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Kali Murray
Marquette University Law School

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KALI MURRAY†

This Article, Infrostructure(s): Administering Information, considers how authoritative entities generate, manage, and produce informational structures, facilities, and architectures that support market creation and creative economy decision-making between private parties and entities. The term infrostructure, as opposed to other terms, such as infostructure and infosphere, suggests that infrostructures play vital roles in modern democratic life including producing new information resources, facilitating private transactions between private parties, and building the administrative state.

This Article is divided into two parts. Part I discusses how information regulation is mediated through information

† Professor of Law, Marquette University Law School. This Article is dedicated to my "sonshine" Saunders Gaines "Tolly" Murray, the best ever sabbatical project. *Infrostructures* benefited from presentations at the Yale Law and Political Economy Workshop (with a particular thanks to Yochai Benkler and Ben Green for their specific comments), the University of Pennsylvania Carey Law School Administrative Law Workshop, the Chicago Intellectual Property Colloquium, the Touro Law School Faculty Workshop ,and the Intellectual Property Scholars Conference. I also want to thank Lubar Center Research Fellow John D. Johnson for his last minute comments on the controversies attendant to census blocks. I would like to thank my research assistants: Azene Seidoffini, Grant McGovern, Traci Jennings, Jennifer Morales, Sydney Lawrence, and Shakia Smith for their ongoing support of this project.

forms and information systems with a focus on the materialities of information forms and systems. Part I then turns to how the infrostructure is built through three legal acts: (1) the act of instantiation, in which law culls certain information from a broader universe of social information to produce authoritative information; (2) the act of relation, in which law produces and reproduces social relations in information; and (3) the act of meaning, in which law considers the legal effects of instantiation and representation.

Part II will demonstrate how the project of infrostructure helps us to present a new story of administrative legitimation, by re-reading diverse areas including administrative law, intellectual property law and constitutional law. Specifically, Part II examines how infrostructure supports three different accounts of administrative legitimation: structural legitimation, expertise legitimation, and cultural legitimation.

INTRODUCTION

Driving on a road is a mundane act. We make it so easy to ignore the road; the road is taken for granted, a modern convenience. The road, though, in law and in action, is more than a convenience.[1] The road is a resonant example of what we term infrastructure, "the basic physical and organizational structures and facilities . . . needed for the operation of a society or enterprise."[2] We often only notice infrastructure if it fails: a bridge falls into incoming traffic,[3]

1. *See* Charles Reich, *The Law of the Planned Society*, 75 YALE L.J. 1227, 1227–28 (1966) (analyzing administrative disputes prompted by disputes over highways).

2. *Infrastructure*, OXFORD LEXICO ENGLISH DICTIONARY; Carol Rose, Big Roads, Big Rights: Varieties of Public Infrastructure and Their Impact on Environmental Resources, 50 ARIZ. L. REV. 409, 417 (2009).

3. Michael Laris & Susan Svrluga, *Engineer on Florida bridge project called state two days before deadly collapse to report crack, state says*, WASH. POST (Mar. 17, 2018), https://www.washingtonpost.com/news/grade-point/wp/2018/03/16/recovery-efforts-continue-following-florida-bridge-collapse-at-least-6-dead/.

a train crashes, killing its passengers,[4] or a streetlight is broken after a hurricane.[5]

If, however, we would truly notice infrastructure, its many political, economic, and legal consequences would become evident. In its political effect, infrastructure is a crucial signal of a government's regulatory authority. In its economic effect, infrastructure facilitates private property and contractual relationships by creating incentives to share information. In its legal effect, infrastructure is, as Michael Likosky notes, an ideal site to examine law's impact because infrastructures arise out of a "molten mass of public and private, domestic, foreign and international laws" that constitute the "global, international, regional, transnational, intercommunal, territorial state, substate, and nonstate legal orders."[6]

"Infrostructures," the subject of this Article, concerns another hidden convenience. Let's return to our journey down the road. As we progress through the road, we encounter all sorts of information: the physical object of the road sign itself, a picture on the road sign, and even the intangible protection afforded the visual or physical shape of the sign.[7] This information can be simple—a stop sign—or complex—the informal social "rules" that we are all assumed to "know" about passing another car. Even if we are alert to this information, we might not see how much of the information is generated by an authoritative entity. The stop sign that tells us "to stop" is government-generated

4. *Amtrak engineer misread signal before fatal crash near Seattle: U.S. agency*, REUTERS (Jan. 25, 2018), https://www.reuters.com/article/us-washington-train/amtrak-engineer-misread-signal-before-fatal-crash-near-seattle-u-s-agency-idUSKBN1FE2NH.

5. Al Pefley, *Three Months after Irma, Thousands of Street Lights Still Not Working*, CBS 12 (Dec. 4, 2017), https://cbs12.com/news/local/three-months-after-irma-thousands-of-street-lights-still-not-working.

6. MICHAEL LIKOSKY, LAW, INFRASTRUCTURE, & HUMAN RIGHTS 7 (2006).

7. *See generally* TrafFix Devices, Inc. v. Marketing Displays, Inc., 532 U.S. 23 (2001) (denying trademark protection for "functional" traffic light previously protected by expired patent).

information, the crossing signal that tells us when to stop and when to go is government-generated information, and the speed limit is government-generated information.

Infrostructure is often invisible to us, which often obscures its economic, political, and legal effects. Taken for granted, we only often see infrostructure when an agency is required to remove information upon a political change in government;[8] an agency fails to maintain a needed social media resource;[9] or an agency fails to prevent unauthorized computer entities from participating in a notice and comment proceeding.[10]

Events surrounding the 2020 election, though, gave us a new appreciation of democratic infrostructures. Some debates were—deceptively—mundane as is evidenced by the debates over the impact of the United States Postal Service on the mail transmission of ballots[11] as well as the ongoing debate over appropriate use of citizenship data in the census administration.[12] Other debates were more existential. We watched as an insurrection attempted to stop Congress's certification of the Electoral College vote.[13] We are currently

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8. *See* Lisa Rein, *Interior Department banned from Twitter after retweet of Trump inauguration crowd*, WASH. POST (Jan. 21, 2017), https://www.washingtonpost.com/news/powerpost/wp/2017/01/20/interior-department-banned-from-twitter-after-retweet-of-smaller-than-usual-trump-inauguration-crowd/.

9. *See* Brian Kahn, *The EPA Has Started to Remove Obama-era Information*, CLIMATE CENTRAL (Feb. 2, 2017), https://www.climatecentral.org/news/epa-climate-web-pages-change-21133.

10. *See* Paul Hitlin et al., Pew Research Center, Public Comments to the Federal Communications Commission About Net Neutrality Contain Many Inaccuracies and Duplicates 2–3 (2017).

11. Jacob Bogage & Christopher Ingraham, *USPS processed 150,000 ballots after Election Day, jeopardizing thousands of votes*, WASH. POST (Nov. 6, 2020), https://www.washingtonpost.com/business/2020/11/05/usps-late-ballots-election.

12. *See* Mark Sherman & Jessica Gresko, *High court keeps citizenship question off Census for now*, ASSOCIATED PRESS (Jun. 27, 2019), https://apnews.com/ade8a97cb1944da2983a3c89cb5dcda8.

13. *See* Carl Hulse, *McConnell Endorses Electoral Count Overhaul, Lifting Chances of Enactment*, N.Y. TIMES (Sept. 27, 2022), https://www.nytimes.

consumed over whether government records are the "personal property" of the President.[14]

In seeking to make the project of infrostructure visible, I draw together different legal concepts from discrete legal subject matters as administrative law, environmental law, trade law, property law, intellectual property law, census law, and constitutional law. In Part I of this Article, I will examine the materiality of the information forms and systems that constitute infrostructure. I will then examine how infrostructure is built through the legal acts of instantiation, representation, and meaning. In Part II, I will place infrostructure into a broader normative perspective by investigating how infrostructures are necessary to the larger legitimation of bureaucratic power. I examine how infrostructure is consistent with three different strategies for administrative legitimation: expertise legitimation, structural legitimation, and cultural legitimation.

I claim three primary benefits from understanding infrostructure. First, I participate in a flowering of an intersectional administrative law scholarship that has examined the relationship of *Mead/Chevron* to areas such as

com/2022/09/27/us/mcconnell-electoral-count-act.html.

14. *See* Charlie Savage & Alan Feuer, *Trump's 'Muddled' Claims About the Presidential Records Act, Explained*, N.Y. TIMES (Sept. 14, 2022), https://www.nytimes.com/2022/09/14/us/politics/trump-presidential-records-act.html.

intellectual property,[15] tax,[16] securities regulation,[17] and antitrust,[18] as well as the relationship between judicial actors, legislative actors, and executive actors in intellectual property regulation.[19] This transsubstantive "re-reading" of administrative law into other disciplines is not only scholarly in nature, but it also helps us to understand how courts such as the Supreme Court of the United States ("Supreme Court") have used discrete subject matters such as intellectual property law to tackle broader issues associated

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15. *See generally* Saurabh Vishnubhakat, *The Field of Invention,* 45 HOFSTRA L. REV. 899, 901–02 (2017) (assessing the USPTO's administration of the field of invention in patent classification); John M. Golden, *The USPTO's Soft Power: Who Needs Chevron Deference*, 66 S.M.U. L. REV. 541, 558 (2013) (assessing the USPTO's substantive administrative powers under the Patent Act of 1952); Sarah Tran, *Administrative Law, Patents and Distorted Rules,* 80 GEO. WASH. L. REV. 831, 884 (2012) (assessing the United States Court of Appeals for the Federal Circuit's refusal to accord sufficient deference to the United States Patent and Trademark Office); Melissa F. Wasserman, *The Changing Guard of Patent Law: Chevron Deference for the PTO*, 54 WM. & MARY L. REV. 1959, 1964–65 (2013) (assessing the shift towards significant Chevron deference after the passage of the America Invents Act of 2011); Sapna Kumar, *The Other Patent Agency: Congressional Regulation of the ITC*, 61 FLA. L. REV. 529, 533 (2009) (assessing differences between the approaches of the USPTO and the International Trade Commission to patent disputes); Kali Murray, *First Things, First: A Principled Approach to Patent Administrative Law,* 42 J. MARSHALL L. REV. 29, 63 (2008) (assessing the historical use of Skidmore deference in patent administrative law); Stuart Minor Benjamin & Arti K. Rai, *Who's Afraid of the APA? What the Patent System Can Learn from Administrative Law*, 95 GEO. L.J. 269, 335 (2007) (assessing how deference to patent agency decision-making should be understood in the *Mead-Chevron* Framework).

16. *See* Kristin E. Hickman, *The Need for* Mead*: Rejecting Tax Exceptionalism in Judicial Deference*, 90 MINN. L. REV. 1537 (2006) (assessing the role of *Chevron* and *Mead* deference in judicial review of tax regulations promulgated by the Department of the Treasury).

17. *See* Nadelle Grossman, *The Sixth Commissioner*, 49 GA. L. REV. 693, 698–99 (2015) (assessing judicial interpretations of the Securities and Exchange Commission's rulemaking authority).

18. *See* Justin Hurwitz, *Chevron and the Limits of Administrative Antitrust*, 76 U. PITT. L. REV. 209 (2014) (assessing the Federal Trade Commission's rulings under the Federal Trade Commission Act through the lens of *Chevron* deference).

19. *See* Tejas N. Narechania, *Patent Conflicts*, 103 GEO. L.J. 1483, 1488 (2015) (assessing the competitive relationship between agencies in the regulation of patent law).

with administrative law.[20]

I offer a twist on this transsubstantive administrative law to contend that other areas of law—for instance, patent law—offer lessons for the field of administrative law. This is the project of *Infrostructure* because, while it has been useful to deploy administrative law as a tool in many narrow specialties, administrative law also needs to get in the figurative "weeds" of specialties so as to truly understand its broad scope.

Too often, we study infrostructure regimes in silos. This is particularly true in the case of information law. The Freedom of Information Act[21] and its effects on access to government records is studied in the "administrative law" silo[22] while section 112 of the Patent Act of 1952,[23] which mandates disclosure of patentable information, is studied in

20. *See* Oil States Energy Servs., LLC v. Greene's Energy Grp., LLC, 138 S. Ct. 1365, 1372 (2018) (holding that inter partes review violates neither Article III nor the 7th Amendment).

21. 5 U.S.C. § 552.

22. *See generally* P. STEPHEN GIDIERE III, THE FEDERAL INFORMATION MANUAL: HOW THE GOVERNMENT COLLECTS, MANAGES AND DISCLOSES INFORMATION UNDER FOIA AND OTHER STATUTES (2006) (providing an overview of the Freedom of Information Act and other related information regimes); JACQUELINE KLOSEK, THE RIGHT TO KNOW: YOUR GUIDE TO USING AND DEFENDING FREEDOM OF INFORMATION LAW IN THE UNITED STATES (2009) (outlining the primary right to know in the United States); Seth F. Kreimer, *The Freedom of Information Act and the Ecology of Transparency*, 10 U. PA. J. CONST. L. 1011, (2008) (assessing the Freedom of Information Act from the institutional perspectives of the requester, the judge, and administrators); Jennifer Shkabatur, *Transparency with(out) Accountability: Open Government in the United States*, 31 YALE L. & POL'Y REV. 79 (2012) (analyzing three proposed transparency regimes to assess an ideal online transparency mechanism); Erin C. Carroll, *Protecting the Watchdog: Using the Freedom of Information Act to Preference the Press*, 2016 UTAH L. REV. 193 (2016) (advocating for a "press preference" governing disclosure of information under the Freedom of Information Act); David E. Pozen, *Freedom of Information beyond the Freedom of Information Act*, 165 U. PA. L. REV. 1097, 1101 (2017) (contending that the Freedom of Information Act engenders contempt for the domestic policy bureaucracy, and advocating for the imposition affirmative disclosure requirements on the government).

23. 35 U.S.C. § 112.

the "patent" silo.[24] Studying infrostructure, as a whole, however, reveals a shared project to create open, transparent, and discursive structures in the law.

Second, I am interested in how *authoritative* entities generate, manage, and produce the informational structures, facilities, and architectures necessary for the operation of a society or enterprise. My use of the term *infrostructure* (rather than, the perhaps easier to pronounce *infostructure* or a term used in information theory, *infosphere*[25]) is a deliberate one. It highlights that infrostructure, like its analogue infrastructure, is an authoritatively generated resource with accompanying public rights and responsibilities.

I am interested in how *public* information generated by *public* entities produces a *private* exchange of information between parties. Here, I stand in contrast to legal academic

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24. *See* Jeanne Frommer, *Patent Disclosure*, 94 IOWA L. REV. 539, 557–560 (2009) (analyzing the importance of disclosure in the patent document); Lisa Larrimore Ouellette, *Do Patents Disclose Useful Information*?, 25 HARV. J.L. & TECH. 545, 566–78 (2011) (analyzing patent disclosure as a source of information within technical fields); Sean Seymore, *The Teaching Function of Patents*, 85 NOTRE DAME L. REV. 621, 641–43 (2010) (arguing that if a "working example" requirement was incorporated into patent disclosures, patents would serve a "teaching function"); Alan Devlin, *The Misunderstood Function of Disclosure*, 23 HARV. J.L. & TECH. 401, 410 (2010) (claiming that the disclosure function of the patent system is "illusory"); Jason Rantanen, *Peripheral Disclosure*, 74 U. PITT. L. REV. 1, 8 (2012) (claiming that the patent system achieves its disclosure function by generating follow-on informational benefits beyond the patent document itself); Daniel Cahoy et al., *Fracking Patents: The Emergence of Patent as Information Containment Tools in Shale-Drillin*g, 19 MICH. TELECOMM. & TECH. L. REV. 279, 283 (2013) (analyzing the role of patents in the employment of new technologies in the fracking industry); W. Nicholson Price II, *Big Data, Patents and the Future of Medicine*, 37 CARDOZO L. REV. 1401, 1439 (2015) (assessing potential incentives for generating and publicizing patent data); Clark Asay, *The Informational Value of Patents*, 31 BERKLEY TECH. L.J. 259, 275–76 (2016) (detailing how disclosure of patent information acts as a signal in various markets); Symposium, *The Disclosure Function of the Patent System*, 69 VAND. L. REV. 1455-849 (2016) (symposium on patent disclosure); Sean Seymore, *Uninformative Patents*, 55 HOUSTON L. REV. 377, 391–93 (2017) (examining patent law doctrine that sustains systemically uninformative patent disclosures).

25. Luciano Floridi, *A Look Into the Future Impact of ICT on Our Lives*, 23 INFO. SOC'Y 59, 59–61 (2007).

scholarship on information facilitation, which has not always distinguished between information created between private entities and information created between public entities. For instance, in intellectual property law, scholarship in information facilitation has theorized that information flows generated by intellectual property law are primarily *private* because it permits private parties to facilitate exchange of ideas or to manage relationships in a competitive marketplace.[26] Infrostructure, by contrast, speaks to the information generated by authoritative entities.

