Technology" includes the physical objects, know-how, personnel, organizations and systems, and political and economic power. Physical objects include hardware (tools, instruments, machines, weapons, appliances), infrastructure (bridges, buildings, plants, networks, roads, telephone lines, electricity), and (metals, plastics, drugs, chemicals, synthetic fibers). Know-how refers to the methods, processes, and procedures people undertake while engaging with technology as a machine, not to be confused with abstract scientific knowledge. Personnel refers to the largely interchangeable workers that manipulate and maintain the physical objects. The organizational aspect of technology refers to the system of management and control and the links between hardware, know-how, and personnel with other

26 Marchant, Allenby, & Herkert, **supra** note 2.
27 Wyatt, 168
28 **Id**.
29 Evgeny Morozov, To Save Everything, Click Here: The Folly of Technological Solutionism (2013).
30 Kirkpatrick Sale, Human Scale (1980).
31 Norman Balabanian, **The Neutrality of Technology: A Critique of Assumptions, in** Critical Approaches to Information Technology in Librarianship: Foundations and Applications 15, 17 (John Buschman ed., 1993).

social institutions. Finally, the political and economic power refers to technology's specific engagement with money, power, and decision-making within a culture.

The limitations of law's treatment of technology become clear when we compare Friedman's quote with one of Balabanian's. Again, Friedman has written, "An automobile is an automobile is an automobile, whether it is in Tokyo or Moscow or Buenos Aires or New York. A cell phone is a cell phone; a computer is a computer. There is no such thing as a Chinese cultural cell phone, or a Brazilian style of computer."[32] Balabanian however explains, "Technology is not simply the computer, for example, but large-scale computer networks linked through telecommunications systems; it is command-and-control systems; it is data banks, the know-how and the software to manipulate them, and the power implicit in controlling them."[33] By expanding our conception of technology to include these other elements, we expand beyond the functional attributes of the physical objects to include cultural, institutional, and structural elements.

Technological determinism is criticized and disconfirmed across a handful of fronts, having consumed three decades of work in STS. First, when investigated closely, the supposed outcome of the technological innovation's impact on society often begins to take place long before the particular conception or invention or proliferation of a technological advancement. Technological determinism overlooks cultural shifts from other sources. As such, the best or suitable alternative designs may lose out as social practices and other interests alter the meaning and use different technologies. Technologies change over time, as well as accumulate and relate to one another. For those opposed to technological determinism, no single, universal outcome results from technological change. Different social arrangements are created around similar technologies situated in various cultures. This perspective is often referred to the **social construction of technology** or SCOT. In simplest terms, social constructivists hold the opposite view of technological determinists. SCOT scholars argue that technology does not determine human action; human action shapes technology and technology cannot be understood without understanding how it is embedded in social context. Its originators, Trevor Pinch and Wiebe Bijker break the conceptual framework into four components: 1) interpretive flexibility (there is great flexibility in the way people think about, use, and design technology); 2) the relevant social groups (specific groups will share a particular set of meanings and shared language around a technology); 3) stabilization and closure (a multigroup design process achieves stabilization when conflicting ideas about a technology are resolved and no more modifications occur, reaching closure by determining no more problems exist or that those problems are not issues); and 4) wider social context (the sociocultural and political context of norms, values, and assumptions that will influence the interpretation of the technology).[34] A fifth would be added later by Bijker[35] and further developed by others:[36] 5) technological framing (a particular social group's shared understanding of a technology – comparable to a paradigm).

In 1993, Langdon Winner, who famously penned "Do Artifacts Have Politics?" in 1977 (wherein he described the way in which bridges between New York and Long Island were not suitable for bus travel thus limiting the travel for populations reliant on public transportation revealing the dramatic social impacts of technologies and design choices), responded to the SCOT movement in STS with "Upon Opening the Black Box and Finding It Empty: Social Constructivism and the Philosophy of Technology." He argued that

32 Lawrence Meir Friedman, Private Lives: Families, Individuals, and the Law 12 (2004).
33 Balabanian, **supra** note XX at 18.
34 Trevor Pinch & Wiebe Bijker, **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: New Directions in the Sociology and History of Technology 17 (Wiebe Bijker, Thomas Hughes, & Trevor Pinch, eds. 1987).
35 Wiebe Bijker, Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change 282 (1995).
36 E.g., Hans K. Klein & Daniel Lee Kleinman, **The Social Construction of Technology: Structural Considerations**, 27:1 Science, Technology, & Human Values 28 (2002).

SCOT is limited in four important ways: 1) it focuses on how technologies come to be but not on their consequences; 2) it focuses on the interests that contribute to the construction of technologies while ignoring those impacted but have no voice in the construction; 3) the focus on the immediate interest of those chosen groups that influence technological design, construction, and choice disregards larger cultural or economic influences; and 4) it rejects normative judgements about the alternative interpretations of technology.[37] Technologies potentially have potential consequences – their designs and affordances are not neutral. But, they are not inevitable, nor do they explain large scale society upheaval. Co-production has emerged as a theory within STS and policy that provides a way of acknowledging dialectical, mutual-shaping of the materiality of technological affordances an object or system extends – the behavior that is allowed by the design of a technological artifact[38] – as well as the social construction of technology, paying particular attention to the surrounding political influences and social order within specific cultures.[39]

Technological exceptionalism in cyberlaw is deterministic in two particular ways. First, it insists that technology drives legal change because it drives social change. Second, this linear relationship wherein law follows technology, is a response to the technology's declared functionality, ignoring Balabanian's other elements and the co-constituting described by Jasanoff. Technological exceptionalism suggests a necessary impact on society and law instead of recognizing, critiquing, or guiding the cultural/legal construction of technology. By ignoring the cultural and political interpretation of technology and focusing on functionality, technological exceptionalism appears, by the end of the next section, to be perhaps little more than American exceptionalism masquerading as a theory of law and technological change.[40]

Testing the Theory of Technological Exceptionalism

To test the theory of technological exceptionalism, we should try to find it. If the functionality of technology drives social values and legal change in the linear fashion organized by technological exceptionalism, we should certainly be able to identify ample evidence of it throughout history. If any technology were to be exceptional, the printing press and/or the internet are surely such, introducing technical functionality so new that they must have changed societies in particular ways and demanded particular legal protections.

From the Print Press to Cyberspace

The printing press is well-understood to be one of, if not **the**, most important technical innovations of all time and credited with ushering in both readership and authorship that magnitudes unknown prior or since. Johannes Gutenberg holds the reputation for inventing moveable type - the technological shift

37 Langdon Winner, **Upon Opening the Black Box and Finding it Empty: Social Constructivism and the Philosophy of Technology**, 18(3) Science, Technology, and Human Values 362-378 (1993).

38 "Affordances" is a term coined by the perceptual psychologist James J. Gibson in his chapter **The Theory of Affordances, in** Perceiving, Acting, and Knowing (Robert Shaw and John Bransford, eds. 1977). and later his book The Ecological Approach to Visual Perception (1979). It was introduced to the HCI community by Donald Norman in his book The Psychology of Everyday Things (1988).

39 Sheila Jasanoff, **Ordering Knowledge, Ordering Society, in** States of Knowledge: The Co-Production of Science and the Social Order 14 (Sheila Jasanoff ed., 2004).

40 Cyberlaw's version of the term should be distinguished from technological exceptionalism in the way that it is used by communication policy scholar Lyombe Eko, who discusses technological innovation policy in the U.S. as technological exceptionalism: "The networking and high performance computing policies advanced [after World War II] were grounded in the exceptionalist economic regime of the United States, which consisted of: academic research, private industry participation, commercialization, and eventual privation of government-funded networks for purposes of fostering innovation, competition and consumer choice in the marketplace." (page 222 of New Media, Old Regimes) While Eko's use is different, he ties exceptionalism to both American technology culture and policy in relevant ways.

that made it all happen. Jeff Jarvis explains though that Gutenberg was more like Steve Jobs than Steve Wozniak.[41]

Media theorist Marshall McLuhan and esteemed historian Elizabeth Eisenstein both detailed the effects of the printing press in their respective books **The Gutenberg Galaxy**[42] and **The Printing Press as an Agent of Change**,[43] both of which have been criticized for underlying determinism (though Eisenstein less so[44]). McLuhan argued that the accuracy, speed, and economics of textual reproduction inherent in the essential functionality of the printing press caused nationalism, dualism, rationalism, automation of scientific methods, cultural uniformity and homogeneity, and the alienation of the individual. Eisenstein's work spanned two volumes and 750 pages, historicizing McLuhan's project in great detail; it similarly argued that the printing press led to (or at least played a central role in) the scientific revolution, the Renaissance, and the Protestant Reformation. Both authors have been central figures in the academic field of the History of the Book, which has continued to enrich the story.

