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Track 1: Scientific Research and Innovation Commons

Session 2: Constructing Commons in Intellectual Resources: A Research Framework and Case Studies

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Presentation: Constructing Commons in Intellectual Resources

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Related papers (following this cover sheet):

**Constructing Commons in the Cultural Environment**

95 Cornell L. Rev. 657 (2010) (with Brett M. Frischmann & Katherine J. Strandburg) and

**The Complexity of Commons**

95 Cornell L. Rev. 839 (2010) (with Brett M. Frischmann & Katherine J. Strandburg)

Both papers were published as part of a single issue of the Cornell Law Review. This issue also included commentaries on the principal paper (“Constructing Commons”) by Elinor Ostrom, Thráinn Eggertson, Robert Merges, Wendy Gordon, Gregg Macey, and Lawrence Solum.

The full issue, with all of the papers available for download, can be accessed at  
<http://www.lawschool.cornell.edu/research/cornell-law-review/volume-95-number-4.cfm>

# CONSTRUCTING COMMONS IN THE CULTURAL ENVIRONMENT\*

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*This Article sets out a framework for investigating sharing and resource-pooling arrangements for information- and knowledge-based works. We argue that adapting the approach pioneered by Elinor Ostrom and her collaborators to commons arrangements in the natural environment provides a template for examining the construction of commons in the cultural environment. The approach promises to lead to a better understanding of how participants in commons and pooling arrangements structure their interactions in relation to the environments in which they are embedded, in relation to information and knowledge resources that they produce and use, and in relation to one another.*

*Some examples of the types of arrangements we have in mind are patent pools (such as the Manufacturer's Aircraft Association), open source software development projects (such as Linux), Wikipedia, the Associated Press, certain jamband communities, medieval guilds, and modern research universities. These examples are illustrative and far from exhaustive. Each involves a constructed cultural commons worthy of independent study, but independent studies get us only so far. A more systematic approach is needed.*

*An improved understanding of cultural commons is critical for obtaining a more complete perspective on intellectual property doctrine and its interactions with other legal and social mechanisms for governing creativity*

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*and innovation, in particular, and information and knowledge production, conservation, and consumption, generally. We propose an initial framework for evaluating and comparing the contours of different commons arrangements. The framework will allow us to develop an inventory of structural similarities and differences among cultural commons in different industries, disciplines, and knowledge domains and shed light on the underlying contextual reasons for such differences. Structured inquiry into a series of case studies will provide a basis from developing theories to explain the emergence, form, and stability of the observed variety of cultural commons and, eventually, to design models to explicate and inform institutional design.*

*The proposed approach would draw upon case studies from a wide range of disciplines. Among other things, we argue that theoretical approaches to constructed cultural commons should consider rules pertaining to membership criteria, contribution and use of pooled resources, internal licensing conditions, management of external relationships, and institutional forms, along with the degree of collaboration among members, sharing of human capital, degrees of integration among participants, and any specified purpose to the arrangement.*

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## INTRODUCTION

The Maine lobster fishery has been recognized as a successful example of a managed natural resource commons. To ensure an ongoing supply of lobster in the face of threats to the fishery from unregulated overfishing, over a period of years Maine lobster fishermen crafted a set of formal and informal rules to determine “who gets the lobster.” By design, the product of their efforts is a commons, a managed-access property regime that allows both lobsters and the lobster industry to flourish.<sup>1</sup>

This Article confronts the theoretical challenge of understanding the governance of what we refer to as constructed commons in the *cultural* environment, in which the resources to be produced, conserved, and consumed are not crustaceans but pieces of information: copyrighted works of authorship, patented inventions, and other forms of information and knowledge that may, but need not, be aligned with formal systems of intellectual property (IP) law. The phrase “constructed cultural commons,” as we use it, refers to environments for developing and distributing cultural and scientific knowledge through institutions that support pooling and sharing that knowledge in a managed way, much as a natural resource commons refers to the type of managed sharing environment for natural resources that the Maine lobster fishery represents. These environments are designed and managed with limitations tailored to the character of those resources and the communities involved rather than left to evolve via market transactions grounded solely in traditional proprietary rights. Just as research on the Maine lobster fishery is grounded in the case study approach used by Elinor Ostrom and her colleagues, this Article develops and argues for the use of a theoretical framework to systematize case study-based research exploring

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<sup>1</sup> See generally JAMES M. ACHESON, CAPTURING THE COMMONS: DEVISING INSTITUTIONS TO MANAGE THE MAINE LOBSTER INDUSTRY (2003) (describing the success of the Maine lobster industry).

the construction of the cultural commons. We borrow from Ostrom in developing our framework, but we necessarily adapt, extend, and distinguish her approach to account for important differences between constructed cultural commons and natural resource commons.