Finally, my work on *Infrostructure* is a deliberate act of multi-disciplinary inquiry.[27] While I remain deeply aware of

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26. Four models of information facilitation in intellectual property have been proposed. First, Brett Frischmann has examined how the information infrastructure utilized by downstream users emerges from building blocks such as basic research, general purpose technologies, and language. *See* BRETT M. FRISCHMANN, INFRASTRUCURE: THE SOCIAL VALUE OF SHARED RESOURCES 253–317 (2012). Second, Peter Y. Lee extends Frischmann's theory of intellectual infrastructure. Lee identifies "basic building blocks" such as "generic words, creative ideas, stock literary devices, natural laws, physical phenomena, and abstract technical ideas" within copyright, trademark, and patent law that enable an array of downstream productive activities. Peter Y. Lee, *The Evolution of Intellectual Infrastructure*, 83 WASH. L. REV. 39, 54 (2009). Third, Collen Chien has argued that patent disclosure not only generates the disclosure of a singular patent, but also a range of "outside" information. This includes "technical disclosures that are related to the patent," such as related academic research by the patent owner; disclosures of relevant patent information to the market, such as technology licenses; and information granting "freedom to operate," arrangements such as "defensive patenting, cross-licensing, patent pledges, and patent non-renewal or forbearance" supporting "broader technology flows." Colleen Chien, *Contextualizing Patent Disclosure,* 69 VAND. L. REV. 1849, 1869–71 (2016). Finally, Lisa Larrimore Ouellette, Beth Novacek and I have all argued that expanding and intensifying the process of examining patent applications produces tangible benefits. *See* Lisa Larrimore Oulette, *Pierson, Peer Review, and Patent Law*, 69 VAND. L. REV. 1825, 1828–29 (2016) (claiming that "a peer review" program allowing patent examiners to seek input from other technical experts could increase the usefulness of patent disclosures); Beth Simone Noveck, "*Peer to Patent": Collective Intelligence, Open Review and Patent Reform*, 20 HARV. J.L. & TECH., 123, 128 (2006) (outlining the peer-to-patent review process at the United States Patent and Trademark Office); Kali Murray, *Rules for Radicals: A Politics of Patent Law*, 14 J. INTEL. PROP. L. 63, 99–110 (2006) (arguing that patent examination should incorporate deliberative elements).

27. For instance, I draw on a variety of fields, such as the history of the book and of printing methods, cultural studies of the law, the history of technology and

the limits of multi-disciplinary approaches in scholarship,[28] the story of *Infrostructures* is one told by many disciplines. A multi-disciplinary inquiry is necessary because in the histories of prototypical information regimes (like intellectual property goods such as a patent[29] or the "news"[30]) we often find that such information regimes were deeply intertwined with state practices in the early modern era. It is multi-disciplinary because, at times, the state itself may mimic what Jürgen Habermas has identified as those informational institutions of the public sphere:[31] the

science, literacy studies, and cultural formations of the state. *See, e.g.*, Ian Williams, *William, Law, Language, and the Printing Press in the Reign of Charles I: Explaining the Printing of the Common Law in English*, 38 LAW & HIS. REV. 339 (2020) (history of the book and printing methods); Rosemary Coombe, *Is There a Cultural Studies of Law? in* A COMPANION TO CULTURAL STUDIES 41–42 (Toby Miller, ed. 2001) (cultural studies of the state); Mario Biagioli, *From Print to Patents: Living on Instruments in Early Modern Europe,* 44 HIST. SCI. 139 (2006) (history of technology and science); M.T. CLANCHY, FROM MEMORY TO WRITTEN RECORD: ENGLAND 1066–1307 (3d ed. 2013) (literacy studies); ERIC SLAUTER, THE STATE AS A WORK OF ART: THE CULTURAL ORIGINS OF THE CONSTITUTION (2009) (cultural formations of the state).

28. Joan Wallach Scott, *Against Eclecticism*, 16 DIFFERENCES 114, 116 (2005) ("What I am against is the notion, implied in the uses of eclecticism I have cited, that we are no longer foregrounding conflict and contradiction in our work, no longer subjecting the foundational premises of our disciplines or, for that matter, our era to rigorous interrogation, no longer asking how meaning is constructed and what relations of power it supports, but instead applying so many useful methods in a common empirical enterprise in which even radical insight is presented simply as new evidence and the conceptual foundations of disciplinary practice are left safely in place.").

29. Biagioli, *supra* note 27, at 140 ("There was, in fact, no intellectual property rights doctrine in seventeenth-century in Europe, only so-called privileges. (The term 'patent' comes from the letter patents on which the privilege was made public). Legally defined as expressions of the sovereign's will, privileges came in a wide range of shapes.").

30. *See* ANDREW W. PETTIGREE, THE INVENTION OF THE NEWS: HOW THE WORLD CAME TO KNOW ABOUT ITSELF 78–116 (2014) (examining the relationship between the emergence of newspapers and state-produced news pamphlets and confidential diplomatic dispatches).

31. *See* JÜRGEN HABERMAS, THE STRUCTURAL TRANSFORMATION OF THE PUBLIC SPHERE: AN INQUIRY INTO A CATEGORY OF BOURGEOIS 31 (Thomas Burger, trans. 1991) (1962) (outlining the institutions of the public sphere).

"library" becomes the state-sanctioned "public library,"[32] the "gazette" becomes the state-sanctioned "Gazette,"[33] and the printing press becomes a state-sanctioned printing press.[34] Thus, the various sub-disciplines become a key vehicle for determining and managing these shifting "borderlands" of information production, information regulation, and the state.

I. BUILDING INFROSTRUCTURE

Infrostructures are formed, at base, from different kinds of information.[35] Information, as Michael Buckland has noted, is characterized by its *thingness*: that is, information is an object that has the quality "of imparting knowledge or

32. 35 U.S.C. § 7 (outlining the responsibilities of the United States Patent Office to maintain a patent library).

33. *Id.* § 10(a)(3) ("The Director may publish in printed, typewritten, or electronic form, the following . . . [t]he Official Gazette of the United States Patent and Trademark Office.").

34. 44 U.S.C. § 505 ("All printing, binding, and blank-book work for Congress, the Executive Office, the Judiciary, other than the Supreme Court of the United States, and every executive department, independent office and establishment of the Government, shall be done at the Government Publishing Office.").

35. The term information is a notoriously difficult subject to describe in a consistent manner. Thus, the term information has been addressed in different ways by diverse fields, including library and information science, information ethics, linguistics, historical disciplines such as library and book history, the history of information systems and infrastructures, the history of information disciplines, cultural and social explorations of information, and the origins of the information sciences. TONI WELLER, INFORMATION HISTORY—AN INTRODUCTION: EXPLORING AN EMERGENT FIELD 12 (2008) ("What is important to note though is that these explicit debates over the meaning of information are relatively recent ones. Although information has existed and has been understood for millennia, it has only since the latter decades of the twentieth century that scholars have focused overtly on trying to define what it is."); FIDELIA IBEKWE-SAN JUAN & THOMAS DOUSA, THEORIES OF INFORMATION, COMMUNICATION AND KNOWLEDGE: A MULTI-DISCIPLINARY APPROACH 2 (2014) (outlining transdisciplinary approach to information, communication and knowledge, the information science approach to conceptions of information and knowledge, and a visual cognitive approach to information); MICHAEL BUCKLAND, INFORMATION AND SOCIETY 1–19 (2017) (outlining primary approaches to understanding information).

communicating information."[36]

Understanding the *thingness* of information has been a sprawling multi-disciplinary affair, but it has settled on two information objects: information forms and information systems. Information forms are discrete objects and sites. Information systems are built around an information object that is produced by and link together specific social actors within a specific social system.

In Section I.A, I define and examine information forms and information systems. I then address information materiality, a complicating factor that impacts how information and information systems function in practice.

In Section I.B, I consider three acts necessary to building an infrostructure: *the act of instantiation*, which is the process by which certain forms of "information" become legally protected information; *the act of relation*, which is the process by which the law recognizes and protects information produced by discursive acts of reciprocal connection in specific epistemic and regulatory communities; and *the act of meaning*, which describes how the law attempts to derive authoritative meaning from its protection of information forms and information systems.

Throughout the discussion, I consider three infrostructures. Initially, I consider the tariff system, which seeks to manage the import and export of goods across borders, and the intellectual property system, which manages the provision of property rights to intangible items. These tariff and intellectual property systems share key commonalities that warrant their explicit comparison. Both trading and intellectual property systems are tied specifically to the production of innovative technologies in the private sector. For instance, the Tariff Act of 1789 and the Patent Act of 1790 were both directed towards the production of "manufactures": that is, goods to be sold in

36. Michael Buckland, *Information as Thing,* 45 J. AM. SOCIETY INFO. SCI. 351, 351 (1991).

international and national markets."[37] Specifically, both tariff and intellectual property systems depend on government processes to support the efforts of private actors in market creation and market maintenance. Consequently, both trade and intellectual property systems were foundational to early administrative structures in the United States. Indeed, like physical infrastructure projects, such as roads and bridges, these infrostructure regimes were intimately tied to the "economic potential" of the new nation-state and thus stood as visible evidence of a nation's capacity to "undertake a major capital investment" that requires "stability, access to capital and expertise, and a reasonably transparent administrative structure."[38]

It is helpful, then, to see tariff and intellectual property law as information systems where the government provides an information form that serves as a basis for a web of facilitated private behavior. Both tariff and intellectual property law work to produce information for third parties, whether it be through the "list" of goods subject to the taxes imposed by customs[39] or the "specification" of the patent information.[40] These information forms, "the list" and "the specification," have also become the fulcrum of sophisticated

37. *See, e.g.*, Act of August 10, 1790, ch. 38, 1 Stat. 24 (repealed 1789) ("Whereas it is Necessary for the Support of Government, for the Discharge of the Debts of the United States, and the encouragement and protection of manufactures, that duties be laid on good, wares and merchandize imported."); Patent Act of 1790, ch. 7, 1 Stat. 109, 109–10 (repealed 1793) ("That upon the petition of any person or persons to the Secretary of State, the Secretary for the department of war, and the Attorney General of the United States, setting forth, that he, she, or they, hath or have invented or discovered any useful art, manufacture, engine, machine, or device . . .").

38. Rose, *supra* note 2, at 417–18.

39. Section 1 contains a list of the goods subject to the custom taxes. Act of August 10, 1790, ch. 38, 1 Stat. 24 (repealed 1789).

40. Patent Act of 1790, ch. 7, 1 Stat. 109, 110 (repealed 1793) ("[The] patent shall, at the time of granting the same, deliver to the Secretary of State a specification in writing, containing a description, accompanied with drafts or models, and explanations and models (if the nature of the invention or discovery will admit of a model) of the thing or things, by him or them invented or discovered, and described as afore–said, in the said patents . . . .").

administrative practices at the international, regional, and national levels that generate information beyond the directly regulated product of the disclosed list or disclosed patent.

I also consider the third infrostructure—the census—which manages the process of counting the population for purposes of apportionment and representation as a way to highlight a key point: infrostructures can vary in purpose. The census infrostructure, in contrast to tariff and intellectual property infrostructures, is public information produced for and used by the public to engage in authoritative action. As Andrea Mennicken and Wendy Nelson Epseland note,[41] "states have always been statistical in their own way,"[42] so consequently, the census serves as an example in administrative law in two ways. First, the example of census illuminates *macro-level administrative law*, which, as I have previously delineated,[43] "concerns itself with examining macro-level relationships between agencies and the legislative, executive, and judicial branches of government."[44] The census serves macro-level administrative functions, generating the basis for the distribution of tax revenue and codifying political representation.[45] Second, the census can also serve as an

41. Andrea Mennicken & Wendy Nelson Espeland, *What's New with Numbers: Sociological Approaches to the Study of Quantification*, 45 ANN. REV. SOCIOL. 223 (2019).

42. *Id.* at 226.

43. Kali Murray, *Charles Reich's Unruly Administrative State*, YALE L.J.F. 714, 716 (2020).

44. *Id.*

45. U.S. CONST. art. I, § 2, cl. 3 ("Representatives and direct taxes shall be apportioned among the several states which may be included within this union, according to their respective numbers, which shall be determined by adding to the whole number of free persons, including those bound to service for a term of years, and excluding Indians not taxed, three fifths of all other Persons. The actual Enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent term of ten years, in such manner as they shall by law direct."); U.S. CONST. art. XIV, § 2 ("Representatives shall be apportioned among the several states according to their respective numbers, counting the whole number of persons in each state,

example of micro-level administrative law, which is "interested in how the law shapes an individual's encounters with agencies of the administrative state."[46] The census also shapes micro-level interactions with the state: its codifications related to social identities such as citizenship,[47] race and ethnicity,[48] gender,[49] and sexual orientation[50] add to the curation of an individual self. Manav Bhatnager, in *Identifying the Identified: The Census, Race, and the Myth of Self-Classification,*[51] exploring the census's constitutive power as to the construction of racial identity, notes:

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excluding Indians not taxed.").

46. Murray, *supra* note 43, at 716.

47. Sarah Starkweather, *Governmentality, Territory, and the U.S. Census: The 2004 Overseas Enumeration Test*, 28 POL. GEO. 239, 240 (2008) (examining the relationship of census enumeration to the process of constructing a "national political community").

48. *See, e.g.*, Edward Tellles, *Latinos, Race and the U.S. Census*, 677 ANNALS. AM. ACAD. POL. & SOC. SCI. 153 (2018) (examining conceptions of political identity in Latino context which often race and ethnicity); Anthony Daniel Perez & Charles Hirschman, *The Changing Racial and Ethnic Composition of the U.S. Population: Emerging American Identities*, 35 POPULATION DEV. REV. 1, 2 (2009) (examining the importance of the census in managing multi-racial identities); Kenneth Prewitt, *Racial Classification in America: Where do We Go From Here*? 134 DAEDALUS 5 (2005) (outlining the relationship of census categories to civil rights and anti-discrimination law).

49. *See, e.g.,* Kristen Schilt & Jenifer Bratter, *From Multiracial to Transgender? Assessing Attitudes toward Expanding Gender Options on the US Census*, 2.1 TRANSGENDER STUD. QUAR., 77 (2015) (assessing the use of data to reflect transgender status on the census).

50. *See, e.g.,* Kevin Gyan, *Constructing a Queer Population? Asking about Sexual Orientation in Scotland's 2022 Census*, 31 J. GENDER STUD. 782 (2022) (assessing the inclusion of a question of sexual orientation on a national census).

51. Manav Bhatnagar, *Identifying the Identified: The Census, Race and the Myth of Self-Classification*, 13 TEX. J. C.L. & C.R. 85, 87 (2007); *see also* Naomi Mezey, *Erasure and Recognition: The Census Race and the National Imagination*, 97 NW. U. L. REV. 1701, 1705 (2002) ("I conclude that the census is both subject to cultural changes in the discourse of race as well as an inspiration for such changes, and that it has played at least two simultaneous and contradictory roles with respect to defining communities of identity as well as the body politic. It has been thought of as a mechanism of surveillance and discipline of groups that were incompatible with the national self-image; and it has also been used in an aspirational way by groups seeking recognition of a group identity and inclusion in the national community.")

> This power is made evident by the role that census data plays in shaping our understanding of racial categories and identity. The census is alleged to have enabled the exclusion and social control of groups, such as Native Americans and Chinese immigrants, while serving as a medium of expressions and official recognition for other groups, including Hispanics and multiracial individuals. These simultaneously exclusionary and affirming powers have rendered the census the site of much political contest.[52]

A. The Material Infrostructure: Forms and Systems in Information

1. Information Forms

Assessing the *form* of information (or rather, its many forms) is quite complex. It can be further divided into objects and sites that are tangible in nature (that is, an object or site that can be perceived through physical experiences) and objects and sites that are intangible (that is, an object or site that cannot be perceived through a physical presence).

Figure 1 outlines a rough distinction in information form: information objects are those objects which convey information, and information sites are those sites at which information is conveyed.

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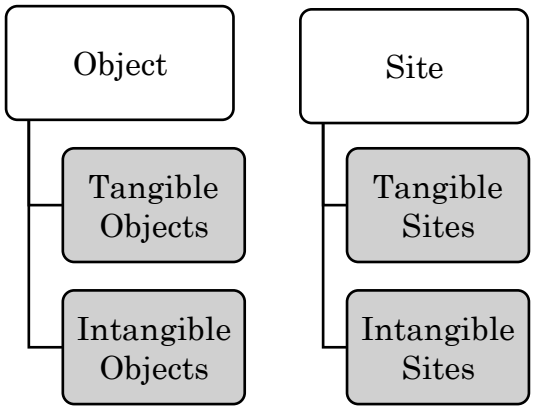
52. *Id.*

FIGURE 1. Information Forms



Following this outline, we can comprehend and explore distinctions between information. For example, we can define a dictionary as an information object because it is a tangible object that can be perceived by sight;[53] by contrast, software is an intangible object that powers hardware like a computer.[54] Likewise, a zoo,[55] a museum,[56] or a library[57] is a

53. *See, e.g.*, RICHARD YEO, ENCYCLOPEDIA VISIONS, SCIENTIFIC DICTIONARIES AND ENLIGHTENMENT CULTURE xii (2001) ("I consider these dictionaries of arts and sciences not merely as poor approximations to later, and larger encyclopedias but as inheritors of an earlier cultural legacy—one that included questions about the organization of knowledge, the role of memory in relation to print, the practice of keeping personal commonplace books.").