Gutenberg did not invent moveable type; in fact, Bi Sheng (990-1051) invented the moveable type in China four hundred years before Gutenberg. Prior to moveable type, engraved woodblock print was used and would continue to dominate the Chinese printing industry until the 19th century.[45] By 1234 Korea had taken the lead on moveable type, but the technology was largely ignored in the region because Asian languages were so complex, it was still easier to use hand-written characters were still more efficient. Public historian John Man explains that printing was inevitable ("an invention waiting to happen"), because the culture and political climate of Europe at the time was primed to embrace and promote such technology and develop wide-ranging use.[46] Romans had developed a simpler alphabet, the Chinese had proliferated paper and paper production, and a number of European countries contributed to social disruption associated with political and religious unrest – all essential to the success of the printing press. Gutenberg should certainly be credited for proliferation of the printing press; his involvement in creating the infrastructure for print as a gifted entrepreneur to be a commercial success and later his resentment toward his business partners' attempts to maintain exclusive control of the technology were vital to its success. However, the functionality of printing technologies cannot be said to have arisen through the independent genius of a single man nor to have caused social change that would necessitate certain laws. It would be centuries before ideas of authorship, ownership, economics, governance, and control would culminate in the first copyright laws.[47]

And as discussed above, the internet was the initial technology to spur the debate using the term technological exceptionalism, but certainly not the first time that scholars have debated the legally relevant novelty of technology. Even though there are many internets (culturally and materially), the internet is referred to in a singular narrow sense. Often the Communication Decency Act is used an example of how

41 Jeff Jarvis, Gutenberg the Geek (2012).
42 Marshall McLuhan, The Gutenberg Galaxy: The Making of Typographic Man (1962).
43 Elizabeth Eisenstein, The Printing Press as an Agent of Change (1979).
44 Sabrina Alcorn Baron, Eric N. Lindquist, & Eleanor F. Shevlin, Agent of Change: Print Culture Studies After Elizabeth L. Eisenstein (2007).
45 Joseph Needham & Tsien Tsuen-Hsuin, Science and Civilisation in China: Volume 5, Chemistry and Chemical Technology, Part 1, Paper and Printing 3 (1985).
46 John Man, The Gutenberg Revolution (2009).
47 Peter Baldwin, The Copyright Wars (2014); Ronan Deazley, Rethinking Copyright: History, Theory, Language (2006); Mark Rose, Authors and Owners: The Invention of Copyright (1993). Though legal protections did develop shortly after the printing press and printing business was popularized. These were not legal protections of the intangible but exclusive rights to print within a certain locale – they were called "letter patents" or "privileges" and extended to new works or ancient works being printed for the first time. Elizabeth Armstrong, Before Copyright: The French Book Privilege, 1498-1526 (1990). See also Pamela O. Long, Openness, Secrecy, Authorship: Technical Arts and the Culture of Knowledge from Antiquity to the Renaissance (2001).

the internet is exceptional, particularly Section 230, which largely limits the liability of platforms for content posted by users. Eric Goldman explains:
47 USC 230 was enacted in 1996 during the height of "cyberspace exceptionalism," the belief that the Internet was unique/special/different and therefore should be regulated differently. 47 USC 230 is a flagship example of such exceptionalism. It creates rules that really differ between the online and offline worlds, such that publishing content online may not create liability where publishing the identical content offline would. The medium matters.[48]

But, this rule is unique to the U.S. The medium, with all of the ways in which it allowed users to connect to people and ideas, create and share content, and impact and foster communities using varying levels of anonymity, was interpreted and regulated differently by different legal regimes. Other countries have extended liability to platforms once the operator has knowledge of legally actionable content.[49] Platforms are not considered neutral, automated systems and accountability is effectuated through human involvement and design choices.[50]

At a minimum, the internet is unexceptional in one very important way: it has not created a global citizenry to replace the nation-state. Echoing John Perry Barlow, in 1996 David Johnson and David Post argued that because of the essential qualities of the internet and the ICT's function, a new form of governance would emerge and that territorially-based laws would have no place in the virtual world of online.[51] A decade later, Jack Goldsmith and Tim Wu took on the claim in **Who Controls the Internet?**, effectively showing that the internet in fact had borders.[52] Those borders have only been reinforced more recently by decisions on the right to be forgotten, the Safe Harbor agreement, intermediary liability, and calls for national or regional ICT infrastructures around the world. The internet cannot turn the world into a global community; we are far from ready to move beyond the nation-state.

Perhaps these particular ICTs are anomalies or perhaps the scope of the technological framing is too large or too small. After all, anything is new if you look closely enough and nothing is new if you from a far enough distance. This is, of course, one of the many problems with technological exceptionalism: what is the "technology" and how is it defined. Because that answer depends and changes, technological exceptionalism's usefulness is in doubt. For instance, one could argue that Alan Westin's work, as well as much of the work done in the 1960s and 1970s around privacy and data protection attempting to convince the public and policymakers that "new" information processing technologies were new threats that needed new laws, but Westin described an array of technologies he found concerning: the radio transmitter microphones that allow conversations to be overheard without the consent of both parties to a conversations (phone tapping), a "radio pill" that emitted a signal from within the body, secret "miniature still and movie cameras with automatic light meters" that can be triggered by movement (motion detection cameras), long range photography equipment and closed-circuit television units the size of a cigarette pack, beepers smaller than a quarter that transmit a signal for several city blocks, audial surveillance that can be built into one's attire, photochromic micro-images, computer storage and processing, credit and debit card systems, polygraphs, and personality tests.[53] He listed these technologies during the civil rights era

48 Eric Goldman, "Roommates.com Denied 230 Immunity by Ninth Circuit En Banc (With My Comments)," Technology & Marketing Law Blog (Apr. 3, 2008), http://blog.ericgoldman.org/archives/2008/04/roommatescom_de_1.htm.
49 Urs Glasser & Wolfgang Schulz, **Governance of Online Intermediaries: Observations from a Series of National Case Studies**, Berkman Center Research Publication No. 2015-5 (Feb. 18, 2015).
50 Meg Leta Jones, **A Right to a Human in the Loop: Political Constructions of Computer Automation & Personhood**, 47 Social Studies of Science 216 (2017).
51 David Johnson and David Post, **Law and Borders: The Rise of Law in Cyberspace**, 48 Stan. Law. Rev. 1367 (1996).
52 Jack Goldsmith and Tim Wu, Who Controls the Internet?: Illusions of a Borderless World (2006).
53 Alan F. Westin, Privacy and Freedom (1967).

when Congress was actively passing laws to protect new ideas about personhood. These technologies existed in a moment in time, a state of being, and Western democracies – the setting was often referred to as a surveillance state, and the state, it was argued, needed to change.

Or, perhaps it is that we are asking too much of exceptionalism - both technical and legal context arguably matter to the theory. In the next section, the brownie - the hand-held photographic machine that supposedly led to the modern right to privacy - will be addressed using a more narrow scope. It will be followed by a similar analysis of commercial drones. In the end, the result is the same: technology does not drive history and it does not drive law. It is only part of the story. New technologies come into being dynamically in social settings made up of existing technologies, uses and users, norms and aspirations.

Photographs and Brownies

Privacy law and cyberlaw sit upon historical groundings that inevitably involve a reference to Warren and Brandeis's "The Right to Privacy,"[54] as either a theoretical reference or a starting point to discuss contemporary privacy concerns. The story is one of dramatic technical novelty that demanded legal novelty: technological advancement and democratization of photographic cameras developed by George Eastman responded to by lawyers Warren and Brandeis with a legal tool in the form of a right that would later be operationalized into four distinct torts. The folklore is so powerful it has leaked from law and technology circles. In his new book **The Internet of** Us, Michael Lynch explains that while most of us may know about Warren and Brandeis's article, we may not know that "Because of this newfangled invention [of the Kodak camera], Warren and Brandeis worried that technology- and our unfettered use of it –was negatively affecting the individual's right to control access to private information."[55]

This succinct story is not quite accurate or is at least incomplete. It is true that Warren and Brandeis were particularly concerned about "instantaneous photography" (though the opinion of two lawyers should not be considered definitive about the larger social relationship between camera technology and a social problem about privacy), the two were not determinists in three major ways: 1) They acknowledged a change in news and celebrity culture. 2) They were anticipating a technology - the Brownie in 1890 was heavy and expensive. It would not become a "democratizing" information technology for another twenty years. Law here is not following technology. 3) They recognized that other national legal cultures had developed in different yet relevant ways not dependent on the function of the snap camera.