54. MATTHEW KIRSCHENBAUM, MECHANISMS: NEW MEDIA AND THE FORENSIC IMAGINATION 17 (2008) (assessing medium embodied in specific technologies, like the hard drive, specific technological processes like hashing, specific software like Storyspace, specific standards such as ASCII, specific data structures, and approaches to digital preservation).

55. *See* Gregg Mitman, W*hen Nature is the Zoo: Vision and Power in the Art and Science of Natural History,* 11 OSIRIS 117 (1996) (discussing the movement from displaying the "information" of animals in zoos from classification to natural habitation).

56. *See* Paul F. Marty, *An Introduction to Museums Informatics*, *in* MUSEUM INFORMATICS: PEOPLE, INFORMATION, AND TECHNOLOGY IN MUSEUMS 3 (Paul f. Marty & Katherine Burton Jones eds., 2008) (assessing the ways in which information is organized and used within the museum context).

57. Tom Glynn, *The New York Society Library: Books, Authorities and Publics in Colonial and Early Republican New York*, 40 LIBR. & CULTURE 493, 494 (2005).

tangible site that inscribes communicative categorization onto a physical space as opposed to an intangible site[58] such as an electronic reading room.[59]

Infrostructures are inclusive sites for the management of information forms. Indeed, the administrative nation-state is the origin of what we understand as many different information forms: the passport,[60] the questionnaire,[61] the archive,[62] and the office memorandum,[63] which are, in essence, bureaucratic information forms that attempt to manage the borders and boundaries of the nation itself.

Intellectual property, such as a patent, offers a very clear example of how infrostructures associated with information form develop in legal regimes since, to reiterate Michael Buckland's definition of information, intellectual property goods have *thingness*, that quality "of imparting knowledge

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58. Kenneth Thibodeau has outlined a commonly accepted method for assessing digital objects. Thibodeau notes that "[e]very digital object is a physical object, a logical object, and a conceptual object, and its properties at each of these levels can be significantly different." Kenneth Thibodeau, *Overview of Technological Approaches to Digital Preservation and Challenges in Coming Year*s, *in* THE STATE OF DIGITAL PRESERVATION: AN INTERNATIONAL PERSPECTIVE 6 (2002). As a physical object, a digital object is defined as a series of signs on a medium (like a compact disc). *Id.* at 6. As a logical object, a digital object can be defined as a logical object, a "united recognized by software application." *Id.* at 7. As a conceptual object, a digital object is "the object that deals with in the real world; it is an entity that we would recognize as a meaningful unit of information such as a book, a contract, a map or photograph." *Id.* at 8.

59. Administrative Procedure Act, § 5 U.S.C. § 552 (a)(2)(A–D) (outlining the primary requirements for the provision of electronic reading rooms).

60. CRAIG ROBERTSON, THE PASSPORT IN AMERICA: THE HISTORY OF A DOCUMENT 4–5 (2010) (assessing the history of the passport in the United States); *see also* Uma Dhupelia-Mesthie, *Paper Regimes*, 40 KRONOS 10, 13 (2013) (assessing the history of alternative non-standardized "paper regimes" used in a control for internal mobility).

61. *See* EVAN KINDLEY, QUESTIONNAIRE 1–24 (2016) (outlining the history of the questionnaire in nineteenth century culture).

62. *See generally* ANN LAURA STOLER, ALONG THE ARCHIVAL GRAIN: EPISTEMIC ANXIETIES AND COLONIAL COMMON SENSE 1 (2009) (analyzing the "archive" as a method of organization in the colonial state).

63. LISA GITELMAN, PAPER KNOWLEDGE: TOWARD A MEDIA HISTORY OF DOCUMENTS 1 (2014).

or communicating information."[64] A patent must first impart information about the inventive efforts of an inventor. This information about inventive effort is disclosed through an information form, termed the patent specification, which includes the written description of the invention, the drawings, and most importantly, the claims themselves.[65]

Moreover, the Patent Act of 1952 requires the production of even *more information*, including (1) the drawings submitted in the patent specification;[66] (2) the tangible object of the prosecution of the patent, often referred to as the "file wrapper" of the patent (indicating its origins as a tangible set of files maintained by an administrative agency);[67] (3) the patent library, which serves as a primary depository for

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64. Buckland, *supra* note 36, at 351. Patent Act of 1952, as amended by the America Invents Act of 2011, 35 U.S.C. § 101 (outlining categories of patentable inventions); Trademark Act of 1946, § 45, 15 U.S.C. § 1127 (outlining definition of trademark); Copyright Act of 1976, 17 U.S.C. § 102 (outlining the requirements for copyright).

65. Patent Act of 1952, as amended by the America Invents Act of 2011, 35 U.S.C. § 112 (outlining requirements for specification, including the written description, enablement requirement and claim requirements); 35 U.S.C. §113 (outlining requirements for drawings).

66. 35 U.S.C. § 113 ("The applicant shall furnish a drawing where necessary for the understanding of the subject matter sought to be patented."). Notably, tensions between interpretating how t a disclosed drawing should be understood in assessing the disclosed claims. Otto v. Koppers Co., 246 F.2d 789, 797 (4th Cir. 1957) ("Diagrammatic drawings are required to be included in a patent application, where appropriate, for the purpose of illustrating the principles described in the specifications and claims. Except in design patents, the proportions shown in the diagrammatic drawings are not critical and they do not purport to be scale or working drawings. So long as the drawings fairly illustrate the principles described in the specifications and the claims, the patent is not made invalid because a precise projection to scale of the dimensions of the drawings would not produce a useful or suitable result, for it is expected that anyone practicing the patent would so proportion the dimensions as to follow the statements of the principles of the invention and procure the practical result envisioned by the patentee." (citations omitted)).

67. 35 U.S.C. § 131 ("The Director shall cause an examination to be made of the application and the alleged new invention; and if on such examination it appears that the applicant is entitled to a patent under the law, the Director shall issue a patent therefor."); *see also* David Radack, *Understanding U.S. Patent File Histories*, 55 JOM 80 (2003) (describing the materials associated with a patent examination).

patent information, including the submitted patent and associated patent examination;[68] and (4) the patent database, referred to as the "PACER database."[69] This does not even include other forms of bureaucratic forms of information produced by the USPTO including, most formidably, the Manual of Patent Examination Procedure:[70] the behemoth and byzantine guidance document used to inform how patent examiners are to conduct patent examination. Notably, these categories of intellectual property infrostructure are not fixed in time. Alain Pottage and Brad Sherman's *Figures of Invention: A History of Modern Patent Law* employs an interdisciplinary legal perspective to examine how patent law moved from treating patent "models" and "drawings" as key informational forms in patent law to a legal regime in which the written claim was paramount.[71]

Existing infrostructure in patent law, then, suggests that the value of an intellectual property good does not merely arise from the disclosed text of the invention. Rather the value the intellectual property good grows because all of the "stuff" (so to speak) that accompanies the administration of patent system. Moreover, the "stuff" of the patent system does not arise from a single patent application or patent record. Rather, the true worth of this "stuff" arises from the fact that users can access this information on a systematic level to evaluate industry-wide trends. For instance, the United States Patent and Trademark Office has made

68. 35 U.S.C. § 7 ("The Director shall maintain a library of scientific and other works and periodicals, both foreign and domestic, in the Patent and Trademark Office to aid the officers in the discharge of their duties.").

69. *Id.*

70. MANUAL OF PATENT EXAMINING PROCEDURE (9th Ed. 2022) (last revised on June 2023); *see also* James E. Ruland, *Chapter 2100 of the Manual of Patent Examining Procedure-A Means for Persuasion*, 6 TEX. INTELL. PROP. L.J. 49, 51 (1997) (assessing the substantive relationship of Chapter 2100 of the Manual of Patent Examining Procedure to the development of patent law).

71. ALAIN POTTAGE & BRAD SHERMAN, FIGURES OF INVENTION: A HISTORY OF MODERN PATENT LAW 12–14 (2014).

available an Open Data portal, which permits users to access datasets, visualizations, and application data programming interfaces.[72] The ability to access this systematic information, furthermore, permits members of the regulated community to construct shared knowledge.

2. Materializing the Information Form

Information forms (objects and sites) pose three distinct organizational challenges to a legal order that coalesce around a concept that I term, *materiality*. *Materiality* flows from three functions that the law must perform: (1) to distinguish between an object and site; (2) to create and protect different mediums of object and site; and (3) to manage the relationship between an actual physical space, place and community, and its abstracted, legally protected information form.

Broadly speaking, *materiality* becomes the site of legal action because infrostructures can mediate the experience of a physical space. The framework of materiality, then, once again, engages Micheal Buckland's idea of the *thingness* of information: materiality encompasses the *stickiness* of the information. Such *stickiness* can be the ways a (particular) information form is preserved in a (particular) medium of information which can then shape a (particular) lived experience.[73] The road, again, serves as a metaphor to understand *materiality* as a legal concept in relationship to infrostructure. For instance, the law distinguishes between

72. *Open Data Portal,* U.S. PATENT AND TRADEMARK OFF., https://developer.uspto.gov (last visited June 7, 2023).

73. Keller Eastering, in EXTRASTATECRAFT: THE POWER OF INFRASTRUCTURE SPACE 11–12 (2014), refers to the relationship of space and information as *infrastructure space, which are* "repeatable forms" such as building codes and shared architectural standards. She notes that these collective categories of information, infrastructure space, have become a "medium of information. The information resides in invisible, powerful activities that determine how objects and content are organized and circulated." *Id*. at 13. My definition of materiality draws from Easterling's concept of infrastructure space insofar as it broadly recognizes how categories of information shape spatial experiences; it, however, views mediums of information in a broader sense.

whether our driver is on a road or a highway: the road exposes the driver to different mediums that express the informational messages (i.e., the stop sign and the red traffic light); and the driver simultaneously experiences the "road" as a both an actual space and as a legally created informational site.

The law, then, performs three functions in making information material in the infrostructure. First, the law attempts to distinguish between different types of information forms. This can be a complex question because information can exist simultaneously in physical, digital, or intangible forms. A legal regime, consequently, may distinguish between different information forms. For instance, section 202 of the Copyright Act of 1976 asserts that, in copyright, the material object is distinguished from its intangible form, immaterial copyright.[74] The first sale doctrine in patent,[75] copyright,[76] and trademark[77] reinforces

74. Copyright Act of 1976, 17 U.S.C. § 202; *see also* Salinger v. Random House, Inc., 811 F.2d 90, 94–95 (2d Cir. 1987), *opinion supplemented on denial of reh'g*, 818 F.2d 252 (2d Cir. 1987) ("The copyright owner owns the literary property rights, including the right to complain of infringing copying, while the recipient of the letter retains ownership of 'the tangible physical property of the letter itself.' 1 *Nimmer, supra,* § 5.04 at 5–32 (footnote omitted). Having ownership of the physical document, the recipient (or his representative) is entitled to deposit it with a library and contract for the terms of access to it. As with all works of authorship, the copyright owner secures protection only for the expressive content of the work, not the ideas or facts contained therein.").

75. Quanta Computer, Inc. v. LG Elecs., Inc.*,* 553 U.S. 617, 625 (2008) ("The longstanding doctrine of patent exhaustion provides that the initial authorized sale of a patented item terminates all patent rights to that item.")

76. 17 U.S.C. § 109(a) ("Notwithstanding the provisions of section 106(3), the owner of a particular copy or phonorecord lawfully made under this title, or any person authorized by such owner, is entitled, without the authority of the copyright owner, to sell or otherwise dispose of the possession of that copy or phonorecord.").

77. Sebastian Int'l, Inc. v. Longs Drug Stores Corp., 53 F.3d 1073, 1075 (9th Cir. 1995) ("The 'first sale' rule provides a sensible and stable accommodation between strong and potentially conflicting forces. By guaranteeing that a product will be identified with its producer, it serves the legitimate purposes of trademark law—the producer gains the good will associated with the quality of its product, and the consumer gets exactly what the consumer bargains for, the genuine

this distinction; a user may sell their particular physical copy of a copyrighted information without the permission of the respective rights holder.

Second, the law may require that information be preserved in different types of mediums. For example, section 41(i) of the Patent Act of 1952 requires the Office to maintain information in diverse media, mandating that the USPTO "maintain public paper, microform or electronic collections of United States patents, foreign patent documents, and the United States trademarks in an effort "to permit search for and retrieval of information."[78] These multiple modalities, section 41(i) continues, must be made available through "automated search systems of the USPTO" so that such mediums are "available for use by the public, and shall assure full access by the public to, and dissemination of, patent and trademark information, using a variety of automated methods."[79]

Materializing the medium, through statutory provisions, then suggests two ongoing responsibilities to place on state actors. First, a state actor needs to actively provide for diverse mediums by which to access a particular resource: there, for instance, may be a qualitative difference between a microfilm and physical copy of an item. Second, the state actor must preserve distinct modalities: for instance, information on a compact disc may need to be transferred in a preservable medium so as to preserve its availability.

The most complex materialization decision is how to manage the relationship between an abstract, legal concept and its embodiment in lived experiential site. Yanni Alexander, in *All Data is Local: Thinking Critically in a*

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product of the particular producer. On the other hand, the 'first sale' rule preserves an area for competition by limiting the producer's power to control the resale of its product. The 'first sale' doctrine has proven to be a reliable and useful guide in an area in which a high volume of business-driven litigation must be expected.").

78. 35 U.S.C. § 41(i)(1).

79. 35 U.S.C. § 41(i)(2).

Data-Driven Society,[80] states of this phenomena, "that data has complex attachments of place which invisibly structure their form and interpretation."[81]

A resonant case study of this third question of materialization is the ways that the abstract concept of the "census tract" impacts how individuals conceive of their collective social identity as established by their location in a neighborhood. As an abstract concept, the "census tract" is a "relatively permanent small-area geographic division of a county or statistically equivalent entity" that the United States Census Bureau ("the Bureau") and other governmental agencies use to track demographic data in a more detailed manner.[82] Census tracts are a relatively late modification to bureaucratic practices of the Census Bureau. Tracking population by neighborhood emerged from the need to define sanitary areas for public health measures during the Progressive Era, and indeed, census tracts, as an independent statistical measure, were only officially included in the 1940 Decennial Census.[83] Census tract data has proven to be pivotal beyond its use in the apportionment of Congress;[84] for example, it is essential for proving claims in a number of contexts, including in the assessment of environment and health risks in specific areas.[85]

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80. YANNI ALEXANDER LOUKISSAS, ALL DATA ARE LOCAL: THINKING CRITICALLY IN A DATA-DRIVEN SOCIETY (2019).

81. *Id.*

82. Dep't of Comm., Census Tracts for 2022 Census, 83 Fed. Reg. 56227 (November 13, 2018).

83. Nancy Krieger, A *Century of Census Tracts: Health and the Body Politi*c (1906-2006), 83 J. URBAN HEALTH 355, 356 (2006).

84. *See, e.g.*, Shayer v. Kirkpatrick, 541 F. Supp. 922, 935–945 (1982) (using census tract for apportionment purposes); Goddard v. Babbitt, 536 F.Supp. 538, 544–555 (1983) (same).

85. *See, e.g.*, Ellis v. Evonik Corp., 604 F. Supp. 3d 356, 368–69 (E.D. La. 2022) ("And more specifically, plaintiffs have alleged that, at least as recently as 2018, it was knowable to the public that these plaintiffs, living in this area, face high cancer risks from EtO. One of plaintiffs' central allegations is that, '[i]n August of 2018, . . . the EPA released the results of the 201x 4 National Air Toxics

As a concrete concept, a census tract is superimposed over an actual street in an actual community. Thus, the census tract is "materialized" through the lived experiences of its residents. Michael Brown and Larry Knopp's seminal use of census tract data to assess the perceptions of the neighborhood in the gay and lesbian population of Seattle, Washington, suggests the relationship of legalized abstraction of the census tract to the lived experience in particular neighborhoods.[86] In particular, Brown and Knopp contend that certain census tracts were correlated with neighborhoods with a significant population of lesbian and gay individuals and thus, the census tract became constitutive of individual identity. As they describe the constitutive effect of the census tract, Brown and Knapp note:

> Put differently this stability in rankings for some census tracts speaks to the reification of ordinal classifications into politically and culturally meaningful ontologies, thus impinging not just only upon Legg's notions of visibility but that of the political subjects' identities as well. To see consistency across denominator scales in term of colour, contiguous patterns, clusters and so on, tempts readers of the maps to invest the representations with a certain amount of power or authority or validity.[87]

To put it more simply, perhaps, than Brown and Knapp, the political, social, and emotional effects of the spatial materialization of form can be seen in the association of a similarly abstract information—the zip code 90210—with a

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Assessment ('NATA') of EtO (and other toxins),' which indicated that 'there are dangerous levels of airborne EtO in certain census tracts around the facility.'"); Pietrangelo v. Sununu, No. 2021 DNH 067, 2021 WL 1254560, at *2 (D.N.H. Apr. 5, 2021), *appeal dismissed*, 15 F.4th 103 (1st Cir. 2021) (discussing the development of New Hampshire health equity plans that rely on the use of the state census tract to determine vaccine eligibility); Bean v. Sw. Waste Mgmt. Corp., 482 F. Supp. 673, 677 (S.D. Tex. 1979) (using census tract data to assess health data in a specific location).