Warren and Brandeis described cultural shifts related to news and celebrity, and scholars have noted Warren's socialite status and frustration with the increasingly invasive press.[56] Samantha Barbas has written extensively on this subject in her book **Laws of Image**. She explains:
Like the surge in libel litigation, the development of the right to privacy was a response to the sensationalistic popular press. It also reflected a historical shift in the ways that Americans, particularly middle-class city dwellers, were conceptualizing their social identities and presenting themselves to others. It was a reaction to a new sensitivity to personal image that grew from the demands of social life in an increasingly urban, commercial, mass-mediated society, where appearances, first impressions, and superficial images were becoming important foundations of social evaluation and judgment.[57]

54 Samuel Warren and Louis Brandeis, **The Right to Privacy**, 4 Harv. L. Rev. 193 (1890).
55 Michael Lynch, The Internet of Us, 89 (2016).
56 E.g., Daniel Solove & Neil Richards, **Privacy's Other Path: Recovering the Law of Confidentiality,** 96 Geo. L.J. 123 (2007).
57 Samantha Barbas, The Law of Images 27 (2015).

Barbas emphasizes that the "visual revolution" was facilitated by image technologies like the Kodak camera, but that a number of changes in understandings of the self, migration patterns, architecture, and relationships toward others are all part of the story of privacy and the desire and right to control one's image.[58] Other cultural historians have emphasized the way enhanced attention to feeling, emotion, and sentiment changed the sense of self and this recognition's role in the right to privacy.[59]

In 1888, George Eastman introduced the snap camera to the market with the slogan, "You press the button, we do the rest." This the camera that Warren and Brandeis would have been referring to in 1890. While Eastman's vision was to produce an easy to use camera that took the technical and chemical elements out of processing the film, the camera cost $25. When one hundred pictures of the film were shot, the camera was mailed to Eastman Kodak, where the film was developed by skilled specialists for $10. The camera was then loaded with new film and returned, followed by the prints when they were finished. This relatively expensive equipment and process was enthusiastically adopted by amateur photographers, who came to be known as Kodakers, because Eastman's product had become standard among many inexpensive, small cameras on the market at the time.[60] The amateur photography craze managed to produce a huge number of photographs that surfaced in every corner of society from advertisements to bulk stacks in dime stores.[61] Described as a seductive, mysterious addiction (even demonic), commentary surrounding photography "arose from a complex interaction between contemporary suspicions about the 'reality' of photographs, and uncertainty about the limitations of the technology, on the one hand, and contemporary bourgeois notions that unguarded facial expressions were reflections of deep and sincere feeling," sometimes referred to as sentimentalism.[62]

Eastman produced the Pocket Camera in 1895 for $5, which was very popular but still expensive for many. Although spy cameras and the idea of hidden cameras were something of a fascination during this period, they were not commercialized and nothing suggests pocket cameras were of particular concern.

58 Id., at 95.
59 Robert Mensel, **"Kodakers Lying in Wait:" Amateur Photography and the Right to Privacy in New York, 1885-1915**, 43:1 American Quarterly 24 (1991).
60 Beaumont Newhall, The History of Photography from 1839 to the Present (1983); Reese V. Jenkins, **Technology and the Market: George Eastman and the Origins of Mass Amateur Photography**, 16 Technology and Culture 1 (1975).
61 Robert Mensel, **"Kodakers Lying in Wait:" Amateur Photography and the Right to Privacy in New York, 1885-1915**, 43:1 American Quarterly 24 (1991).
62 **Id**., at 29.

Fig 1: Kodak Pocket Camera advertisement, 1899.

It would not be until 1900 that the Brownie would make its debut. Made of a cardboard box and costing only $1, the Brownie was intended to be owned and operated by everyone. In fact, the major marketing campaign was directed at children.

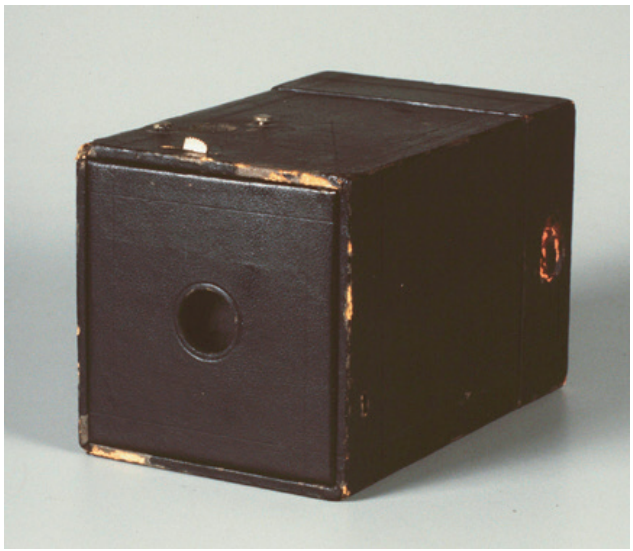


Fig. 2: Brownie (original model), Feb. 1900.

Let the Children Kodak

And then in turn Kodak the children. In every home, on every vacation trip, there's a story for the Kodak to record. But above all is the serial story of the children, from the days of wild gallops across the nursery floor upon the fractious rocking-horse to the foot ball days; from the days of tending dollies to the graduation days.

And it's all a simple story to record, for the Kodak system of photography has removed most of the opportunities for making mistakes. It's inexpensive now and there's no dark-room for any part of the work.

KODAK Means Photography
With the Bother Left Out.

Kodaks, $5.00 to $100. Brownie Cameras, $1.00 to $12.00.

EASTMAN KODAK CO.

Catalog free at the dealers or by mail. ROCHESTER, N. Y., The Kodak City.

Fig. 3: "Let the Children Kodak" 1909 Advertisement by Eastman Kodak Co. Image, Duke University Libraries Digital Collections.

Over the turn of the century, the Kodak camera was far from the most angst-inducing technology surfacing. Urban areas were being fitted with electricity, the punch card machine was being introduced for government use, silent movie cinemas were popping up around the country, the electric chair was replacing hangings, and lines were being laid for the telegraph.[63] Perhaps no other technology was more confusing and terrifying than the x-ray. Seeing the inside of the human body was exciting and unnerving and its limits, particularly in combination with these other technological advances, were not well understood.[64] A short essay in an issue of the weekly trade journal, **The Electrical Age**, refers to personal x-ray cameras and reads "One imaginative contemporary fears that all privacy in human affairs will be gone when the X-ray Kodak fiend is let loose. He will, it is argued, be able to reveal family inner-life, through brick walls, etc., and no one will ever know whether his actions are being 'shadowed' by a perambulating X-ray Kodak crank or not." (17:6, 103 (Feb 8, 1896)).

63 When Old Technologies Were New

64 Linda Simon, Dark Light: Electricity and Anxiety from the Telegraph to the X-ray (2005); John H. Lienhard, Inventing Modern: Growing up with X-Rays, Skyscrapers, and Tailfins 47 (2003).

Fig. 4: illustration in "Photographing the Brain," 17:6 The Electrical Age 103 (Feb. 8, 1896).

A time of significant change, there was great enthusiasm for technology, innovation, and science, but also an undercurrent of anxiety, angst, and disquiet punctuated by a seemingly constant stream of sensemaking, negotiating, accepting, rejecting, and adapting.

Photography and cameras have been relevant to developments to rights to privacy outside of the U.S., but the Brownie is not the star of the show. The United Kingdom, often considered the most similar to the U.S. for comparative purposes, followed what Daniel Solove and Neil Richards called "privacy's other path."[65] This path is one that has rigidly emphasized an existing relationship between parties to establish a legal claim of confidentiality, regardless of how information by one party is captured, contained, or shared. The Human Rights Act of 1998 and the Data Protection Act of 1998, both passed to bring British law in line with the European Convention on Human Rights, have increased the UK's recognition and enforcement of privacy rights through tort actions, many of which involve modern celebrities like Naomi Campbell and Michael Douglas – complete with pictures.[66] [Further research on privacy (defamation, confidentiality, persona) cases involving photographs in development of informational boundaries in UK law]. A great deal of changes occurred in British privacy law since the beginning of the 20th century to the end but virtually none of it was driven or inevitable because of the affordances of the snap camera.

In France, the camera - but not necessarily the snap camera - played an important role in the development of a right to privacy. French privacy rights are, like others, one in a bundle of personality rights that also include moral rights of creators for the purposes of copyright, the right to control the use of one's image, and the right to protect one's honor and reputation. Although France, too, is a civil law system, its privacy

65 Solove & Richards, Privacy's Other Path, **supra** note XX.

66 James E. Stanley, **Max Mosley and the English Right to Privacy**, 10 Wash. U. Global Stud. L. Rev. 641 (2011). See Douglas v. Hello!, Ltd. [2001] Q.B. 967 (wherein Michael Douglas and Catherine Zeta-Jones initially won injunction relief as well as damages but on appeal were granted only damages). Lord Justice Sedley of the Court of Appeals explained the judicial circumstances: "Courts have done what they can, using such legal tools as were on hand, to stop the more outrageous invasions of individuals' privacy; but they have felt unable to articulate their measures as a discrete principle of law. . . . Nevertheless, we have reached a point at which it may be said with confidence that the law recognizes and will appropriately protect a right to personal privacy." Douglas v. Hello!, Ltd. [2001] Q.B. 967 at 997. See also Campbell v. Mirror Group Newspaper Ltd. [2004] UKHL 22 (supermodel Naomi Campbell sued publishers over photographs taken when she was leaving a Narcotics Anonymous meeting). After a series of appeals, the declaration that there was no free-standing right to privacy under English law was made, but the House of Lords (then called the Law Lords) had to recognize the private information and fit it within a breach of confidence claim, explaining, "The continuing use of the phrase 'duty of confidence' and the description of the information as 'confidential' is not altogether comfortable. Information about an individual's private life would not, in ordinary usage, be called 'confidential.' The more natural description today is that such information is private. The essence of the tort is better encapsulated now as misuse of private information." Campbell v. Mirror Group Newspaper Ltd. [2004] UKHL 22 at 14.

rights developed in a "remarkably uncivil" way.[67] Without legislation on the books, French judges essentially created a right to oppose the publication of private facts through common law based on tort principles and expanded into recognition of a substantive right to privacy in the 1950s and 1960s.[68]

One hundred years prior French courts were already laying the groundwork for the comprehensive system to come based on changing notions of dignity, personhood, and information.[69] These cases paid little attention to the actions or wrong-doing of the defendant.[70] One of the most prominent privacy cases in the country's history illustrates the development of a unique protection of private life and the information producing abilities of the camera. In 1867, the famous Three Musketeers author Alexandre Dumas père filed a claim revolving around a set of untoward photos taken with his mistress, half his age, that were subsequently disseminated by the photographer.

Fig. 5: Alexandre Dumas with Adah Isaac Menken 1866.

Dumas admitted he had sold his rights in the photographs to the man he was suing for publishing them.[71] The Dumas court adopted ideas regarding private life that were expressed when the first law lifting post-Napoleonic censorship of the press was passed in 1819.[72] The court explained that even if a person had consented to exposure, that person must retain the right to withdraw in order to protect his or her dignity.[73] Although a photograph could capture the unsavory behavior of the elite and it expose it to the mass, privacy laws would protect against such indignity. This would remain true as the camera became an object toted by all.

67 Jeanne M. Hauch**, Protecting Private Facts in France: The Warren and Brandeis Tort is Alive and Well and Flourishing in Paris**, 68 Tulane L. Rev. 1219, 1231 (1994).
68 **Id**.
69 Guarding Life's Dark Secrets; Two Western Cultures of Privacy; When Information Came of Age.
70 See e.g., Judgment of June 16, 1858, Trib. pr. inst. de la Seine, 1858 D.P. III 62 (Fr.) (affaire Rachel).
71 Dumas c. Liébert, CA Paris, May 25, 1867, 13 A.P.I.A.L. 247 (1867).
72 James Q. Whitman, **The Two Western Cultures of Privacy: Dignity Versus Liberty**, Yale L.J. 1151 (2004)
73 Dumas, 13 A.P.I.A.L. 247.

Today the ability to capture an image is as easy and democratized as Eastman could have hoped, but the mantra surrounding photographs and photography has changed from, "You press the button, we do the rest," to "Pics or it didn't happen." Over the time period of that change, the right to know has gained powerful traction in the U.S.[74] while expansive data protection and privacy rights were being codified in Europe.[75] In America, the affordances of the snap camera have become demanding forms of expectation. The legacy of prior and existing technologies, norms, boundaries, laws, and protections uniquely shapes the way in which legal cultures make sense of "new" technologies.

Computers & Automation

Computers are a curious example of legal constructions of novelty, spanning decades and countries. Like all innovations, the story is one of incremental advancements, uses, political history, and legal institutions. The legally relevant novelty of computers was found more readily in European countries than in the U.S., or at least it was constructed in dramatically different ways. With different concepts of personhood, speech, privacy, autonomy, civic efficiency, and governance, European countries mobilized more quickly around computing technologies in the mid-1900s than the U.S., which easily recognized issues of transparency and errors but was more inclined to politically view computers as solutions to bias, corruption, and waste.[76]

A slew of data protection laws were passed in European municipalities and countries in the early 1970s to address automated data processing. The first, in Hesse, applied only to automation[77] and the 1973 Swedish **Datalog** applied to data "held in machine-readable form."[78] In fact, without permission from the Data Inspection Board, Swedish records could not be put in machine-readable format. Germany and France, both studying the issue in the late 1960s, had varied policy responses. Germany's first federal law was passed only after overcoming the idea that existing laws sufficiently protected individuals.[79] A 1971 working group assigned to study possible national data protection regimes would develop the influential German idea of informational self-determination and the 1977 Federal Data Protection Act prohibited data processing unless authorized by law or performed on the basis of consent.[80] France had initiated a number of studies in the late 1960s and passed its national data protection law in 1978, which provided the remarkable right to non-automated processing for decisions have legal effects and requires notification to the data protection agency when personal data is automatically processed.[81]

Meanwhile in the U.S., two codes of information practices developed. In 1973 the Department of Health, Education, and Welfare issued the **Records, Computers, and Rights of Citizens** wherein five principles were outlined.[82] The existence of a record-keeping system should not be secret; individuals should be able to find out what information is collected and used; individuals should be able to prevent the use of data for purposes beyond their consent; individuals should be able to correct or amend information; and

74 The Rise of the Right to Know
75 Gloria Fuster; Collin Bennet
76 Meg Leta Jones, **A Right to a Human in the Loop: Political Constructions of Computer Automation & Personhood**, 47 Social Studies of Science 216 (2017).
77 Hessischer Landtag, Vorlage der Landesregierung, Betreffend den Entwurf für ein Datenschutzgesetz, LT-Drs. 6/3065 (1970).
78 Datalag (Svensk författningssamling [SFS] 1973: 289).
79 Spiros Simitis, **Chancen und Gefahren der Elektronischen Datenverarbeitung**, 24 Neue Juristische Wochenschrift 673 (1971).
80 Wilhelm Steinmüller, et al., **Grundfragen des datenschutzes**. Gutachten im Auftrag des Bundesministeriums des Innern, Report BTDrs. VI/3826 (1971).
81 Philippe Boucher, **La Situation en France, in** Informatique et Vie Privée 45 (Collard F, et al. eds., 1980).
82 "Records, Computers, and the Rights of Citizens," Advisory Committee on Automated Personal Data Systems, US Department of Health, Education, & Welfare (July 1973).

organizations holding records must assure against misuse. The Hew Report foreword has a quintessentially American tone for the time:

This report of the Secretary's Advisory Committee on Automated Personal Data Systems calls attention to issues of recordkeeping practice in the computer age that may have profound significance for us all. One of the most crucial challenges facing government in the years immediately ahead is to improve its capacity to administer tax dollars invested in human services. To that end, we are attempting to eliminate ineligibility, overpayment, and other errors from welfare caseloads. We are encouraging local government and public and private service agencies to forge new cooperative links with one another. We are attempting to move away from the fragmented social service structures of the past, which have dealt with individuals and with families as if their problems could be neatly compartmentalized; that is, as if they were not people. Many of these measures could result in more intensive and more centralized record keeping on individuals than has been customary in our society. Potentially, at least, this is a double-edged sword, as the Committee points out. On the one hand, it can help to assure that decisions about individual citizens are made on the basis of accurate, up-to-date information. On the other, it demands a hard look at the adequacy of our mechanisms for guaranteeing citizens all the protections of due process in relation to the records we maintain about them.[83]

The Committee's strategy "for putting cash directly in the hands of those who need it," was "keeping accurate, up-to-date, easily retrieved records on individual beneficiaries."[84] Although computer-based systems and automation are discussed thoroughly throughout, in its recommendations for safeguards, the distinction between human and computer data collection and use is dropped:

Computer-based systems magnify some record-keeping problems and introduce others, but no matter how data are stored, any maintenance of personal data presents some [] problems… Moreover, the distinction between an automated and non-automated system is not always easy to draw; require safeguards for all personal data systems eliminates the need to rule on ambiguous cases. Uniform application of safeguards to all systems will also facilitate conversion from manual to automated data processing when it does occur.[85]

The report recommended Congress pass broad legislation to address the collection and use of personal data; this of course, did not happen. The political construction of computers by this group was similar but not exactly the same as working groups in European countries and did not result in legislative action, nor did judicial interpretation establish broad principles of privacy.