86. Michael Brown & Larry Knopp, *Places or Polygons? Governmentality, Scale, and the Census in the Gay and Lesbian Atlas*, 12 POPULATION, SPACE AND PLACE 223, 234–35 (2006).

87. *Id.* at 234–235.

constitutive political identity of a white Southern California teenager in the 1990s.[88]

The law, thus, is a necessary component of this spatial materialization because it must maintain the boundaries between an abstract information form or site and its tangible manifestation in a landscape. A resonant example of this spatial materialization is the recent controversy over "the census block." A "census block" is an even more specific way of describing the particular geographies within a census tract, which the Census Bureau has described as "statistical areas bounded by visible features, such as streets, roads, streams, and railroad tracks, and by non-visible boundaries, such as selected property lines and city, township, school district, and county limits and short line of sight extensions of streets and roads."[89]

Collecting census block data creates a foundational problem: by collecting data with locational specificity, it may reveal the individual identities of persons who live within a particular area. Revealing individual identity would violate the Census Act, which requires that when the Census Bureau provides data to Congress and states, that it furnish "copies of tabulations and other statistical materials which do not disclose the information reported by, or on behalf of, any particular respondent,"[90] and, moreover establishes that there should be no "publication whereby data furnished by any particular establishment or individual under this title can be identified."[91]

Understanding the impact of spatial materialization may illuminate a recent case, *Alabama v. U.S. Dep't of*

88. Susanna Hamscha, *Coolness Has a Number: The 'American Cool' of Beverly Hills 90210, in* IS IT 'CAUSE IT'S COOL 95, 96 (2014) (analyzing why "the zip code became a globally recognized cultural code for coolness.").

89. Dep't of Comm., Census Tracts for 2022 Census, 83 Fed. Reg. 56227, 562789 n.3 (Nov. 13, 2018).

90. 13 U.S.C. § 8(b).

91. 13 U.S.C. § 9(a).

Commerce,[92] in which a three judge district court panel considered whether the Census Bureau had acted improperly when it considered using the differential privacy method (a statistical technique which masked the identity of individuals) in its assessment of census block data.[93] The panel held that the State of Alabama, one congressman, and two state voters, could not sustain a preliminary injunction claim that the use of the differential privacy method violated 13 U.S.C. § 141(c); that the use of the differential privacy method in its collection of a census data violated U.S.C. § 706(2)(a) of the Administrative Procedure Act (APA); and that the use of the data was outside of the Census Bureau's constitutional mandate under Article I, Section 2 of the Constitution.[94]

Alabama v. U.S. Dep't of Commerce was determined on procedural grounds. First, the Court held that neither the State of Alabama nor the other claimants could raise a claim under section 141(c). The state of Alabama was precluded from raising a claim under section 141(c) because it was a sovereign, as opposed to " a person" that could challenge a statistical method under section 209(b) of the Census Act. The Court further held the individual plaintiffs were unable to raise a claim under the Census Act because the injuries from potential under-representation due to use of the differential privacy method were "future injuries," and additionally the claim was not ripe as the plaintiffs had waited over twenty-seven months to object to the use of the differential privacy method. Second, the Court held that, as to all the individual and sovereign plaintiffs, the claim under section 706 of the APA, while potentially valid, could not be raised, once again, due to the time delay in bringing it.[95]

Alabama v. U.S. Dep't of Commerce, despite its limited

92. 546 F. Supp. 3d 1057 (2021).

93. *Id.* at 1064.

94. *Id.* at 1062.

95. *Id*. at 1068–69.

holding, is representative of a claim that may arise from spatial materialization. It demonstrates that, as infrostructure becomes a pervasive governance mechanism, it necessarily will raise legal challenges to *how* the data is collected. The institutional design of infrostructure may have to fully consider the normative implications that flow from the fact that the abstract claim of the infrostructure will intersect with individual identity, raising questions of equality, privacy, and freedom.

3. Information Systems

Daniel Headrick has proposed a succinct definition of information systems: "information systems are the methods and techniques by which people manage and organize information rather than the content of the information itself."[96] In their classic sociological study, *Sorting Things Out: Classifications and Its Consequences*,[97] which examined how different classification schemes emerged in a range of fields, Geoffrey Bowker and Susan Leigh Star note that working classification systems:

> [A]re or have been maintained by organizations, governments and individuals. We have observed several dances between classifier and classified, but nowhere seen either unambiguous entities waited to be classified or unified agencies seeking to classify them. The act of classification is of its nature infrastructural, which means to say that it is both organizational and informational, always embedded in practice.[98]

A paradigmatic example of an information system is the Dewey Decimal Library System, which is a classification system that categorizes library books ("information forms") into a decimal scheme ("information system").[99] Wayne

96. DANIEL HEADRICK, WHEN INFORMATION CAME OF AGE: TECHNOLOGIES OF KNOWLEDGE IN THE AGE OF REASON AND REVOLUTION, 1700-1850, at 4 (2000).

97. *See* GEOFFREY BOWKER & SUSAN LEIGH STAR, SORTING THINGS OUT: CLASSIFICATIONS AND ITS CONSEQUENCES (1999).

98. *Id.* at 320.

99. Derek Langridge, *Classifying Knowledge*, *in* KNOWLEDGE AND

Wiegand has concluded that the Dewey Decimal System and its principles of classification arose out of the liberal arts curriculum at Amherst College, noting that "it was that the Amherst College tradition, curriculum, faculty, and assigned texts provided Dewey with much of the information he needed to structure a hierarchy, and name divisions and sections within the major classes he had appropriated from [Professor] Harris's scheme."[100]

Information systems are distinct from information forms. Initially, information systems are distinct from information forms because information systems arise from deeply contingent historical, social, and institutional circumstances. Moreover, although information forms may originate from information systems, information systems achieve a secondary purpose, that is information systems protect the *sociality* of actors. Sociality is a concept that suggests that how we understand information is deeply embedded in the cultural, political, and social environment of a temporally bound community.[101]

Information and sociality, therefore, are intimately linked. Information systems within different administrative systems often manifest this sociality insofar as such information systems are designed to be used by a range of socially constituted actors. Moreover, information systems not only draw from these social experiences, but these

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COMMUNICATION: ESSAYS ON THE INFORMATION CHAIN 8–13 (A.J. Meadows ed., 1991) (outlining the history of the Dewey Decimal Library Classification System).

100. Wayne A. Weigan, *The "Amherst Method": The Origins of the Dewey Decimal Classification Scheme*, 33 LIBR. CULTURE 175, 188 (1998).

101. The link between sociality and information has been widely studied in an inter-disciplinary manner. For instance, information technologists, John Seely Brown and Paul Duguid have examined the relationship between information and sociability in communities, organizations, and institutions. JOHN SEELY BROWN & PAUL DUGUID, THE SOCIAL LIFE OF INFORMATION (1st ed., 2000). Information historians, such as Peter Burke, have examined the sociological interrelationship between intellectuals as a social group and the social institutions, such as universities, academies, and science societies, in the dissemination of information in early modern Europe. *See generally* PETER M. BURKE, POPULAR CULTURE IN EARLY MODERN EUROPE (1978).

information systems can also shape how individuals, groups and communities engage with the regulated object, a process that Holly Doremus[102] has described as law's constitutive role. Thus, the production of information system performs a constitutive function in administrative law because the law asks the government and its regulated entities to engage in the joint act of producing information that can serve to fulfill the purposes associated with a regulated community.

Providing legal protection to information systems protects not only the actors, but the respective institutions by which those actors seek to achieve specific goals. For example, free speech regimes are understood to protect actors; an actor enjoys the right to speak, produce, and associate with others.[103] Free speech regimes, though, can also protect certain categories of institutions because of their centrality in an information system. For instance, the Supreme Court in *Board of Education Island Trees Union Free School District v. Pico*,[104] recognized that a school board's removal of information from local libraries violated the Free Speech Clause of the First Amendment of the U.S. Constitution.

In a plurality majority opinion authored by Justice William Brennan, the Court stressed that free speech of the First Amendment was not only dedicated to "individual self-expression," but also to "public access to discussion, debate, and the dissemination of information and ideas" and thus, the Constitution protects an actor's ability not just to speak but to receive information and ideas.[105] The Court, then,

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102. Holly Doremus, *Constitutive Law and Environmental Policy*, 22 STAN. ENV'TL. L.J. 295, 300 (2003) ("As used here, constitutive law includes all the ways that law constitutes—that is, shapes—the essential qualities of individuals, groups and communities.").

103. U.S. CONST. amend. I.

104. 457 U.S. 853 (1982); *see also* Meliah Thomas, *The First Amendment Right of Access to Docket Sheets,* 94 CAL. L. REV. 1537, 1539 (2006) (examining the right to access public dockets in criminal matters).

105. *Id.* at 867.

went to single out an institution—the library—as a necessary conduit to facilitate the freedom to inquire, to study and to evaluate new material.[106] The Court in *Pico* appears to recognize the library's function of facilitation, because of its ability to provide access to the public of new material and its ability to prompt new information production. Thus, while it is often understood in light of the individual's right to receive information, *Pico* is equally protective of institutional infrostructures that provide access to and dissemination of new material.

Legal rules, then, are necessary to build and sustain information systems and infrostructures and can play several roles in the institutional design of information systems. Initially, legal rules related to information systems can be linked to basic institutional design that seeks to allocate responsibilities between actors and institutions. A small-order institutional design question can be addressed to specific actors—for example, does an individual deserve access to a record or does a document have to be preserved? A large-order institutional design question may be whether management of an information systems should be formally preserved by a state-governed process, by a private entity, or a mix involving public entities and private entities.[107]

Legal rules on information systems are also necessary to advance broader bureaucratic goals. Sophisticated information systems are a result of specific organizational practices that originate in bureaucracies, whether public (such as legislative, administrative, and judicial bureaucracies), or private (such as corporations, universities, and professional societies).

Legal rules that have developed around public bureaucracies that produce information systems reinforce

106. *Id.* at 864–65.

107. *See generally* Margaret Chon, *Global Intellectual Property Governance (under Construction)*, 12 THEORETICAL INQ. L. 349 (2011) (assessing institutional design choices within the international order).

the shared mutuality of information: what I term the facilitative function and the representative function. Initially, information systems can perform a facilitative function by fostering further interactions in the social community, which then leads to the production of more information. The facilitative function, then, is not concerned with existing information per se; rather, the facilitative function of information systems fosters new interactions and new production of information within the private sector. Second, information systems can serve a representative function as the administrative entity furthering the ability of certain members of the community to "represent" the agency's administrative goals to other regulated actors.

Taken together, the two functions of information systems build what I will term the relational infrostructure, which is an infrostructure that facilitates a relationship between the regulator and the regulated, among the regulated themselves, or between regulators themselves. To return to our drive down the road, relational infrostructure on the road is that information that may facilitate already pre-existing social affinities—the helpful signs indicated that the road has been "adopted" by some local organization—and may also designate certain individuals—the crossing guard standing over children—to fulfill its regulatory goals.

The institutional design contained within the Customs Modernization Act ("the Mod Act"), passed as part of the North American Freedom Trade Agreement Implement Act of 1993,[108] should be understood as protecting a relational infrostructure.

Initially, the Mod Act identifies a shared community—the regulator, the Customs and Border Control—and then creates a new institutional design to regulate the relationship between the two primary actors. As Vivian

108. The Customs Modernization Act, Pub. L. 103-82, 107 Stat. 2057 (1993).

Jones and Lisa Seghetti note,[109] the passage of the Mod Act changed the primary paradigm of customs regime:

> The Mod Act addressed the tension between trade facilitation and trade enforcement by replacing the historical "agency-centric" model of trade enforcement with a "shared responsibility" approach. Thus, whereas USCS previously had monitored imports and determined the level of customs duties owed by each importer, under the shared responsibility approach USCS (now CBP) is required to inform importers of their rights and responsibilities under the customs regulations and related laws; and importers of record are required to be aware of their legal obligations and to make their own duty determinations through the concept of "informed compliance."[110]

The twin concepts of "shared responsibility" and "informed compliance" are representative of an information system. Initially, the Mod Act designs the relationships between actors and institutions in the system by placing the Customs and Border Patrol and designated actors into a public-private partnership as to the regulation of imported trade. Likewise, the Mod Act also suggests the way in which infrostructures perform representative and facilitative functions. For instance, section 1484[111] imposes a duty on the

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109. Vivian C. Jones & Lisa Seghetti, Cong. Rsch. Serv., R43014, U.S. Customs and Border Protection: Trade Facilitation, Enforcement and Security 9 (2015).

110. *Id.*

111. 19 U.S.C. § 1484 states:

> An 'importer or record' . . . shall, using reasonable care——
>
> (A) make entry therefor by filing with the Bureau of Customs and Border Protection such documentation or, pursuant to an authorized electronic data interchange system, such information as is necessary to enable the Bureau of Customs and Border Protection to determine whether the merchandise may be released from custody of the Bureau of Customs and Border Protection;
>
> (B) complete the entry, or substitute 1 or more reconfigured entries on an import activity summary statement, by filing with the Customs Service the declared value, classification and rate of duty applicable to the merchandise, and such other documentation or, pursuant to an electronic data interchange system, such other information as is necessary to enable the Customs Service to—
>
> (i) properly assess duties on the merchandise,

importer of record to use reasonable care in making entries on import activity statements, assessing the imposed duties, and collecting accurate statistics on the submitted materials, thus imposing a set of duties on the importer of record to steward the information directed towards the agency.

Additionally, section 1508 imposes a broader set of duties on a wide range of actors, including "the owner, importer, consignee, importer of record, entry filer, or other party who imports merchandise in the 'customs' territory of the United States" or "knowingly causes the importation or transportation or storage of merchandise carried or held under bond into or from the customs territory of the United States" to "make keep, and render for examination and inspection records (which for purposes of this section include, but are not limited to, statements, declarations, documents and electronically generated or machine readable data)."[112]

Thus, section 1508 ensures the preservation of material necessary to fulfill goals of the relevant information system, a goal which is furthered by section 1509 of the Mod Act, which grants the Customs and Border Patrol the authority to examine or cause to be examined, upon reasonable notice, any record, which is defined as including any statement, declaration, document, or electronically generated or machine-readable data.[113] These provisions, as a result, can be seen as serving the facilitative function by ensuring that the information presented to the government is accurate, stewarded, and preserved. Elsewhere, I have described similar patent requirements as an ethical requirement to "speak fairly" in order to ensure the correct information is circulated through the relevant regulated community.[114]

(ii) collect accurate statistics with respect to the merchandise, and

(iii) determine whether any other applicable requirement of law (other than a requirement relating to release from customs custody) is met.

112. 19 U.S.C. § 1508.

113. 19 U.S.C. § 1509.

114. Kali Murray, A POLITICS OF PATENT LAW: CRAFTING THE PARTICIPATORY

B. Constructing the Infrostructure: The Acts of Instantiation, Relation and Meaning

1. The Act of Instantiation

The informational infrostructure reflects a decision that certain information should be legally protected. An infrostructure culls information that will become *legal information* from the larger universe of information. This culling process is achieved through what I term instantiation, the process by which concrete legal protection is afforded to a category of abstract information.[115]

The legal instantiation of information involves three choices: (1) a choice to protect information by authoritative means, (2) a choice in which material is afforded authoritative protection, and (3) a choice as to how to collect that information. The collective choices associated with building the infrostructure can be considered neutral as an element of institutional design: that is, such choices may not necessarily be linked to democratic politics. Thus, an illiberal state may produce and protect information as easily as a liberal state.[116]

The first choice occurs when an authoritative entity, such as a legislative, executive, or administrative actor, decides to first expend authoritative resources on protecting a category of information. The initial choice to protect information can be a fraught one. For example, debates over custom nomenclature, argues Samia Costai Tavares,[117] are

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BARGAIN 36 (2013).

115. *Instantiation*, Oxford English Dictionary (2d ed. 1989)

116. *See, e.g.*, Verne Harris, The *Archival Sliver: Power, Memory and Archives in South Africa*, 2 ARCH. SCI. 63, 75–81 (2002) (examining the reconstruction of memory in light of Apartheid archival practices); Graham Dominy, *Overcoming the Apartheid Legacy: The Special Case of the Freedom Chart*er, 13 ARCH. SCI. 195 (2013) (assessing the archival legacy of the Apartheid regime and corresponding anti-Apartheid regime).

117. *See generally* Samia Costa Tavares, *The Political Economy of the European Customs Classifications*, 129 PUB. CHOICE 107 (2006).

often the site of the political contest since customs classification systems (like intellectual property systems) are sites where nation-states manage conflict over new technologies.[118] Moreover, the bureaucratic practice of classifying goods can in turn produce new bureaucratic sites where classification disputes are managed. For instance, Tavares recounts how the European Commission's designated sub-committee, the Committee on Tariff and Statistical Nomenclature, which is composed of member state appointments, permitted interest groups to navigate two channels of influence over potential tariff classification: their national governments and the European Commission.[119]

As to the second choice, an authoritative decision-maker culls from a broader class of information which category of information will be protected as legal information. This baseline determination of "what is in" and "what is out" is key to determining the informational infrostructure of the relevant regime. For instance, it was not until the Electronic Freedom of Information Act Amendments of 1996[120] that the Freedom of Information Act (FOIA) defined the term "record,"[121] which caused considerable uncertainty as to

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118. *Id*. at 108 (discussing the re-classification debates over compact disc technology).

119. *Id*. at 109 (discussing the bureaucratic structure of custom classifications).

120. Electronic Freedom of Information Act Amendments of 1996, Pub. L. 104–231, § 3, 110 Stat. 3048 (1996). Although it appears that at least one sponsor of the bill, Senator Patrick Leahy viewed the inclusion of section 3 as increasing the scope of relevant information that could be claimed under section 3, most commentators viewed the definition of record to rely on pre-existing case law. Craig D. Feiser, *Privatization and the Freedom of Information Act: An Analysis of Public Access to Private Entities under Federal Law*, 52 FED. COMMC'NS. L.J. 21, 34 n.75 (1999).

121. Justice Rehnquist, in *Forsham v. Harris*, explained that since Congress failed to use the broad term "record" in the initial passage of FOIA, "the use of the word "agency" as a modifier demonstrates that Congress contemplated some relationship between an "agency" and the "record" requested under the FOIA." 445 U.S. 169, 178 (1980); *see also* Feiser, *supra* note 120, at 33 n.72. Consequently, after Forsham, a number of tests attempted to address whether a

what constituted a record under the scope of FOIA. This failure to define what constituted a record led to controversies over what should be considered protected material under the Act.[122]

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material relationship existed between the agency and the record itself, so as to test whether the agency exercised control over the relevant document.

Resolving these controversies, in U.*S. Dep't. of Just. v. Tax Analysts*, the Supreme Court stated to establish to a material relationship between the agency and the record, (1) "an agency must 'either create or obtain' the requested materials 'as a prerequisite to its becoming an 'agency record' within the meaning of the FOIA'" and (2) "the agency must be in control of the requested materials at the time the FOIA request is made. By control we mean that the materials have come into the agency's possession in the legitimate conduct of its official duties." 492 U.S. 136, 144–45 (1989).

The United States Court of Appeals for the District of Columbia has crafted the most commonly used test to determine whether the agency has established control over the record: "[1] the intent of the document's creator to retain or relinquish control over the records; [2] the ability of the agency to use and dispose of the record as it sees fit; [3] the extent to which agency personnel have read or relied upon the document; and [4] the degree to which the document was integrated into the agency's record system or files." *See* Tax Analysts v. U.S. Dep't of Just., 845 F.2d 1060, 1069 (D.C. Cir. 1988), *aff'd*, 492 U.S. 136 (1989).

122. Under previous decisions, considerable controversy existed over what material could be protected under this relatively narrow decision. *See, e.g.*, Crooker v. U.S. Parole Comm'n, 730 F.2d 1, 4 (1st Cir. 1985) (pre-sentence report was an agency record because a pre-sentence record was not material that was specifically foreclosed by statute); Hercules Inc., v. Marsh, 839 F.2d 1027, 1029–30 (4th Cir. 1988) (plant telephone directory is an agency record because the government paid for its production); Illinois Inst. for Continuing Legal Educ. v. U.S. Dep't of Lab., 545 F. Supp. 1229, 1233 (N.D. Ill. 1982) (briefing book was not a record because no governmental agency did exercised control over the record); Gilmore v. U.S. Dep't of Energy, 4 F. Supp. 2d 912, 921 (N.D. Cal. 1998) (conferencing technology was not an agency record because it was not related to the structure, operation or decision-making structure of the Department of Energy); Missouri *ex. rel.* Garstang v. U.S. Dep't of Interior, 297 F.3d 745 (8th Cir. 2002) (advisory reports created by a private entity in advisory relationship are not agency records); Consumer Fed'n Am. v. Dep't of Agric., 455 F.3d 203 (D.C. Cir. 2006) (electronic calendars of agency employees were agency records because agency retained control over the material and the materials were not personal records); Burka v. U.S. Dep't of Health & Hum. Servs., 455 F.3d 283, 285 (D.C. Cir. 1996) ("data tapes were agency records because governmental entity ordered creation of the materials, plans to take physical possession of the tapes at the conclusion of the project, has indicated it will disclose the information after its publication schedule is completed and prohibited IMS from making any independent disclosures, and has read and relied significantly on the information in writing articles and developing agency policies").

Moreover, defining the term "record" as "any information that would be an agency record subject to the requirements of this section when maintained by an agency in any format, including an electronic form"[123] still creates significant uncertainty over the scope of the term. Given its origins in the opaque term "agency record" and its subsequent muddled case law, the troubled history of the term "record" in FOIA demonstrates that information instantiation is not always an intuitive "check the box" process in institutional design.

2. The Act of Relation

Infrostructure, like infrastructure, builds relationships between members of a particular discursive community because infrostructure facilitates relationships between social actors within a particular community. As I have discussed above, the study of infrastructure emphasizes that while infrastructure projects are *public* in nature,[124] they often serve to facilitate *private* market transactions or *private* social relationships. Carol Rose points that the building of a primary road may simplify local use-rights over ingress and egress in a given community by forcing them into

123. Considerable controversy also exists what type of form are an agency record can assume with under FOIA. Proj. on Predatory Lending of Legal Servs. Ctr. of Harv. L. Sch. v. U.S. Dep't of Just., 325 F. Supp. 3d 638, 652 (W.D. Pa. 2018) (database created during litigation was not considered an agency record, although the agency exercised control over the database, it was serving only a warehouse function); Na Iwi O Na Kupuna O Mokapu v. John Dalton, 894 F. Supp. 1397, 1411 (D. Haw. 1995) (inventory of human remains considered an agency record); Showing Animals Respect & Kindness v. U.S. Dep't of Interior, 730 F. Supp. 2d 180, 187–88 (D. D.C. 2010) (video recording of an animal killing can be considered an agency record); SDC Dev. Corp. v. Mathews, 542 F.2d 1116, 1117–20 (9th Cir. 1976) (database is a library and therefore not an agency record); Frydman v. Dep't of Just., 760 F. Supp.193, 194 (D. Kan. 1991) (electronic index was a protected agency record); Save the Dolphins v. U.S. Dep't of Com., 404 F. Supp. 407, 411 (N.D. Cal. 1975) ("The term 'records' in common parlance includes various means of storing information for future reference. There does not appear to be any good reason for limiting 'records' as used in the Act to written documents. The motion picture film in question was made in order to store the information it now contains; it therefore falls within the definition of 'records' in 5 U.S.C. § 552.").

124. Rose, *supra* note 2, at 417.

more standardized forms that facilitate market relationships.[125]

Like its close analog, the facilitative function of infrostructure (particularly those infrostructures generated through information systems) is directed towards *facilitating* social relationships between private and public entities, or between private entities. Infrostructure often facilitates access to information by the regulated community by permitting gathering information, by preserving and storing information, and by facilitating communication of information. Infrostructure can facilitate the gathering of information by citizens through the request of government records; for instance, a journalist can request a public record through a FOIA request.[126] Infrostructure can facilitate the storage and retrieval of information by private actors that are permitted access through government or government-approved libraries or databases; for instance, a researcher can gain access to archival material through a governmental library.[127] Infrostructure can also facilitate communications between private individuals; for instance, a postal service

125. *Id*. at 428.

126. The Freedom of Information Act, 5 U.S.C. § 552(3)(A) ("Except with respect to the records made available under paragraphs (1) and (2) of this subsection, and except as provided in subparagraph (E), each agency, upon any request for records which (i) reasonably describes such records and (ii) is made in accordance with published rules stating the time, place, fees (if any), and procedures to be followed, shall make the records promptly available to any person.").

127. Headrick, *supra* note 96, at 5 (outlining information systems related to gathering information); The National Archives and Records Administration, 44 U.S.C. § 2109 ("The Archivist shall provide for the preservation, arrangement, repair and rehabilitation, duplication and reproduction (including microcopy publications), description, and exhibition of records or other documentary material transferred to him as may be needful or appropriate, including the preparation and publication of inventories, indexes, catalogs, and other finding aids or guides to facilitate their use. He may also prepare guides and other finding aids to Federal records and, when approved by the National Historical Publications and Records Commission, publish such historical works and collections of sources as seem appropriate for printing or otherwise recording at the public expense.").

can be used to facilitate private communication between actors.[128]

Additionally, infrostructure can facilitate private interactions in property exchanges by requiring the public registration of ownership interests.[129] For example, a corporation can register a satellite object on the international space registry, which, consequently, can create significant intellectual property rights at the national level.[130] Requiring registration of ownership can often produce new information that is helpful to the regulated community. For instance, in 2014 the USPTO created a new searchable dataset, the United States Patent Assignment Database, which combined three different categories of patent assignments (assignment of assignor's interests, security interest agreements, and government interest agreements).[131] This category of secondary information is often helpful in determining the economic value of a given patent and to determine down-market exchanges by other actors.[132]

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128. Headrick, *supra* note 96, at 5 (outlining information systems related to communicating information); U.S. CONST. art. I, § 8, cl. 7 (Congress is empowered "To Establish Post Offices and post Roads.").

129. *Compare* Camilla Toulmin, *Securing Land and Property Rights in Sub-Saharan Africa: The Role of Local Institutions,* 26 LAND USE POL'Y 10, 15 (2009) (analyzing the major benefits associated with registering title), *with* Daniel Bromley, *Formalising Property Relations in the Developing World: The Wrong Prescription for the Wrong Malady*, 26 LAND USE POL'Y 20 (2009) (critiquing the three primary justifications for encouraging developing nations to invest in significant land registration).

130. Article VII of the Outer Space Treaty allows a state to exercise jurisdiction over an over a space object placed upon the relevant state registry. *See* The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies, art. VII, Jan. 27, 1967, 6347, 610 U.N.T.S. 205.

131. Alan C. Marco, et. al., *The USPTO Patent Assignment Dataset: Descriptions and Analysis*, Working Paper No. 2015-2, at 5–9 (2015).

132. *See* Stuart Graham, Alan Marco & Amanda Myers, *Patent Transactions in the Marketplace: Lessons from the United States Patent Assignment Dataset*, 27 J. ECONS. & MGMT. STRATEGY 343 (2018) (claiming that the USPTO Patent Assignment can be used to facilitate analyze the intellectual property

Finally, infrostructure can facilitate private economic transactions by "naming, classifying and organizing" information goods.[133] For instance, a law that dictates how to classify goods facilitates the taxation of private market goods at the border.[134] Infrostructure, as embodied in the customs classification, can serve as an authoritative indicator of governmental power (i.e., the government's power to tax), and can also impact subsequent private market relationships, to the extent that how a good is classified may impact its taxation levels, which may consequently impact its subsequent market worth in the private market.

3. The Act of Meaning

The authoritative infrostructure is, quite simply, where the instantiated infrostructure and the relational infrostructure are given authoritative meaning and power so that the state can order the rights, privileges, duties, and immunities of a regulated community. Thus, through the act of meaning, we can contemplate the legal consequence associated with infrostructures.

To return to our journey on the road, we also encounter infrostructure that conveys how the state will regulate information. Authoritative infrostructure is a posted sign that tells us that a driver can go fifty miles or eighty miles per hour. Authoritative infrostructure, consequently, reflects the state's determination that the generated infrostructure can promote the rights to access and to preservation of

collateralization and the markets for technology and innovation).

133. *Id.* at 5.

134. Tariff classification at the national level is conducted under the International Convention on the Harmonized Commodity Description and Coding System, which outlines the type of classification codes that are be used at the national level to classify import and export codes. *See* International Convention on the Harmonized Commodity and Description and Coding System on the Harmonized Commodity Description and Coding System, Jan. 1, 1988, Temp. State Dep't No. 89-45, 1503 U.N.T.S. 2 (entered into force in the United States, Jan. 1, 1989).

certain types of information and, moreover, imposes duties on the state and other regulated actors to provide access to, and to preserve certain types of, information.

The authoritative decision-making of the state over infrostructure can take many forms. This Section will focus on one example: how legal meaning is derived from classification systems in the law.

In law, classification systems have provided for a unitary method for classifying goods into particular categories to expedite review and examination of the trade and intellectual property goods.[135] Classification systems are "sophisticated information systems."[136] International classification systems have a multi-scalar effect since such systems require international entities to engage in consistent monitoring of national recommendations to classification systems;[137] ongoing management of translations to ensure consistency across classes;[138] and

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135. Strasbourg Agreement Concerning the International Patent Classification, art. 1, Oct. 7, 1975, 26 U.S.T. 1793 (outlining the establishment of a Special Union to adopt a common classification for patents for invention, inventor's certificates, utility models and utility certificates) (hereinafter *Strasbourg Agreement*); Nice Agreement Concerning the International Classification of Goods and Services for the Purposes of the Registration of Marks, art.1(1) Feb. 6, 1979, 828 U.N.T.S. 191 (outlining classification requirements for trademark requirement) (hereinafter *Nice Agreement*).

136. Stephen Adams, *Comparing the IPC and the US Classifications Systems for the Patent Search*, 23 WORLD PAT. INFO. 15, 17 (2001).

137. *Strasbourg Agreement*, *supra* note 135, art. 5(3)(ii-ii) (outlining the responsibilities of the Committee of Experts, including monitoring recommendations associated with suggested classifications); *Nice Agreement*, *supra* note 135, art. 3(ii) (outlining the responsibilities of the Committee of Experts, including monitoring recommendations associated with suggested classifications).

138. *Strasbourg Agreement*, *supra* note 135, art. 3(1)-(2) (outlining the requirements related to the classification being published in English and French, and permitting other official texts of the classification in German, Japanese, Portuguese, Russian, Spanish and other languages designated by the Assembly); *Nice Agreement*, *supra* note 135, art. 1(4) (outlining the requirements related to the classification being published in English and French). Michèlle Lyon, has noted that inclusion of official texts aids patent search because "the user consult the version preferred, i.e., the one best understood, to find the appropriate

ongoing management of informational retrieval procedures and processes.[139] Once determined, international classification systems are then applied in a relevant national context; thus, it would seem to be a prototypical example of an international legal decision that penetrates and impacts the creation of domestic law.

The information form underlying the classification infrostructure is often a list. The information form of a list poses two practical challenges to legal interpretation. First, the information form of the list is a dense social object that cannot be read solely as a sentence or a paragraph[140] since a classification system embodied in a list needs to provide access to concepts rather than words.[141] For instance, a custom classification system needs be understood as a conceptual map that permits the reader to link a specified word—say, for instance, gloves—to a specific lexical class: "a glove that is subject to a 10% tariff" or "a trademark of a glove that is assigned to a class of goods designated to clothing."

Developing a legal meaning in a concept can be quite difficult. Linking a concept (for instance, color) to a word (red) can be one of the most difficult tasks in learning development. Catherine Sandhofer and Linda B. Smith, analyzing the difficulty that children have in matching specific words to specific colors, note that when thinking about "word learning" as a concept, it can be hard to learn a

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symbol(s) to carry out the patent search on the subject matter of interest." Michèlle Lyon, *Language Related Problems in the IPC and Search Systems Using Natural Language*, 21 WORLD PAT. INFO. 89, 90 (1999).

139. Mikhail Makarov, *The Process of Reforming the International Patent Classification*, 26 WORLD PAT. INFO. 137, 140–42 (2004) (analyzing patent reform in the IPC with a focus on information retrieval).

140. *Strasbourg Agreement*, *supra* note 135, art. 1; *Nice Agreement*, *supra* note 135, art. 1(1).