A large two-part hearing, entitled Privacy: Collection, Use, and Computerization of Personal Data, was held in the summer of 1974 to discuss financial, medical, student, and census records.[86] The Privacy Act of 1974 governs the collection, maintenance, use, and dissemination of personal information maintained by federal agencies, mirroring the recommendations in the Hew Report. Four years earlier in 1970, the Fair Credit Reporting Act had passed to amended the Consumer Credit Protection Act of 1968 and while the text itself makes no mention of computer automation, the legislative record is peppered with concerns about accuracy of and access to automated systems.[87] This flurry of activity wanes at the end of the 1970s as the Privacy Protection Study Commission, organized to further legislative privacy efforts, was disbanded in 1977. The Commission's last report stated that the Privacy Act, "had not resulted in the

83 **Id**.
84 **Id**.
85 **Id**., at 49.
86 Ad Hoc Subcommittee on Privacy and Information Systems (1 June 1974) Privacy: Collection, Use, and Computerization of Personal Data, Part 1: HRG-1974-OSP-0008, Part 2: HRG-1974-OPS-0009.
87 Public Law 91–508, 84 Stat. 1114, enacted 26 October 26 1970.

general benefits to the public that either its legislative history or the prevailing opinion as to its accomplishments would lead one to expect."[88]

Americans were influential in the Organisation of Economic Co-Operation and Development's (OECD) transborder data flow guidelines, set in 1980. The OECD Guideline's emphasis on privacy, not data protection (used nowhere in the document but the basis for European national laws passed up to that point) and include eight principles.[89] Most of the principles place a duty on the data controller and the Individual Participation Principle states that an individual should have rights related to access, erasure, and amendment. The Council of Europe's Legal Committee assigned to look into technology and human rights issues in the late 1960s found computers an overlooked and severely threatening technology, particularly those private entities utilizing electronic data banks.[90] In 1981, after adopting two related Recommendations in 1973 and 1974, the CoE finalized the Convention for the Protection of Individuals with Regard to Automatic Processing of Personal Data (Convention 108), which was intend to "strengthen data protection, i.e. the legal protection of individuals with regard to automatic processing of personal information relating to them."[91] The European Union would codify a version of these principles, converged with others sourced from strong federal data protection laws, in its 1995 Data Protection Directive, creating legal duties and rights across European member states.[92]

No such general rights or duties were extended to American entities or individuals over the course of the Computer Revolution. As personal computers launched in the 1980s and institutions became increasingly computational, the focus was on how to harness computing efficiency and precision to cut costs, though the Electronic Communication Privacy Act and Computer Matching and Privacy Protection Act managed to pass in this political environment.[93] Americans have a right to access and accuracy of records held by federal agencies and credit reporting agencies, but do not hold general rights in relation to computers or automated decisions. The U.S. had not yet placed significant boundaries around or protections of computing technologies beyond transparency and correction requirements in some specific contexts.

Even with clear and consistent policy interaction between the two regions, the novelty of computers was not constructed similarly. No clear marker of novelty – no moment of newness – appears to have moved American policy-makers like the internet would later. The E.U. established most of its data protection principles in light of computers (after the earlier third of the century had been wrought with human atrocities and a unique sense of the threat of information and personal data shared across the region) and then extended them to the internet with the 1995 Data Protection Directive. In Europe, connectivity was less novel, legally speaking, than was digital automation. In the U.S., the surge of civic energy and multifaceted developments around transparency for issues of equality, injustice, and government accountability more fully (though not wholly) explain legal change than the novelty of the functional aspects of computing technology in the 1960s. Tabulation and adding machine had long been part of the American economic prosperity landscape with companies like Burroughs and Hollerith thriving from the beginning of the

88 **Final Report of the Privacy Protection Study Commission**, Subcommittee on Government Information and Individual Rights, Committee on Government Operations, HRG-1977-SGA-0058, 502 (July 12, 1977).
89 OECD Guidelines Governing the Protection of Privacy and Transborder Flows of Personal Data (Sept 23, 1980).
90 Gloria Gonzalez Fuster, The Emergence of Personal Data Protection as a Fundamental Right of the EU (2014); MD Kirby, **Transborder Data Flows and the 'Basic Rules' of Data Privacy**, 16 Stanford Journal of International Law 27 (1980).
91 Council of Europe, Convention for the Protection of Individuals with Regard to Automatic Processing of Personal Data, ETS No. 108 (1980).
92 European Union, Council Directive No. 95/46/EC of 24 October 1995 on the Protection of Individuals with Regard to the Processing of Personal Data and on the Free Movement of Such Data, art. 2(c), OJ. L 281/31 (1995).
93 Public Law 99-508, 100 Stat. 1848 (1986); Public Law 100-503, 102 Stat. 2507 (1988).

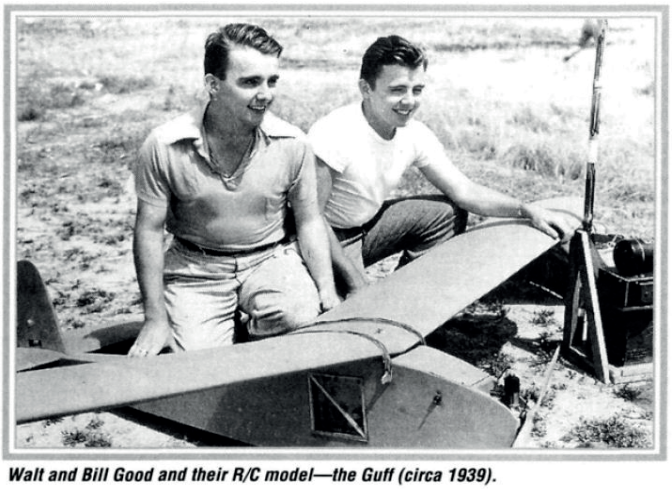
1900s and remaining competitive computing companies to this day (Unisys and IBM respectively). Computing technologies found their way into businesses, governments, and homes, and it is unclear at what moment they were new. If computers drove American law, it is unclear how they did so.

Drones and the Internet of Things

Like the novelty of the snap camera and computers, the novelty of drones depends on its context. Remote control drones were developed not long after planes were introduced into warfare in World War I in 1915 – the Radioplane OQ-2 was the first remote control aircraft the beginning of World War II in 1939.

Fig. 6: Norma Jeane Dougherty assembled OQ-2s during WWII before she became Marilyn Monroe.

Amateur UAV (unmanned aerial vehicles) technologies benefited from some of the military innovations, but remote control model aircrafts predate both world wars – they were sometimes flown around music halls at the end of the 19th century.[94] By 1937 subgroups of the R/C community centered around the ham radio managed to produce six entrants for a national R/C model plane contest (only three of which were actually able to get their planes to fly for even a few seconds).



Walt and Bill Good and their R/C model—the Guff (circa 1939).

Fig. 7: Walter and William Good with their plane, The Gulf, circa 1939.

Commercial uses and increased levels of autonomy, as well as the incorporation of advances to make the

94 David Boddington, Radio Controlled Model Aircraft, 7 (2004).

systems easier to fly by less skilled operators, more resilient under various conditions, and better sensors to promote both information gathering and safety, have developed more recently.

Fig. 8: Washington Nationals came under Federal Aviation Administration's scrutiny for using drones for promotional materials. When asked whether permission was obtained first, a spokesperson stated, "No, we didn't get it cleared, but we don't get our pop flies cleared either and those go higher than this thing did."

Drones are and have been predicted to substantially increase the effectiveness of law enforcement, revolutionize agriculture, alter the fundamentals of warfare, improve delivery services, open new avenues for newsgathering, and transform public spaces. As data gathering and/or visual technologies, the Congressional Research Service drafted "Domestic Drones and Privacy: A Primer" in 2015. The Primer outlines two issues: the understanding of privacy in the context of aerial surveillance and institutional responsibility. Drones, depending on how they operate, are considered a category within robotics in legal scholarship and policy debates in the U.S. They have been incredibly challenging for U.S. regulators, so much so that three states put moratoriums on drones until their legislatures had time to fully consider the matter[95] and the FAA effectively did the same by prohibiting commercial drones until they passed regulations. In a potentially anti-innovation moment in U.S. history, drones have been significantly delayed while waiting for regulations to be passed, much to the chagrin and resentment of U.S. drone makers who claim America is ceding its technological lead and place in the market to other countries. Is it because drones are so technologically exceptional that they require all new laws which take a long time to pass?