141. Adams, *supra* note 136, at 17. As Stephen Adams notes, classification systems are useful——as opposed to say, full text sources because "classifications provide access to concepts rather than words, and "classifications schedules provide the searcher with some level of synonym control." *Id.*

word if "the words are infrequent in the language, if the concepts are not available, or if the word-concept mapping is not transparent or in some way is ambiguous."[142] Classification systems face challenges in all three areas identified by Sandhofer and Smith: a word may be used infrequently;[143] a word may be linked to emergent technologies and so may have a poorly articulated associated concept;[144] and a word may be capable of multiple interpretations.[145] A legal classification taxonomy may face even more challenges because information systems can organize and inscribe discriminatory practices related to social identities such as race[146] and gender.[147]

Second, a classification system has to manage the fact that any words on the list must be translated across different legal systems. For instance, in the context of patent searches, Michèlle Lyon has noted that including official classifications

142. Catherine Sandhofer & Linda B. Smith, *Learning Color Words Involves Learning a System of Mapping*s, 35 DEV'L PSYCH. 668, 668 (1999).

143. *See, e.g.*, Mattel, Inc. v. United States, 346 F. Supp. 2d 1295 (2004) (court analyzed the meaning of "game" under its dictionary definition to determine the classification of the good Pop-Up Wackaroos).

144. *See, e.g.*, Digidesign, Inc. v. United States, 44 F. Supp. 3d 1366 (2015) (court analyzed the meaning of "work" and "conjunction" under its dictionary definition to determine the classification of consoles referred to as control surfaces used for editing, mixing, and manipulating music in digital format on computer and hard drive switches).

145. Ben Baumgartner, *Chewing It Over: Determining the Meaning of Edible in the Harmonized Tariff Schedule of the United States*, 64 KAN. L. REV. 293, 304 (2015) (assessing over seven tests for the term edible).

146. *See* Natali Valdez, *Improvising Race: Clinical Trials and Racial Classifications*, 41 MED. ANTHRO. 34 (2019) (assessing the use of ethnicity codes in clinical trials); Christine Hickman, *The Devil and the One Drop Rule: Racial Categories, African-Americans, and the U.S. Census*, 95 MICH. L. REV. 1161, 1171 (1997) (examining the racial classifications associated with multi-racial identity); Luther Wright Jr., *Who's Black, Who's White, and Who Cares: Reconceptualizing the United States's Definition of Race and Racial Classifications*, 48 VAND. L. REV. 513 (1995) (assessing the emergence of racial classifications strategies in the United States).

147. *See, e.g.*, Jason Lewis, *Gender-Classified Imports: Equal Protection Violations in the Harmonized Tariff Schedule of the United States*, 18 CARDOZO J.L. & GENDER 171 (2011) (assessing the impact of gender classification).

aids patent search because "the user consults the version preferred, i.e., the one best understood, to find the appropriate symbol(s) to carry out the patent search on the subject matter of interest."[148]

In light of these analytical difficulties, the law of "classification" tries to build authoritative meaning in different ways. Tariff classification turns inward and requires that that any interpretative meaning associated with a term is to be judged solely by the content of the list,[149] as embodied by the Harmonized Tariff Schedule and its respective divisions, sections, chapters, headings, and subheadings. Indeed, the General Rules of Interpretation used to interpret the Harmonized Tariff Schedule suggests that "[t]he table of contents, alphabetical index, and titles of sections, chapters and sub-chapters are provided for ease of reference only; for legal purposes, classification shall be determined according to terms of the headings . . . ."[150]

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148. Lyon, *supra* note 138, at 90.

149. See Michael G. Hodes & Nina C. Mohseni, *Classification Determinations in the United States Court of International Trade Brought Under 28 U.S.C. § 1581(a)*, 46 GEO. J. INT'L L. 27, 30–31 (2014).

150. U.S. INT'L TRADE COMM'N, 2021 Preliminary Revision 3, HTUS General Notes, General Rules of Interpretation and General Statistical Notes (2021), https://www.usitc.gov/publications/docs/tata/hts/bychapter/1000gn.pdf; *see also* Kalle USA, Inc. v. United States, 273 F. Supp. 3d 1319 (Ct. Int'l Trade 2017) (court looked to the Explanatory Notes of the General Rules of Interpretation to determine the classification of casings used for processed meat and cheese products); Applied Biosystems v. United States, 715 F. Supp. 2d 1327 (Ct. Int'l Trade 2010) (court looked to the Harmonized Tariff Schedule of the United States to determine the classification of thermal cyclers and parts)*;* Sparks Belting Co. v. United States, 715 F. Supp. 2d 1305 (Ct. Int'l Trade 2010) (court looked to the Headings of the Harmonized Tariff Schedule of the United States to determine the classification of conveyor belts); Roche Vitamins, Inc. v. United States, 750 F. Supp. 2d 1367 (Ct. Int'l Trade 2010) (court looked to the Harmonized Tariff Schedule of the United States to determine the classification of the organic colorant beta carotene); Outer Circle Prods. v. United States, 602 F. Supp. 2d 1294 (Ct. Int'l Trade 2009) (court looked to the Headings of the Harmonized Tariff Schedule of the United States to determine the classification of bottle and jug wraps); Arko Foods Int'l, Inc. v. United States, 679 F. Supp. 2d 1369 (Ct. Int'l Trade 2009) (court looked to the Headings of the Harmonized Tariff Schedule of the United States to determine the classification of the frozen dessert mellorine); Photonetics, Inc. v. United States, 659 F. Supp. 2d 1317 (Ct. Int'l Trade 2009)

Restricting disputes to the text of the list itself does not mean no controversy exists as to debates over classification of a good. Instead, the parties may dispute over, for instance, whether the plain meaning of a term should be used in interpreting its relationship to a good.[151] Rather, it does mean that the list can be treated as an interpretative text that can be interpreted by an administrative or judicial decisionmaker.

In contrast to tariff classifications, significant controversy exists over whether authoritative meaning can be built from the classifications of an intellectual property law. Section 1112 of the Lanham Act regulates the classification of registered trademarks.[152] It states that "[t]he Director may establish a classification of goods and services, for convenience of Patent and Trademark Office administration, but not to limit or extend the applicant's or registrant's rights."[153]

The Court of Appeals for the Federal Circuit ("the Federal Circuit") has interpreted section 1112 in a restrictive

(court looked to the Headings of the Harmonized Tariff Schedule of the United States to determine the classification of precision turntable lasers).

151. *See, e.g.*, Ciba-Geigy Corp. v. United States, 223 F.3d 1367 (Fed. Cir. 2000) (court analyzed the meaning of "inks" under its dictionary definition to determine the classification of synthetic organic coloring matter); Baxter Healthcare Corp. v. United States, 182 F.3d 1333 (Fed. Cir. 1999) (court analyzed the meaning of "synthetic" and "monofilament" under its dictionary definition to determine the classification of polypropylene filament); Carl Zeiss, Inc. v. United States, 195 F.3d 1375 (Fed. Cir. 1999) (court analyzed the meaning of "optical microscope" under its dictionary definition to determine the classification of product consisting of a microscope, a stand, and accessories, including a camera, all specially tailored for neurosurgical use); IKO Industries, Ltd. v. United States, 105 F.3d 624 (Fed. Cir. 1997) (court analyzed the meaning of "asphalt paper" under its dictionary definition to determine the classification of Armour Lock shingles); Medline Indus., Inc. v. United States, 62 F.3d 1407 (Fed. Cir. 1995) (court analyzed the meaning of "bed linen" under its dictionary definition to determine the classification of drawsheets); Stewart-Warner Corp. v. United States, 748 F.2d 663 (Fed. Cir. 1984) (court analyzed the meaning of "bicycle" under its dictionary definition to determine the classification of double-gear hub drive speedometers used primarily on bicycle-type exercisers).

152. 15 U.S.C. § 1112.

153. *Id.*

manner. Specifically, in *Jean Patou, Inc., v. Theon,*[154] the Federal Circuit refused to grant authoritative power to a decision to classify a trademarked good in a specific category of goods.

In *Jean Patou,* the Federal Circuit considered an appeal from the Trademark Trial and Appeal Board (TTAB) in which the TTAB determined that, under 15 U.S.C. § 105, Theon Inc. could not use the trademark "DERMAJOY" on a medicated astringent gel because its use created a likelihood of confusion with another company, Jean Patou, Inc., which had previously used the term "JOY" on a similar line of products.[155] The key to the controversy was the trademark examiner's initial determination that "DERMAJOY" should be listed in two classifications, cosmetics and pharmaceutical

154. Jean Patou, Inc. v. Theon, Inc., 9 F.3d 971, 975 (Fed. Cir. 1993); *see also in re* Detroit Ath. Co., 903 F.3d 1297, 1307 (Fed. Cir. 2018) ("Classification is solely for the 'convenience of Patent and Trademark Office administration,' and 'is wholly irrelevant to the issue of registrability under Section 1052(d), which makes no reference to classification.'") (citations omitted); Patsy's Italian Rest., Inc. v. Banas, 658 F.3d 254, 269–70 (2d Cir. 2011) ("Patsy's Pizzeria also suggests that the distinction between pizzeria services and restaurant services was inappropriate because the classification system used by the PTO does not distinguish between the two services, providing only the category of 'restaurant services.' This argument misunderstands the purpose of the PTO's classification system. The PTO's classifications exist solely for administrative purposes and does not affect the substantive rights of a mark's owner in any way."); *in re* Inca Textiles, LLC, 344 F. App'x 603, 606 (Fed. Cir. 2009) ("The PTO correctly points out that likelihood of confusion to the consuming public is independent of the classification manual, and that classification schedules do not alter the scope of the registration."); *in re* Omega SA, 494 F.3d 1362, 1364 (Fed. Cir. 2007) ("The PTO states that the classification system is merely a search tool and does not determine the trademark owner's rights, which are based on use of the mark and identification of the goods, not on the class in which the mark is registered."); Farmasino, Inc. v. Farmasino Pharms. Co., No. 5:15-CV-01877-SVW-DTB, 2016 WL 7655740, at *8 (C.D. Cal. June 20, 2016) ("The selection of registration classes is an administrative convenience for the U.S. PTO and has no bearing on the rights afforded a registrant."); United States v. Washington Mint, LLC, 115 F. Supp. 2d 1089, 1100 (D. Minn. 2000) ("Thus, the PTO's classification system is not determinative of whether a particular article manufactured by a registrant or applicant is subject to trademark protection.").

155. *See Jean Patou, Inc.*, 9 F.3d at 973.

preparations for skin care.[156] Jean Patou challenged Theon's trademark use and relied on a previous use of the term "JOY" under the classification of the toilette preparations, which had later been replaced by a broader international classification under the Strasbourg Agreement.[157]

In an opinion authored by Judge Giles Rich, a primary architect of the modern trademark system, the Federal Circuit reversed the TTAB because the TTAB had based its likelihood of confusion analysis on the fact that the term "JOY" was being used in a similar classification.[158] Discussing his reversal of the TTAB, Rich contended that "classification is wholly irrelevant to the issue of registrability . . . ."[159] Rich based his opinion on two grounds. First, Rich noted that section 1052 of the Lanham Act, which provides the bases for the denial of a trademark registration, did not directly reference classification as grounds for denial.[160] Second, Rich stressed that since section 1112 of the Lanham Act (which states that the Commissioner "may establish a classification of goods and services, for the convenience of the Patent and Trademark Office Administration, but not to limit or extend the applicant's or registrant's rights") appears to suggest that trademark classifications are only done "for the convenience" of the USPTO. Consequently, Rich argued that trademark classifications should have no substantive effect on understanding the scope of any particular trademark use and its use as a source identifier in a given category of use.[161]

Section 1112 and its reification in *Jean Patou* should be criticized on normative grounds. The act of classification should have meaning in those cases where the mark is

156. *See id.*

157. *See id.*

158. *See id.* at 975.

159. *Id.*

160. *See id.*

161. *Id.*

registered because we understand that a consumer may use a mark within different kinds of markets, a fact that is recognized by the act of classification. In these cases, therefore, the likelihood of confusion for a mark that is used in a different market might be low. Indeed, this phenomenon is referred to as trademark coexistence[162] and is often resolved through consent agreements between the impacted parties.

Moreover, conflicting precedent exists that suggests the *initial* classification of a trademarked good may limit the category of goods for which a registered trademark can be used as a source identifier.[163] As the Federal Circuit noted in an earlier case, *Octomom Systems, Inc., v. Houston Computer Serv., Inc.*:

> [A]uthority is legion that the question of registrability of an applicant's mark must be decided on the basis of the identification of goods set forth in the application regardless of what the record may reveal as to the particular nature of an applicant's goods, the

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162. *See* Marianna Moss, *Trademark "Coexistence" Agreements: Legitimate Contracts or Tools of Consumer Deception*, 18 LOY. CONSUMER L. REV. 197 (2005) (analyzing trademark co-existence agreements); Trademark Manual of Examining Procedure (TMEP) § 1207.01(d)(viii) (July 2021) ("A consent agreement may take a number of different forms and arise under a variety of circumstances, but, when present, it is "but one factor to be taken into account with all of the other relevant circumstances bearing on the likelihood of confusion referred to in § 2(d).").

163. *See* TMEP § 1401.03(a) (July 2021) ("Generally, in applications under § 1 or § 44 of the Trademark Act, prior to their assignment to an examining attorney, the USPTO retains the class number designated by the applicant, in the absence of any information clearly contradicting that classification."); *see also* Octocom Sys., Inc. v. Houston Comput. Servs., Inc., 918 F.2d 937, 942 (Fed. Cir. 1990) (citing in support for this statement); Squirtco v. Tomy Corp., 697 F.2d 1038, 1042 (Fed. Cir. 1983); Tuxedo Monopoly, Inc. v. General Mills Fun Grp., 648 F.2d 1335, 1337 (C.C.P.A 1981); San Fernando Elec. Mfg. Co. v. JFD Elecs. Components Corp., 565 F.2d 683, 684–85 (C.C.P.A 1977); Broderick & Bascom Rope Co. v. Goodyear Tire & Rubber Co., 531 F.2d 1068, 1070 (C.C.P.A 1976); Pennwalt Corp. v. Ctr. Lab'ys, Inc., 524 F.2d 235, 236 (C.C.P.A 1975); Paula Payne Prods. Co. v. Johnson Publ'g Co., 473 F.2d 901, 902 (C.C.P.A. 1973); Int'l Paper Co. v. Valley Paper Co., 468 F.2d 937, 938 (C.C.P.A 1972); Vornado, Inc. v. Breuer Elec. Mfg. Co., 390 F.2d 724, 726 (C.C.P.A 1968); Kalart Co. v. Camera-Mart, Inc., 258 F.2d 956, 957 (C.C.P.A 1958); Miles Lab'ys, Inc. v. Naturally Vitamin Supps., Inc., 1 U.S.P.Q.2d 1445, 1450 (T.T.A.B.1986) (amended 1987).

> particular channels of trade or the class of purchasers to which sales of the goods are directed.[164]

Octomom Systems Inc., then, stands for a basic proposition: the mark as described and classified in the initial application should delineate the scope of the registered trademark in subsequent goods.[165] Consequently, *Jean Patou*'s reading of 15 U.S.C. § 1112 is likely inapposite as well to the extent that the initial scope of a right is separate from subsequent limits or extensions.

Classification disputes in intellectual property are not limited to trademark law; indeed, Saurabh Vishnubhakat has criticized the fact that the classification of a patent's field

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164. *Octomom Sys.*, *Inc.*, 918 F.2d at 952.

165. Subsequent case law has affirmed *Octomom's* basic principle that the choice of classification in trademark law is crucial decision. *See in re* i.am.symbolic, LLC, 866 F.3d 1315, 1326–27 (Fed. Cir. 2017) ("Here, substantial evidence supports the Board's findings that the will.i.am restriction does not impose a meaningful limitation and the registrations at issue do not contain any express limitations. Thus, unlike in *M2 Software*, the application and registrations here do not contain meaningful limitations in the identification of goods. As a result, the Board properly declined to import restrictions into the identification of goods based on alleged real-world conditions."); Stone Lion Cap. Partners, L.P. v. Lion Cap., LLP, 746 F.3d 1317, 1323 (Fed. Cir. 2014) ("It was proper, however, for the Board to focus on the application and registrations rather than on real-world conditions."); *in re* Dayan, 61 F. App'x 695, 696 (Fed. Cir. 2003) ("First, we note that Dayan's identification of goods, which controls this analysis, is broad enough to include golf-style clothing, particularly 'golf shirts.'") (citing *Octocom Sys.*, 918 F.2d at 942); Bd. Of Regents of Univ. of Wis. Sys. v. Phoenix Int'l Software, Inc., 653 F.3d 448, 455–56 (7th Cir. 2011) ("The Federal Circuit case on which the district court relied, *Octocom Systems, Inc. v. Houston Computer Services, Inc.,* 918 F.2d 937, 942 (Fed.Cir.1990), is not to the contrary. There a registrant whose mark was challenged tried to supplement the registration to show that it intended its mark to cover a narrower set of goods than those described in the registration. The Federal Circuit rejected this attempt, saying that the court should consider the goods as described in the registration. A likelihood of confusion existed because the registrant's original application 'encompassed modems and computer programs' and thus conflicted with the petitioner's registration of a similar mark for computer programs. Furthermore, the record showed that modems and computer programs are used together in networking; they can come from a single source; and they may be identified with the same mark. *Id.* at 943. The critical fact in *Octocom* was thus not that the registrations were identical; it was that they covered similar products.").

of invention under section 8 of the Patent Act[166] is too often either ignored or assumed in judicial decision-making.[167] Vishnubhakat claims that the classification of the patent is a crucial threshold inquiry as to the scope of a patent claim. He notes:

> The shortcoming in the current judicial practice of ignoring, assuming, or improvising the field of the invention is that it evinces no principled rule of decision that might give reasonable certainty to creators, implementers, and consumers of technology about how an important threshold question, with pervasive effects on their rights and obligations, will be answered.[168]

Vishnubhakat identifies the way in which ignoring classification impacts the substantive scope of the law and speaks to the way infrostructure is often rendered invisible in the law. Moreover, by rendering relational infrostructure invisible, it has the subsidiary effect of erasing the transnational effect of classification and its ability to ensure that international law inter-penetrates domestic patent law.