Based on this policy treatment one can see how the new capabilities of light-weight, semi-autonomous flying objects would need a legal overhaul, but other countries have not had the same hurdles or followed the same timeline. Similar to the U.S., European countries have size and location restrictions, as well as licensing and insurance schemes in place. Privacy is a different matter. As a surveillance tool, are drones new? Are they exceptional? Because European countries have had comprehensive data protection regimes in place that regulate data practices generally and have utilized visual surveillance technologies to monitor the public at least since the late 1970s and European Union countries since the 1990s, drones are arguably much newer in the U.S. than elsewhere.

95 Pennsylvania, Virginia, and North Carolina

In the U.K., for instance, using a drone to capture the image of an individual without her consent could be a violation of the Data Protection Act ("If a drone has a camera, it is covered by the Data Protection Act."[96]) or the CCTV Code of Practice.[97] To reiterate: drones were added to the CCTV governance strategy in the U.K. If you want to understand how to responsibly use a drone in public, you can go to section 7 of the Code of Practice, titled "Surveillance Technologies Other than CCTV Systems," that explains, "While the technologies covered in this section present new issues, the recommendations throughout the rest of this code will still be relevant."[98] The section does not detail the new issues but emphasizes that UAVs are to be treated like others discussed in the document and also specifically addresses facial recognition and body cameras in these terms. Although surveillance is a key mode of ordering in modern capitalism[99] based on a rationale of risk-management around the globe,[100] video surveillance in the UK has been normalized over the course of the 1990s and uniquely flourished in the area.[101] Privacy's "other path" and late embrace of the ECHR in the UK provided little footing for legal challenges of video surveillance technologies.

Germany, on the other hand, pioneered data protection after experience with totalitarianism, fascism, and World War II, and the German Federal Constitutional Court's 1983 landmark privacy decision on the census and the extent of protections offered by Article 10 hindered the spread of CCTV.[102] Germany thus places drone privacy within its existing data protection laws (established in the 1970s): "As is the case with normal photography, images taken from civilian drones are not allowed to violate another person's image rights. Under § 22 KUG, images of a person may only be disseminated or presented in public with the consent of that person."[103] Drone capabilities, functionality, or affordances were not exceptional in Germany, their newness was not considered legally relevant and no major legal overhaul has been found necessary. Drones, like other robotic technologies, may also be categorized as IoT (internet of things). In anticipation of this new innovation - the networking of 50 billion devices by 2020, the FTC hosted a workshop in November, 2013, and released an accompanying report in January of 2015.[104] Three principles, beyond security, of the Fair Information Practices Principles, relied on for decades were emphasized: data minimization, notice, and choice. The FTC report explains:

Staff acknowledges the practical difficulty of providing choice when there is no consumer interface and recognizes that there is no one-size-fits-all approach. Some options include developing video tutorials, affixing QR codes on devices, and providing choices at point of sale, within set-up wizards, or in privacy dashboards. Whatever approach a company decides to take, the privacy choices it offers should be clear and prominent, and not buried within lengthy documents.[105]

All these provide recommendations are mobile and internet-based, wherein the data collected is from the user with whom operators have a direct relationship.

96 "Drones" Information Commissioner's Office, https://ico.org.uk/for-the-public/drones/
97 "In the Picture: A Data Protection Code of Practice for Surveillance Cameras and Personal Information," Information Commissioner's Office (May 21, 2015), available at https://ico.org.uk/media/for-organisations/documents/1542/cctv-code-of-practice.pdf.
98 Id.
99 David Lyon, Surveillance Studies (2007).
100 Ulrich Beck, Risk Society: Towards a New Modernity (1992); Ericson & Haggerty, Policing the Risk Society (1997).
101 David Murakami Wood & C. William R. Webster, **Living in Surveillance Societies: The Normalisation of Surveillance in Europe and the Threat of Britain's Bad Example,** 5:2 Journal of Contemporary European Research 259 (2009).
102 Marianne L. Gras, **The Legal Regulation of CCTV in Europe**, 2 Surveillance & Society 216 (2004).
103 "Civilian Drones and the Legal Issues Surround their Use," Wilde Beuger Solmecke Blog (Feb. 18, 2014), https://www.wbs-law.de/internetrecht/civilian-drones-legal-issues-surrounding-use-50459/
104 Internet of Things: Privacy & Security in a Connected World, FTC Staff Report (Jan. 27, 2015), available at https://www.ftc.gov/system/files/documents/reports/federal-trade-commissionstaff-report-november-2013-workshop-entitled-internet-things-privacy/150127iotrpt.pdf.
105 **Id**., at v.

The European Union has been working on IoT since 2009 (with a press release entitled "When Your Yogurt Pots Start Talking to You: Europe Prepares for the Internet Revolution")[106] and created initiatives, including the European Research Cluster on the Internet of Things (IERC) that has produced a number of events and documents[107] that build off its work on RFID technologies in the mid-2000s.[108] The E.U. also touts IoT as big money:

Whereas in the first run Internet of Things referred to the advent of barcodes and Radio-frequency identification (FID), helping to automate inventory, tracking and basic identification, the second current wave of IoT sees a strong verve for connecting sensors, objects, devices, data and applications. The next wave could be called a "cognitive IoT", facilitating object and data reuse across application domains, leveraging on hyper-connectivity, interoperability solutions and semantic enriched information distribution, incorporating intelligence at different levels, in the objects, devices, network(s), systems and in the applications for evidence-based decision making and priority setting. Economically, it could generate billions of Euros that easily translate into growth and employment, provided it ensures trust and security for the European citizens and businesses.[109]

Like in the U.S., E.U. institutions have found no need for new rules. Unlike in the U.S., however, notice and choice remains central to E.U. data protection.[110]

The Article 29 Working Party (A29WP), an independent body made up of representatives from the data protection authorities across the E.U. to provide expert advice to member states and the Commission, published an opinion focused mainly quantified self technologies, as well as household automation devices like smart light bulbs and toasters.[111] The Opinion emphasized six concerns about personal information: lack of control and information asymmetry, quality of consent, inferences derived from data, patterns and profiling, limitations on anonymity, and security risks.[112] The A29WP was able to provide specific recommendations to a number of parties., that essentially mirror those that from the General Data Protection Regulation.[113]

The FTC and the A29WP approach the internet of other people's things in slightly different ways, but both treat the object connected future as an extension of the internet and big data policy issues. The institutions describe future by detailing the underlying IoT, which are simply connected devices that are smart by utilizing big data. When considering, debating, and regulating emerging technology, framing matters. Various legal cultures reflect, what science and technology studies scholar Sheila Jasanoff calls, diverse "civic epistemologies" that shape the way in which policy issues are framed. In this instance, there is little variation in the way in which the technology itself is framed, which is a missed opportunity. Of course IoT is an extension of the internet, big data, robotics, algorithmic living, and a number of other computational shifts, all of which present new forms of newness every day.

106 European Commission Staff Working Document, **Future Networks and the Internet – Early Challenges to the Internet of Things** (Sept. 29, 2008), available at http://ec.europa.eu/information_society/policy/rfid/documents/earlychallengesIOT.pdf.

107 Press Release, When Your Yogurt Pots Start Talking to You: Europe Prepares for the Internet Revolution, IP/09/952, European Commission (June 18, 2009), http://europa.eu/rapid/press-release_IP-09-952_en.htm?locale=en.

108 Press Release, Commission Launches Public Consultation on Radio Frequency ID Tags, IP/06/289 European Commission (Mar. 9, 2006); Press Release, Commission Proposes a European Policy Strategy for Smart Radio Tags, IP/07/332 European Commission (Mar. 15, 2007).

109 Digital Agenda for Europe: The Internet of Things, European Commission, http://ec.europa.eu/digital-agenda/en/internet-things (last visited Mar. 10, 2015).

110

111 Article 29 Data Protection Working Party, Opinion 8/2014, **supra** note 9.

112 **Id**., at 1-9.

113 **Id**., at 21-24.

Arguably, the newness that matters here is the loss of the screen and data collection of individuals who have no direct relationship to the device – the problem of the internet of other people's things. But, only if agency personnel are interested in pushing dramatically new, potential costly, policies. And, neither institution constructed IoT in this way. They missed the opportunity to achieve what both appear to be pursuing – establish meaningful digital privacy for the future. How is such a lapse explained? There is, of course, much more going on here than rules and technological affordances.

Revisiting the Pacing Problem

We do not find technological exceptionalism in the mid-1400s, we do not find it in the late 1800s, we do not find it at the turn of either centuries and we do not find it today - at least not from the technological advancements of the printing press, the snap camera, computers, the internet, or drones. Just because technological exceptionalism has not occurred does not mean that it could never happen. The reason that technological exceptionalism could never happen is because technology is so much more than function - because technology is far more socially constructed (from conception by creators to adaptation by the very latest users) than the theory of technological exceptionalism allows for. Historian and sociologist of science Steven Shapin explains:

The story of how we came to terms with the new technology—how we adjusted to it, adapted to it, domesticated it, altered it to suit our purposes—didn't come with the technical spec sheet. It never does. No instruction manual can explain how a technology will evolve, in use, together with the rhythm of our lives.[114] By acknowledging the social construction of novelty within a legal system the pacing problem also comes into question. Not only does law not linearly follow technology, a great deal of legal work shapes technology and the way in which it will be understood in the future.

Scholars, judges, regulators, and legislators often make sense of technologies in a way that is forward-looking. Supreme Court Justices in cases like **Riley v. California** interpret not only the Fourth Amendment but also technologies like cell phones, described as "such a pervasive and insistent part of daily life that the proverbial visitor from Mars might conclude they were an important feature of human anatomy" and not just another technological convenience.. [holding] for many Americans "the privacies of life."[115] That particular interpretation of a smart phone in 2013 will be able to account for other technologies that will include more and various types of personal information in the future. Other technologies, like the small personal antennas that delivered broadcasted content on online users at issue in **American Broadcasting Cos. V. Aereo** (2014), are not recognized as new but instead analogized to a previous technological systems already covered by existing law.[116] We know very little about how these constructed determinations are or should be made.

The Federal Trade Commission and the National Telecommunications Information Administration develop a political understanding of technologies through workshops and engagement with stakeholders. Like the European Union's Article 29 Working Group, the FTC took a close look at the Internet of Things and both treated the wave of connected devices as moderate extension of the internet, not a novel disruption to privacy and security.[117] Beyond the guidelines and workshops put on by administrative agencies, which

114 Steven Shapin, "What Else is New?" New Yorker (May14, 2007), http://www.newyorker.com/magazine/2007/05/14/what-else-is-new.
115 Riley v. California, 573 U.S. 783 (2014).
116 American Broadcasting Companies v. Aereo, 573 U.S. ___ (2014).
117 Meg Leta Jones, **Privacy without Screens and the Internet of Other People's Things**, 51 Idaho Law Review 639 (2015).

may steer information technology development and deployment, the Department of Education has created PTAC, the Privacy Technical Assistance Center, to provide interactive technical and security support as well as guidance on privacy practices within educational settings. This type of agile regulatory practice recognizes a rapid pace of technological change and celebrated novelty.

These are somewhat unique to American culture in relation to technology and American legal culture, which both exist within a political environment intent on fostering innovation for economic and social gains.[118] When and where novelty is not associated with prosperity, progress, and national identity is it so readily observed by the legal community?

The OncoMouse, the first animal to be patented in the U.S.,[119] represents a particularly contentious moment of international technological construction. Genetic modification was not considered particularly novel in the U.S.[120] American patent law exempts "products of nature" to prevent monopolies on things found in nature. In the 1970s a General Electric research engineered a bacterium and filed for a patent, which eventually made its way to the Supreme Court in 1980, wherein the majority concluded there was no relevant difference between living and nonliving organisms.[121] An influential amicus brief filed by Genetech explained how it produced human insulin by injecting it into bacteria, but also distinguished bacteria from living animals that are protected by various laws and policies. The incrementally was persuasive and the benefits convincing. The OncoMouse was engineered to be predispose to cancer and public outcry resulted in a five year moratorium on animal patenting, but was lifted and hundreds of patents have been filed since 1993 supporting a thriving biotech industry in the U.S. In fact, the OncoMouse had his own t-shirts that reads "Stalking Cancer" portraying the animal as a scientific superhero.[122]

Fig. 9. Tee-Shirt, OncoMouse, National Museum of American History, 2001.3066.04.

118 David Nye, American Technological Sublime (1996). See also Jones, **supra** note XX.
119 OncoMouse, National Museum of American History, 2013.0279.01.
120 Sheila Jasanoff, The Ethics of Invention: Technology and the Human Future (2016).
121 **Id**.
122 Tee-Shirt, OncoMouse, National Museum of American History, 2001.3066.04.

In Canada, genetic modification and animal patents were perceived as far more novel. Canada denied the OncoMouse patent and the Canadian Supreme Court ruled that no higher level animals would receive patents.[123] Even though Canadian and American patent language is almost identical, the Canadian Supreme Court did not see the genetically engineered mouse as no different than any other composition of matter. Margot Kaminski argues that even within a national system, the same technology may lead to different kinds of disruption.[124] Artificial intelligence, she explains, raises different legal questions for copyright law and First Amendment law, and autonomous vehicles are handled differently by the Federal Aviation Administration and the National Highway Traffic Safety Administration.[125] While computers were being debated in terms of novelty in relation to privacy and data protection issues of computers in one part of the Capitol, in another the National Commission on New Technological Uses of Copyright Works, a committee with expertise in everything but computing, argued about what exactly software was but agreed on its categorical novelty.[126]

Innovation, though universally coveted and fiercely protected today,[127] has had its ups and downs, even in America. When Noah Webster took to writing an "American Dictionary of the English Language" in 1800, his politics and disagreeable demeanor attracted the ire of friends, foes, and critics. Two other American language dictionaries had already been published and canned by reviewers. In the era when modern political parties were born and rigid partisanship ruled, Webster's critics were not only cultural conservatives that took issue with new words and the idea of an American language, but also the Federalist (Webster's own political affiliation) and Republicans. Federalists, who were social elites and favored strong central government, would certainly take issue with the recent additions of "mansplain" and a second meaning to the word literally (so commonly misused, it can now also mean its opposite – figuratively). Republicans believing the American Revolution had not gone far enough, celebrated the French Revolution and its broadening of the French language, simply could not support Webster and thus labeled his novelty useless. Innovation was a dirty word in the Federalists Party. In principle and policy, innovation had to cede to stability in the new America or risk the chaos of the French Revolution. Webster adamantly defended himself from insults and the novelty of his project: "I did **not** innovate, but **reject innovation**." In uncovering this story, historian Jill Lepore explains, "Only after what Webster stood for no longer mattered, only after Americans had begun to forget who he was, did his dictionaries succeed." Like today's debates about AI and driverless cars, novelty is contested and political. Whether a technological advancement matters, whether it is novel or innovative, depends heavily on a cultural landscape. Technological exceptionalism disregards this aspect of innovation and assumes newness based on technological essentialism.

Alternative Theories and Methods

Because cyberlaw has not spent much time on theories of technological change or refining exceptionalism, there are numerous examples of scholarship that do not adhere to the linear technology-then-law methodology, are not deterministic, and/or do not depend on technological exceptionalism. Cyberlaw scholarship has already taken a constructivist turn, as, at least much of the time, research involves some form of social construction. For example, Tarleton Gillespie explains in his book **Wired Shut** that researchers "must look at how technologies subtly urge certain uses, how debates around their design concern how they should intervene into social activity, and how users orient themselves and their worldviews so

123 Harvard College v Canada (Commissioner of Patent) 2002 SCC 76.
124 Margot Kaminski, **Legal Disruption: How Technology Disrupts the Law**, forthcoming, on file with author.
125 **Id**.
126 Gerald Con Diaz, **The Text in the Machine: American Copyright Law and the Many Natures of Software, 1974-1978**, 57(4) Technology and Culture 753-779 (2016).
127 After the disruptive nature of the 2016 U.S. presidential election and Brexit, innovation may find new critics around the globe.

as to best use the technologies."[128] This may be the task for media or information scientists, but cyberlaw scholars are uniquely suited to analyze how legal communities, institutions, traditions, doctrine, players, boundaries, arrangements, and concepts construct and co-constitute technological change.

I use the term legal construction of technology or "techno-legal construction" to tie the "social construction of technology" in STS to the field of law and technology. The legal construction of technology focuses on law as a cultural corner of societies with its own customs and rituals, players and roles, institutions and relationships, and rules and power - and how this cultural corner makes sense of a technology, technological system, or technological concept.

Although Calo's 2015 piece "Robotics and the Lessons of Cyberlaw" argues that robotics is or will be technologically exceptional because the technology acts on the world in an embodied form, can display emergent behavior, and provokes a tendency to be anthropomorphized by human interactors, his 2016 article "Robots in American Law" analyzes what judges call robots and how they are using the term.[129] It does not analyze actual robotic technologies (characterized today as technologies that "sense-think-act"). Instead it is an analysis of the term "robot" used by judges over five decades. In other words, it is an excellent example of the legal construction of technology.