II. INFROSTRUCTURE(S) AND THE ADMINISTRATIVE STATE

While understanding the descriptive basis of infrostusture is necessary, a key element of this work is to ensure that we see infrostructure work within different legal subjects. In this Part, I examine how making infrostructures visible is a key project in transubstantive administrative law.

Infrostructures help us to think about a question central to administrative law: how the administrative state is legitimated. We focus on two primary models in our standard

166. 35 U.S.C. § 8 ("The Director may revise and maintain the classification by subject matter of United States letters patent, and such other patents and printed publications as may be necessary or practicable, for the purpose of determining with readiness and accuracy the novelty of inventions for which applications for patent are filed.").

167. *See generally* Vishnubhakat, *supra* note 15.

168. Vishnubhakat, *supra* note 15, at 909.

account of administrative legitimation in the law of the United States. The first model, *expertise legitimation*, suggests that the administrative state is legitimated because it is a site where an expert administrator manages the conflicting desires of interest groups. The second model, *structural legitimation*, suggests that the administrative state is legitimated because of the competing constitutional controls asserted by the executive, judicial, or legislative branch. In Section II.A, I consider how the concept of infrostructure is consistent with an account of expertise legitimation. In Section II.B, I examine how infrostructures are consistent with an account of structural legitimation.

However, as I discuss in Section II.C, making infrostructure visible suggests another explanatory model of administrative legitimation: *discursive legitimation,* in which relational infrostructures demonstrate how statutory regimes can be legitimized by discursive strategies that are constitutive of particular regulated communities.[169] Infrostructure demonstrates that agency legitimation can be premised on "dialogue in the process of policy formation—a two-way discourse between lawmakers and citizens as interlocutors rather than supplicants."[170]

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169. *See generally* Julia Black, *Regulatory Conversations*, 29 J. L. & SOC'Y 163 (2002); Kelvin Kolben, *Dialogic Labor Relation in the Global Supply Chain,* 36 MICH. J. INT'L L. 425 (2015) (examining the interactions between private entities and public labor regimes in regulating supply chain management); John Gillespie, *Towards a Discursive Analysis of Legal Transfers into Developing East Asia,* 40 N.Y.U. J. INT'L L. & POL'Y 657, 693–712 (2008) (analyzing how regulatory discourse shaped the introduction of corporate law in Vietnam); Leonard Dobusch & Elke Schübler, *Copyright Reform and Business Model Innovation: Regulatory Propaganda at German Music Industry Conferences*, 83 TECH. FORECASTING & SOC. CHANGE (2014) (analyzing how German copyright law is shaped by regulatory discourse between different actor groups).

170. Annemarie Bridy, *Copyright Policymaking as Procedural Democratic Process: A Discourse-Theoretic Perspective on ACTA, SOPA, and PIPA*, 30 CARDOZO ARTS & ENT. L.J. 153, 155 (2012).

A. Infrostructure and Expertise Legitimation

Infrostructure is consistent with a standard account of legitimation in administrative law: that is, judicial deference is accorded to the agency and the agency acts as an expert administrator of those powers delegated to it by Congress.[171] This can be a broad delegation; for instance, 13 U.S.C. § 141(a) delegates to the Secretary of Commerce broad power to conduct the census "in such form and content as he may determine."[172] A narrower (and perhaps stronger) delegation might specifically delegate to an agency's expert responsibility to create, steward, and preserve an infrostructure, thus supporting a claim that the agency should be invested with significant expertise when it acts in that capacity.

These expert claims, however, are often obscured because claims based on infrostructures are poorly understood and often under-theorized. A prototypical example of this obscurity is 35 U.S.C. § 2(b), which grants the USPTO a broad authority to manage infrostructure. Specifically, 35 U.S.C. § 2 states that "the United States Patent and Trademark Office, subject to the policy direction of the Secretary of Commerce . . . (2) shall be responsible for disseminating to the public information with respect to patents and trademarks."[173] Section 2(b) authority, though, in both historical and cumulative terms, speaks to the importance of infrostructure in establishing expert authority in administrative terms.

Initially, in historical terms, some form of section 2(b) authority has been present in patent law since 1836. Section 1 of the Patent Act of 1836, which granted the Commissioner

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171. Agency expertise can derive from congressional delegation, *See* Chevron, U.S.A., Inc. v. Nat. Res. Def. Council, Inc., 467 U.S. 837, 842–43 (1984), or from experience with administering the state over a period of time, Skidmore v. Swift & Co., 323 U.S. 134, 140 (1944).

172. 13 U.S.C. § 141(a).

173. 35 U.S.C. § 2(a)(2).

of Patents regulatory authority, stated that the Commissioner of Patents "shall have the charge and custody of all books, records, papers, models, machines, and all other things belonging to said office."[174] This authority was reaffirmed in the Patent Act of 1870[175] and the Patent Act of 1952.[176]

The historical continuity of this responsibility suggests two insights. First, while the power of section 2(b) is often seen to supplement the USPTO's power to govern proceedings under section 2(a),[177] it should be rightly understood as an independent source of power. Second, the power of section 2(b) demonstrates that infrostructure is a key element of the modern administrative regime in the United States. Recent scholarship has challenged the claim that the administrative footprint of the United States in the nineteenth century was minimal; the emergence of infrostructure supports a more robust account of administrative power than previously supposed.[178]

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174. Patent Act of 1836, ch. 357, § 1, 5 Stat. 117, 118 (July 4, 1836); *see also id.* § 4 ("That the said Commissioner shall cause a seal to be made and provided for the said office, with such device as the President of the United States shall approve; and copies of any records, books, papers, or drawings, belonging to the said office, under the signature of the said Commissioner, or, when the office shall be vacant, under the signature of the chief clerk, with the said seal affixed, shall be competent evidence in all cases in which the original records, books, papers, or drawings, could be evidence.").

175. Patent Act of 1870, ch. 299, § 7 ("The Commissioner of Patents . . . shall have charge of all books, records, papers, models, machines, and other things belonging to said office."); *see also id.* § 1 ("there shall be the Department of Interior office . . . known as the patent office, wherein all records, books, models, drawings, specifications, and other papers and things pertaining to patents shall be safely kept and preserved); *id.* § 15 ("there shall be purchased for the use of said office, a library of such scientific works and periodicals, both foreign and American, as may aid the officers in the discharge of their duties").

176. Patent Act of 1952, *amended by* America Invents Act of 2011, 35 U.S.C. §§ 1-390; *see also id.* § 2(a)(2).

177. *See id.* § 2(a) ("The United States Patent and Trademark Office, subject to the policy direction of the Secretary of Commerce—(1) shall be responsible for the granting and issuing of patents and the registration of trademarks.").

178. The vibrant infrostructures associated with trade, intellectual property, and postal administrative systems in the nineteenth century are consistent with

Additionally, section 2(b) is cumulative, tying together different parts of the Patent Act that directly provide for the creation of information resources. These duties can be roughly placed into two categories under the Patent Act: a collection of statutory responsibilities,[179] which outline administrative responsibilities as to the tangible information forms; and a collection of statutory rights, which outlines administrative responsibilities to intangible forms. Sections 7 through 13 of the Patent Act impose administrative duties on the USPTO to provide public access to information forms, which include: the patent library;[180] certified copies of records, patent, and trademark certificates;[181] the Official Gazette of the USPTO;[182] annual indexes and volumes related to patent and trademark cases;[183] pamphlet copies of the laws, rules of practices, and rules related to patents and trademarks;[184] patent exchange information between the USPTO and foreign countries;[185] and an Annual Report to Congress.[186]

Additionally, section 41(i) of the Patent Act of 1952[187] protects intangible information forms, mandating that the USPTO: (1) maintain public paper, microform or electronic collections of United States patents, foreign patent

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Jerry Mashaw's claim that administrative law in the United States in the nineteenth centory was more robust than typically understood in the relevant historical treatments of the administrative state.. *See* JERRY MASHAW, CREATING THE ADMINISTRATIVE CONSTITUTION 10 (2002). Indeed, any account of administrative law history may be unnecessarily constrained without a full examination of the infrostructure.

179. *See* 35 U.S.C. §§ 7–13.

180. *See id.* § 7.

181. *See id.* § 10(a)(2).

182. *See id.* § 10(a)(3).

183. *See id.* § 10(a)(4).

184. *See id.* § 10(a)(6).

185. *See id.* § 11.

186. *See id.* § 13.

187. *See id.* § 41(i).

documents, and the United States trademark "to permit search for and retrieval of information";[188] (2) fully deploy automated search systems of the USPTO so that such are "available for use by the public, and shall assure full access by the public to, and dissemination of, patent and trademark information, using a variety of automated methods";[189] (3) establish reasonable grounds for access to the public to the automated search system, and further, to the extent that requirement exists, mandates some form of free access must be provided;[190] and (4) provide an annual report to Congress as to the provision of automated search systems.[191]

Tying section 2(b) of the Patent Act of 1952 more explicitly to specific outcomes mandated by these cumulative provisions in the Patent Act of 1952 achieves two goals. First, as a practical matter, reading section 2(b) cumulatively may offer a way to strengthen its practical use. Section 2(b) appears to be a generalized mandate, and so, consequently, it would be difficult to produce the type of specific agency necessary to promote judicial review of any potential harm under the APA.[192] A cumulative reading, however, suggests that the USPTO has a specific mandate to provide information to the public, and a failure to fulfill that mandate is a potential harm under the APA.

Second, reading section 2(b) cumulatively suggests the USPTO needs to be understood as an information regulation (a close analogue might be, for instance, the Environmental Protection Agency, which itself produces substantial information that facilitates environmental action) rather

188. *Id.* § 41(i)(1).

189. *Id.* § 41(i)(2).

190. *Id.* § 41(i)(3).

191. *Id.* § 41(i)(4).

192. Section 2(b) contains a generalized duty to disseminate information. The Supreme Court's holding in *Norton v. Southern Utah Wilderness Area Alliance* suggests that a generalized duty is not sufficient to raise a claim under § 706(1) of the Administrative Procedure Act. Norton v. Southern Utah Wilderness All., 542 U.S. 55, 66–67 (2004).

than simply an agency tasked with the minimal ministerial task of granting and issuing patents. Specifically, it suggests that in the preservation and stewardship of a patent infrostructure, the "public" law of patents may be linked more closely to the types of administrative practices and proceedings that accompany complex property systems, such as property and environmental regimes. Additionally, reading section 2(b) cumulatively as a public infrostructure means that a third party besides the patent owner or a competitor may have distinct rights of access and rights of stewardship to publicly available tangible and intangible information forms (at least the ones protected by these provisions). This may have the potential for broadening the scope of standing to bring claims in patent law. A cumulative reading of 2(b), thus, makes it much more likely that a third-party claimant could challenge, for instance, an agency failure to appropriately maintain the Public Patent database under section 41(i), thus, violating both Patent Act and the APA. This is a way to expand the relatively narrow grounds on which a third party, who is not a direct competitor, can challenge the actions of the USPTO.[193]

B. Infrostructure and Structural Legitimation

Structural legitimation in the administrative state also supports the legitimation of the administrative state in the United States based on the claim that the executive, legislative, and judicial branches exercise constitutional control of the "fourth branch" of the administrative state.[194] Infrostructure is consistent with a structural legitimation in the administrative state in two ways. First, it can reinforce the power enjoyed by a specific branch of government under

193. *See, e.g.*, Murray, *supra* note 26, at 79–85 (2006) (examining standing context for patent challenges).

194. *See, e.g.*, Peter Strauss, *The Place of Agencies in Government: Separation of Powers and the Fourth Branc*h, 84 COL. L. REV. 573, 576–78 (1984) (outlining the different way constitutional principles of separation of power manifest itself in the administrative state).

a separation of powers principle. Second, infrostructure can reflect what I term *(demos)forms*—information forms and systems that a constitutional regime invests into to ensure that actions by bureaucratic bodies are open and accessible to citizens—and are used to facilitate democratic discourse.[195]

One way of achieving structural legitimation is to focus on the particular power of each constitutional branch to conduct its own business for infrostructures that reinforce the powers granted to the different branches. For instance, Clause 5 of Article 1 of the U.S. Constitution ("The Journals Clause") requires that:

> [Each] House shall keep a Journal of its Proceedings, and from time to time publish the same, excepting such Parts as may in their Judgment require Secrecy; and the Yeas and Nays of the Members of either House on any question shall, at the Desire of one-fifth of those Present, be entered on the Journal.[196]

The Journal Clause is an infrostructure. The Journal Clause establishes an information form: "the journal proceedings."[197] The Journal Clause instantiates the information form of the journal proceeding: the clause determines the form of the information as a "journal" and also "culls" information by distinguishing between accessible and secret information. Likewise, the Journal Clause creates an accompanying information system: the journal is to be maintained in the House and the Senate, information should be maintained in the journal, although the House can vote to keep some material separate, and the vote shall be recorded as "yea or nay."[198]

Consequently, the Journal Clause builds a relational infrostructure. Josh Chafetz, in his account of the

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195. *See infra* Section II.C.

196. U.S. CONST. art. 1, cl. 5.

197. *Id.*

198. *Id.*

bureaucratic powers of Congress, discounts the Journal Clause because "it only requires a bare-boned account of actions taken [in proceedings]."[199] Chafetz misreads the importance of the Journal Clause: the Journal Clause is an important relational infrostructure because it performs a facilitative function—by providing basic information about the voting records of each Congressperson—and it performs a representative function: reinforcing the representativeness of the members of each chamber since it invests their "yeas and nays" with a visible and recorded presence.

Indeed, in *United States v. Ballin*,[200] the Supreme Court considered whether a challenge that Congress had a sufficient quorum had been met with regard to voting on a bill, which reinforced the importance of the Journal Clause. In its opinion, the Court noted the following:

> The Constitution (Article I, section 5) provides that 'each house shall keep a journal of its proceedings;' and that 'the yeas and nays of the members of either house on any question shall, at the desire of one-fifth of those present, be entered on the journal.' Assuming that by reason of this latter clause reference may be had to the journal, to see whether the yeas and nays were ordered, and, if so, what was the vote disclosed thereby; and assuming, though without deciding, that the facts which the constitution requires to be placed on the journal may be appealed to on the question whether a law has been legally enacted, yet, if reference may be had to such journal, it must be assumed to speak the truth.[201]

A reading of the Journal Clause in *Ballin* suggests the ways in which the law produces the information system that serves to reinforce Congress's bureaucratic power. A requirement such as the Journal Clause establishes a certain pre-condition to ensure that the bureaucratic information is stated clearly—the "yeas and nays" are the expression of Congress's desire to affirmatively commit to a legislative act.

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199. JOSH CHAFTEZ, CONGRESS'S CONSTITUTION: LEGISLATIVE AUTHORITY AND THE SEPARATION OF POWERS 282 (2017).

200. United States v. Ballin, 144 U.S. 1, 4 (1892).

201. *Id.*

Moreover, the Journal Clause states that once those speaking acts are bound to a stable material form that this produces an ethical and authoritative commitment to action: that is, as the Court notes in its opinion, once a vote is recorded in the Journal "*it is assumed to speak the truth.*"[202] Finally, the Journal Clause creates an authoritative meaning through its reinforcement of a legislative bureaucratic power. Relatively little case law exists on the authoritative meaning of Article 3 indicating that this power is understood to be one in which Congress can set the terms of its own proceedings.[203] The Journal Clause, thus, operates to establish Congress' own internal bureaucratic power.

C. Infrostructure and the Cultural Legitimation of the Administrative State

Infrostructure also supports another ground for legitimation, the cultural legitimation of the bureaucracy. The cultural legitimation of the bureaucracy contends that the administrative state is legitimated because bureaucratic institutions produce regulatory texts and manage regulatory discourse. Initially, the cultural legitimation of the bureaucracy suggests that the administrative state is legitimated because bureaucratic states produce what Matthew Hull terms bureaucratic text, a text produced by the administrative actor.[204] Hull notes that "bureaucratic texts are produced, used, and experienced through procedures, techniques, aesthetics, ideologies, cooperation,

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202. Murray, *supra* note 114, at 44–45; In the *Politics of Patent Law: Creating the Participatory Patent Bargain*, I described this as an ethical requirement that a party "speak fairly" as to the informational content produced by the relevant bureaucratic regime.

203. Common Cause v. Biden, 909 F. Supp. 2d 9, 27 (D.D.C. 2012), *aff'd on other grounds*, 748 F.3d 1280 (D.C. Cir. 2014) ("The Supreme Court has long recognized that the power committed in Article I, section 5 provides each House with broad discretion to determine the rules of its proceedings.").

204. MATTHEW HULL, THE GOVERNMENT OF PAPER: THE MATERIALITY OF BUREAUCRACY IN URBAN PAKISTAN 18–19 (2012).

and contestations" of the administrative states. Moreover, as Hull continues, the bureaucratic texts can multiply since these texts are used by "people, places, and things to make other bureaucratic objects."[205]

Building on this premise, a cultural legitimation of the bureaucracy suggests that discursive legitimation is achieved through the regulatory discourse between "target groups whose activities are to be modified and the entities that enforce regulations."[206] This regulatory discourse can be expressed as:

> [I]n all forms of interpersonal communications, extending beyond standards, policy, documents, and guidance notes to include micro-level conversations that may occur in formal or informal sites, including policy briefings, seminars, and conferences, in the course of the regulatory process between individuals both within and across organizations or particular cohesive communities."[207]

Although it has substantial informal elements, regulatory discourse can be formally recognized in the law; a notable example of formalized regulatory discourse is the Administrative Procedure Act's recognition of the regulated communities' ability to substantively comment on proposed rulemaking.[208] Infrostructures, whether protecting information forms or information systems, support a claim that the administrative state is justified through its cultural production. Notably, information forms in the modern state

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205. *Id.*

206. Chris Koski, *Regulatory Choices: Analyzing State Policy Design*, 29 L. & POL'Y 407, 409 (2007).

207. Black, *supra* note 169, at 171.

208. Donald J. Kochan, *The Commenting Power: Agency Accountability through Public Participation*, 70 OKL. L. REV. 601, 622 (2018) (assessing agency responsibility to substantively consider submitted comments); *see also* Administrative Procedure Act, 5 U.S.C. § 553 (b) (requiring that a general notice of proposed rulemaking is to be proposed rulemaking is to be published in the Federal Register); 5 U.S.C. § 553 (c) (requiring the agency grant interested persons an opportunity to participate in the rulemaking through written data, views or arguments, or arguments and that the agency prepare a concise general statement of the basis and purpose of the rule).

can reproduce and strengthen the bureaucratic power of the state in an affirmative or negative manner.

While the parameters of the modern intellectual property regime are often understood to lie in Article I, Section 8, Clause 8,[209] which requires Congress to protect the inventions and writings of inventors and authors, equally important is the emergence of a modern administrative regime that deems that the *records* associated with the issuance patent be circulated to the widest number of individuals (i.e., serving as a type of democratic circulation of the information to the widest available users). First, section 1 of the Patent Act of 1790 required the following:

> [L]etters patent . . . shall be recorded in a book to be kept for that purpose in the office of the Secretary of State and delivered to the patentee or his agent, and the delivery thereof shall be entered on the record and endorsed by the said Secretary at the time of granting the same.[210]

Second, section 3 of the Patent Act of 1790 required the following:

> That upon the application of any person to the Secretary of State, for a copy of any such specification, and for permission to have similar model or models made, it shall be the duty of the Secretary to give such copy, and to permit the person so applying for a similar model or models, to take, or make, or cause the same to be taken or made, at the expense of such applicant.[211]

Consequently, the requirement of a patent record should be seen as a seminal moment in the foundations of the modern intellectual property regime. The Patent Act of 1790 simultaneously created a bureaucracy dedicated to the circulation of all information related to the patent and, moreover, reinforced the fact that the government was required to provide a patent record to its citizens so that they

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209. U.S. CONST., art. I, § 8, cl. 8.

210. Patent Act of 1790, ch. 7, § 1, (Apr. 10, 1790).

211. *Id.* § 3.

could access that information and evaluate the performance of that government.

A records requirement is unremarkable today, but, arguably, we have not paid enough theoretical attention to this moment in our understandings of administrative law. Here, I draw inspiration from Danielle Allen's examination of the drafting of the Declaration of Independence, in which she argues that its drafting should be understood as what she calls democratic writing.[212] For Allen, the Declaration of Independence should be understood as not merely a democratic product but a democratic process. Allen states:

> [If] we focus on this list of conversations, we cannot avoid seeing that the importance of this Declaration has a much to do with process as with products. This process—the sequence of conversations—had multiple goals. For course, one was to reach a decision on the draft of the Declaration and whether to sign it. Another was to establish procedures for cooperation—for getting these done by means of talk. In the very process of organizing these conversations about independence and the Declaration, the colonists established patterns of collaboration that would provide for ongoing collective action in the freshly and new united states.[213]

Allen's insight into the collaborative process of democratic writing highlights a way in which we should view the information forms produced from the revolutionary and constitutional moment in the United States; namely, that the *records* requirement expressed in the original acts following the passage of the Constitution should be seen as a new type of information form, *(demos)(forms)*.[214]

(Demos)(forms) are information forms and systems produced by bureaucratic bodies that are open and accessible to citizens and are used to facilitate democratic discourse. (Demos)(forms) serve to justify the administrative state because they are understood to produce information that

212. DANIELLE ALLEN, OUR DECLARATION: A READING OF THE DECLARATION OF IN DEFENSE OF EQUALITY 81 (2014).

213. *Id.*

214. *Id.*

serve its citizens.[215] (Demos)(forms) are structural in nature to the extent that they emerge out of administrative commitments prefigured in constitutional text.

The Supreme Court, as early as 1852, determined that a patent record could be a (demos)(form).[216] In *Boyden*, the Supreme Court considered the appeal of Uriah Boyden against the United States Patent Office for the refusal to provide him with the patent certificate, which proved his ownership of the patent.[217] The Office refused to grant Boyden's two written requests for his patent certificate on the grounds that Boyden's initial request was "taunting, insulting, and libelous, indicating a want of taste and temper."[218]

Reversing a lower court determination that upheld the Office's refusal to issue the patent, the Supreme Court held that:

> [P]atents are public records. All persons are bound to take notice of their contents, and consequently should have a right to obtain copies of them. The patent law of 1836, section 4, enacts that 'any person making application therefor may have certified copies,' &c. These records being in the care and custody of the Commissioner of Patents, it is his duty to give authenticated copies to any person who shall demand the same, as soon as he conveniently can, on payment of the legal fees."[219]

The Court distinguished between what it termed Boyden's failure of "social intercourse" and his "rights guaranteed by the plaintiff by the laws of the land."[220] The Court ended with the claim that "ill manners or bad temper

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215. *Id.*

216. Boyden v. Burke, 55 U.S. 575 (1852). I credit my colleague Bruce Boyden for informing me of an unusual Supreme Court case involving his rather ill-tempered ancestor at the very beginning of this project of *Infrostructure*.

217. *Id.* at 577.

218. *Id.* at 583.

219. *Id.* at 582–83.

220. *Id.* at 583.

do not work a forfeiture of men's civil rights."[221] *Boyden* is a remarkable case insofar as it breaks the chains of reciprocity and intimacy to assert that the state no longer cared to police the behavior of its citizens when it came to their access to a public record. What is remarkable is this principle is established far earlier than what is generally understood to be the establishment of freedom of information regimes during the 1960s.

Information systems also reinforce the legitimation of the administrative system through discourse. The existence of information systems suggests that administrative law should not be understood as a constrained relationship between different actors (court-agency, or agency-regulated community). Rather, making infrostructures visible understands administrative law to be shaped by a dynamic social relationship between heterogeneous administrative actors in its formal dimensions and competing coalitions of informal regulated communities in its informal dimensions.[222] Infrostructure is an ideal way to examine regulatory dynamism because it is a visible site where we can map how the social relationships between formal and informal actors operate in the regulation of contested resources. For instance, an agency library site can serve as a transparent vehicle to disseminate information to a wide audience, thus allowing the agency to foster conversations between the agency and its impacted regulated audience.

Highlighting information systems grounds the cultural legitimation in agency behavior in three ways. First, agencies can provide information that can be circulated to engaged members of the public so they can facilitate further action within the system. For example, Article I, Section 8, Clause 7 of the United States Constitution states that

221. *Id.*

222. Kali Murray & Esther van Zimmeren, *Dynamic Patent Governance in Europe and the United States: The Myriad Example*, 19 CARDOZO J. INT'L & COMP. L. 287, 294–95 (2011).

Congress shall have the power "[t]o establish Post Offices and post Roads." Clause 8 reveals the parallel structure of infrastructure ("the post Road") and infrostructure ("the Post Offices").[223] While it may be obvious that the "roads" would be the subject of congressional power, it is less obvious how congressional power would be exercised. However, pursuant to this power, Congress, in 1792, passed the first Post Office Act, which designated new postal routes, postal offices, and postal rates. Unlike previous iterations of the postal systems in Europe, this new postal system was not to carry sovereign messages but to disseminate knowledge throughout the entire United States, keeping the citizenry informed on a range of issues.[224] Benjamin Rush, one of the signers of the Declaration of Independence, noted in his support of the postal service:

> [F]or the purpose of diffusing knowledge, as well as extending the living principle of government to every part of the united states—every state—city—county—village and township in the union, should be tied by means of the post-office. This is the true non-electric wire of government. It is the only means of conveying heat and light to every individual in the federal commonwealth. Sweden lost her liberties, says the abbe Raynal, because her citizens were so scattered, that they had no means of acting in concert with each other. It should be a constant injunction to the post-masters, to convey newspapers free of all charge for postage. They are not only the vehicles of knowledge and intelligence, but the centinels of the liberties of our country.[225]

Rush's conception of the Post Office also suggests the links between the political philosophy of Jürgen Habermas and republican views of the administrative state. An administrator is necessary in information systems because it facilitates the actions of private individuals. The

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223. U.S. CONST. art. I, § 8, cl. 7.

224. *Id.*; Anuj C. Desai, *The Transformation of Statutes into Constitutional Law: How Early Post Office Policy Shaped Modern First Amendment Doctrine*, 58 HASTINGS L.J. 671 (2006) (outlining the impact of Post Offices in early Republic).

225. Benjamin Rush, *Address to the People of the United States*, AMERICAN MUSEUM 3 (1787).

administrative information serves as a "vehicle" that moves between private action, the public sphere, and the authoritative state.[226]

Second**,** highlighting the information systems grounds the claim of cultural legitimation since agencies can engage in certain discursive acts that manifest the relationship between social actors that serve to mirror the relationships of the social communities that produce them. For example, in patent law, it is often required that an individual with a technical background be deemed necessary to evaluate a patent during the patent examination because the examiner is said to be able to replicate how a given scientific or technical community would approach the claimed invention. Indeed, as noted in my previous work, *The Politics of Patent Law: Crafting the Participatory Bargain*, I contended that the patent and its accompanying disclosure should be understood as what I term an intermediated text:[227] that is, a text whose speech act lies in its ability to reflect the social context of its inventive creation, and that the government's issuance of a patent to a specific inventor allows that individual to become the authoritative representative of that

226. Jurgen Habermas and his claim that democratic society are reliant on what he terms the public sphere, which was a "public sphere constituted of private people" based on the presumed equality of its participants, the commodification of cultural property (such as art and literary works) that has once been the province of the elite and the accessibility of resultant cultural production as a result. Jurgen Habermas, *The Public Sphere: An Encyclopedia Article* (1964), 3 NEW GER. CRITIQUE 49, 49 (1974). As classically defined by Jurgen Habermas, democratic society is divided between what he terms three realms: the private realm, which is composed of what he terms civil society (realm of a commodity exchange and social labor) and the family; the public sphere, a social realm in which "something approaching public opinion can be formed that in which individuals act "neither like business or professional people transacting private affairs" nor like the state bureaucracy, and the state realm, which consists of the state exercising its authoritative power. *Id.* at 50–52; Dena Goodman, *Public Sphere and Private Life: Towards a Synthesis of Current Historiographical Approaches to the Old Regime*, 31 HIST. & THEORY 1–20 (1992) (assessing Habermas' distinction between public, private and authoritative spheres).

227. Murray, *supra* note 114, at 22.

community.[228]

Finally, agencies can engage in behavior that builds a relationship of moral reciprocity as to the regulated information form or information system.[229] To return to *Boyden*, in that case, the Supreme Court emphasized the moral relations that were set in motion once a patent was issued. A moral cascade, an issued patent binds "all persons" to "take notice" of their contents, so consequently, "[a]ll persons . . . have a right to obtain copies of them," and finally, the Commissioner of Patents had a "duty to give authenticated copies" to any individual who requested them.[230]

Boyden posits a world in which the agency operates to authenticate the data that is circulating through an active public. Although the case was ultimately determined by the fact that a patent record is a (demos) form (i.e., information that is, by its nature, public), *Boyden* spends inordinate time on the ways in which the patentee's (Boyden) lack of appropriate sociality may have undermined the information system. Throughout the opinion, *Boyden* refers to the relationship between the regulator and the regulated in almost intimate terms. The party must request the information from the government in a "proper manner" that did not trade "personal insult, or vulgar abuse of the officer,"[231] and moreover, "[t]hose to whom the people have committed high trusts, are entitled at least to common courtesy, and are not bound to submit to the insolence or ill temper of those who disregard the decencies of social intercourse."[232] The Court clearly perceived the parties' relationship in unusually personal terms. *Boyden* set out the

228. *Id.* at 23.

229. Kali Murray, *What Is Owed: Obligation's Relevance in Property and Intellectual Property Theory*, 2 TEX. A&M J. PROP. L. 275, 286 (2015).

230. Boyden v. Burke, 55 U.S. 575, 582–83 (1852).

231. *Id.* at 583.

232. *Id.*

appropriate social relationships that ought to be enjoyed between the regulator and the regulated but then concluded such sociability must give in to a broader democratic claim-that information is a "civil right" enjoyed by the patentee or a member of the public to access the patent record.

CONCLUSION

Infrostructure is an essential form of bureaucratic power, whether it exists as a statutory provision that waxes at length on an electronic reading room or as a treaty section that details the tedious details associated with classifying a custom good.

The future project of mapping infrostructure, then, will be a robust one. One task will be expanding on the rights associated with infrostructure: individuals will enjoy substantive rights of access,[233] stewardship,[234] and preservation[235] that place substantive duties on state actors as to infrostructure.[236] Another task will emerge as we consider what happens when private entities like Facebook and X (formerly, Twitter) are responsible for creating, maintaining, and preserving their own infrostructures.[237]

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233. FABRIZIO SCROLLINI MELENDEZ, RIGHT TO INFORMATION ARENAS: EXPLORING THE RIGHT TO INFORMATION IN CHILE, NEW ZEALAND AND URUGUAY 171 (2015) (examining how participation in the political process, the professionalization of the statute bureaucracy, and right to information enforcement institutions).

234. URSULA GRAHAM, ACCESS TO INFORMATION TECHNOLOGY AND JUSTICE: A CRITICAL INTERSECTION 103 (2017) (assessing a user-generated program to preserve legal information websites based on four steps: identification of user needs, assessment of readability of site content; assessment of website usability, and review of documents used by website.

235. Ingrid Mason, *Cultural Information Standards—Political Territory and Rich Rewards*, *in* THEORIZING DIGITAL CULTURAL HERITAGE: A CRITICAL DISCOURSE 221 (Fiona Cameron & Sarah Kenderdine eds., 2007) (examining how information standards that support the collection and preservation of digital collections in museum collections).

236. Maeve McDonagh, *The Right to Information in International Human Rights Law*, 13 HUM. RTS. L. REV. 26 (2013).

237. Infrostructures can be created redistribution of the task of maintain

Making infrostructure, then, visible will be a significant scholarly endeavor; happily, much like our journey on the road, the start of the trip is the most exciting part.

public information to private entities (the current most relevant example is Twitter). I term them, *vampire infrostructures*, because while such infrostructures mirror infrostructures they pose significant challenges from a constitutional and administrative law perspective. *See, e.g.*, Julian N. Eule & Jonathan D. Varat, *Transporting First Amendment Norms to the Private Sector: With Every Wish There Comes a Curse*, 45 UCLA L. REV. 1537, 1600–01 (1998) (delegating speech challenges to the private sector crates process legislative and judicial challenges that arise from the redistribution of speech governance, and substantive challenges raised by a compelled speech orthodoxy imposed private entities); Nina Mendelson, *Private Control Over Access to the Law: The Perplexing Federal Regulatory Use of Private Standards*, 112 MICH. L. REV. 737, 762 (2012) (use of standards created by public entities poses an administrative challenge because interest groups lack access to the decision-making structure).