Other pursuits may include analyzing technological framing in policy debates,[130] technological metaphors in judicial analogical reasoning,[131] and technological expertise in legislative and regulatory bodies.[132] Limits to the legal construction of technology are similar to those of SCOT; normative claims are difficult though not impossible to assert using these pursuits and methods. But, cyberlaw scholarship excels at normative claims and has managed, without notice, to achieve both construction and normative assertions.

Some have relied on critical theory to engage in work with ties to the new fields of critical information theory and critical data theory practiced in information science, communication fields, and media studies. As outlined by Siva Vaidhyanathan, Critical Information Studies investigates: 1) the abilities and liberties to use, revise, criticize, and manipulate cultural texts, images, ideas, and information; 2) the rights and abilities of users to alter the means and techniques through which cultural texts and information are rendered, displayed, and distributed; 3) the relationship among information control, property rights, technologies, and social norms; and 4) the cultural, political, social, and economic ramifications of global flows of culture and information.[133] Critical Data Studies has also emerged as a related field of study, wherein big data is questioned and analyzed not as scientifically empirical but as already constituted within social structures and contexts. Both poke and prod to question the assumptions underlying information technology design, power relationships, and regulation with a particular focus on copyright and more recently privacy. A prominent example is Julie Cohen's work on outdated ideas of the self within both copyright and privacy law as detailed in her book **Configuring the Networked Self**.[134]

128 Tarleton Gillespie, Wired Shut: Copyright and the Shape of Digital Culture, 68 (2008).
129 Ryan Calo, **Robots in American Law** (forthcoming 2016).
130 E.g., Meg Leta Jones, **Privacy Without Screens and the Internet of Other People's Things**
131 E.g., Daniel Solove, **Privacy and Power: Computer Databases and Metaphors for Information Privacy**, 53 Stan. L. Rev. 1393 (2001).
132 E.g., Peter Swire, "Don't Strike Down the Safe Harbor Based on Inaccurate Views About U.S. Intelligence Law," IAPP (Oct. 5, 2015), https://iapp.org/news/a/dont-strike-down-the-safe-harbor-based-on-inaccurate-views-on-u-s-intelligence-law/.
133 Siva Vaidhyanathan, **Afterword: Critical Information Studies: A Bibliographic Manifesto**, 29: 2 Cultural Studies, 292-315 (2006).
134 Julie Cohen, Configuring the Networked Self (2012).

"Law in action," or perhaps here "cyberlaw in action," is a fundamental idea in socio-legal studies wherein the way in which law actually plays itself out in society is examined – beyond statutes and cases. Kenneth Bamberger and Deirdre Mulligan's work **Privacy on the Ground** represents exceptionally rigorous investigation into how privacy laws and rules are actually interpreted, understood, and implemented by various institutions in a number of different countries.[135] Through interviews and surveys, the authors uncover how rules on the books work or do not work on the ground. Kate Klonick's recent Harvard Law Review article, **The New Governors: The People, Rules, and Processes Governing Online Speech**, on the inner-workings of platform take-down systems utilizes a similar method to understand what is actually going on behind the technology of the flag icon.[136]

Finally, some cyberlaw scholarship is explicitly anticipatory – it looks to future technologies and considers how the law will be able or unable to handle social ramifications. Scholars that regularly work in this capacity could be considered legal futurists. This type of research is often quite deterministic, but does not have to be. For instance, Neil Richards and Bill Smart's article "How Should the Law Think About Robots?" argues that the law should anticipate the tendency for humans to anthropomorphize robots as they are integrated across society in the future and that the law should actively resist constructing robot technologies with human-like characteristics.[137]

It should be stressed that a linear tech-then-law approach remains a viable method even if the theory of technological exceptionalism falls. Identifying a technology associated with an ongoing or prospective social problem that requires a legal change based on some recognized policy outcome is certainly a worthy set of research steps to take. Importantly, this approach also acknowledges the possibility of an effect – the potential for a causal relationship when one may exist, something legal construction does not lend itself to discovering. But, any approach must also be analyzed and criticized. What were the methodological choices of the researcher and why were they chosen? What assumptions about technology, society, and law are the researcher making and why? Danielle Citron's work on cyber civil rights, for example, is particularly careful across these methodological steps.[138]

It should also be stressed that the alternative approaches listed are not necessarily based on an alternative theory of technological change. The scholars undertaking these approaches may very well be operating in a technologically deterministic mindset or consider themselves technological exceptionalists. This is particularly evident in the area of anticipatory governance, where much time is spent looking at the technological functionalities in research developments on university campuses, Silicon Valley, and science fiction novels. The argument here is not that some scholars are doing good research and others bad research, but that some are utilizing technological exceptionalism in more explicit or reliant ways than others and that utilization of such a deterministic theory of technological change is not justified. Legal construction of technology occurs, as Kaminski writes, "by placing [technology] into doctrinal or statutory categories; by situating it within institutional arrangements; by subjecting it to information-gathering; and by making assumptions about how technology fits into regulatory setting against which the law operates."[139] Even before technology arrives at moments of formal construction in judicial opinions or legislation, researchers, judges, and policy-makers come to the technology with some sense-making apparatus

135 Kenneth Bamberger & Deirdre Mulligan, Privacy on the Ground: Driving Corporate Behavior in the United States and Europe (2015).
136 Kate Klonick, **The New Governors: The People, Rules, and Processes Governing Online Speech**, 181 Harv. L. Rev. (forthcoming).
137 Neil Richards & William Smart, **How Should the Law Think About Robots?** We Robot 2013, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2263363.
138 Danielle Keats Citron, **Cyber Civil Rights**, 89 Boston University Law Review 61 (2009).
139 Kaminski, **supra** note 123.

at work. Perhaps a powerful individual loves driving or hates traffic or largely rejects new technologies and sees use as a choice; perhaps an institution has a long-standing goal to be seen as pro-innovation to avoid budget cuts; perhaps a wider sentiment that society has become dangerously unstable and constant disruption needs to take a back seat to established trust takes root. Much legal construction of novelty is negotiated between parties and governing bodies, which may occur across media campaigns, the press, multi-stakeholder meetings, and targeted lobbying. By focusing on the technology's function and giving it deterministic power, cyberlaw has not developed (or acknowledged its own) rich understanding of the way in which law, in numerous, varied ways, constructs novelty.

In 1994, Leo Marx and Merritt Roe Smith redefined technological determinism in light of the SCOT movement, writing that the term "now refers to the human tendency to create the kind of society that invests technologies with enough power to drive history."[140] My criticism of the theory of technological exceptionalism is more than its lack of historical evidence. Technological exceptionalism perpetuates an American political culture replete with technological determinism. Just as measuring innovation "only by its eventual effect obscures other possible outcomes, and, finally, distorts the historical record,"[141] technological exceptionalism obscures what we know about legal constructions of novelty. By focusing on the technology, cyberlaw's theory of technological exceptionalism as a foundation for technological change and law obscures much of the vital components relevant to the field's pursuits.

Conclusion

Back in 1996, Sheila Jasanoff explained in her foundational STS book, **Science at the Bar**, "The law today not only interprets the social impacts of science and technology but also constructs the very environment in which science and technology come to have meaning, utility, and force."[142] At the same time, the field of cyberlaw was being newly created and foundations laid by early legal scholar pioneers. One of these foundations for understanding law and the internet in terms of governance and technological change was technological exceptionalism - that dramatic technological change necessitates systematic legal change. After three decades, we can look back on technological exceptionalism and assess its utility and validity, using both interdisciplinary fields. As the analytic case studies show, such drama is contextual, political, and culturally constructed, and nothing necessitates legal change. Upon reflection, no sound example of technological exceptionalism can be found and will not be found, because the theory is too technologically deterministic to accurately reflect the rich landscape of governance and technological change. Cyberlaw scholarship has already begun, though subtly and without recognition, to develop work beyond the linearity provided by technological exceptionalism. As this work continues, it is also important to develop methodological and theoretical foundations, discussions, and critique to shape and reinforce rigor within the field of cyberlaw.

140 Smith and Marx, **supra** note 11 at xiv.
141 Jill Lepore, "Our Own Devices: Does Technology Drive History?" The New Yorker (May 12, 2008), available at http://www.newyorker.com/magazine/2008/05/12/our-own-devices.
142 Sheila Jasanoff, Science at the Bar: Law, Science, and Technology in America, 16 (1995).

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