Our approach provides a framework to systematize and unify analyses of various constructed cultural commons that until now have been regarded largely as separate species. We do not claim that all cultural commons work in exactly the same way or that they all solve exactly the same problems or that they all produce exactly the same benefits (or costs). Our claim is precisely the opposite: by aligning case studies of related but distinct commons phenomena, over time we will be able to identify those features of commons that are more and less significant to the success and failure of a commons enterprise. Aligning the empirical study of constructed cultural commons via a framework of structured inquiry will facilitate the development of and choice among theories to explain the existence and structure of the commons currently in existence and provide insights into the interplay between IP law and commons arrangements. Some initial illustrations make the point more vivid.

*Intellectual property pools.* A patent pool is an agreement by two or more patent holders to aggregate and share their patents by cross-licensing.<sup>2</sup> The patents in question typically relate to complementary technologies, where one holder's exercise of patent rights "blocks" a different holder's exercise of related rights. Pooled patents are typically available to all members of the pool and are available to non-members on standard licensing terms.<sup>3</sup> A well-known example of an early patent pool in the United States is the Manufacturer's Aircraft Association (MAA), which formed in 1917 and encompassed nearly all American aircraft manufacturers.<sup>4</sup> The Wright Company and Curtiss Company held major patents on aircraft technology, but Wright and Curtiss did not hold all the relevant patents, and for any given manufacturer the cost of licensing a single needed patent from a competitor might have made manufacturing an airplane prohibitively expensive. During World War I, the United States government needed airplanes at reasonable costs and in a short time. As a result, the government facilitated the implementation of the MAA, a private corporation. The MAA entered into an agreement with airplane manufacturers, through which the manufacturers pooled their patents and their potential claims for exploitation of the patents by rivals and

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<sup>2</sup> See Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting*, in 1 INNOVATION POLICY AND THE ECONOMY 119, 127–28, 134 (Adam B. Jaffe et al. eds., 2000).

<sup>3</sup> See *id.*

<sup>4</sup> See *id.* at 127–28.

agreed to cross-licensing of the patents to one another on what was, essentially, a royalty-free basis.<sup>5</sup> Largely because of this functioning commons of patented inventions, airplanes were built, and the war was won.

*Open source software.* The Linux operating system, an alternative to Windows and Mac OS (the Macintosh operating system), was produced and is still maintained by a volunteer collaborative of individual programmers.<sup>6</sup> The Linux collaborative is linked loosely by communications technologies, by members' voluntary allegiance to the project, and by the terms of an open source license. Unlike proprietary computer programs, which are distributed to users in object code or executable format only, open source programs such as Linux are made available in source code form so that members of the community may modify their copies and, under the terms of the governing license, publish their modifications for use by others. Members of the community may also volunteer their modifications for inclusion in the standard Linux code base. Thus, each member of the Linux community may use material in the Linux commons and may contribute material back to the Linux commons. Each individual member of the community contributes code to the accumulated archive of the Linux kernel, which is the core of the operating system. The rules governing the use of open source material and contributions to the open source commons are partly formal and partly informal. Formally, the software is governed by copyright law, and its use is managed by the terms of the General Public License. Informally, the integrity of Linux as an identifiable and stable program depends on a thin hierarchy of informal authority, which extends from Linus Torvalds at the top to the body of individual developers at the bottom.<sup>7</sup> The result is a complete, complex, and successful industrial product that is built and maintained not by a traditional, hierarchical, industrial firm, but by a loose-knit community.

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<sup>5</sup> See *Mfrs. Aircraft Ass'n, Inc. v. United States*, 77 Ct. Cl. 481, 483–87 (1933); Harry T. Dykman, *Patent Licensing Within the Manufacturer's Aircraft Association* (MAA), 46 J. PAT. OFF. SOC'Y 646, 648–50 (1964); Robert P. Merges, *Contracting into Liability Rules: Intellectual Property Rights and Collective Rights Organizations*, 84 CAL. L. REV. 1293, 1343–46 (1996).

<sup>6</sup> Some of these programmers contribute to the Linux project at the behest of their corporate employers and thus are not volunteers in the strict sense. They are volunteers with respect to the Linux project, however. Their relationship to the Linux community is governed by the same rules as apply to those who participate for other reasons. For an exploration of the governance issues involved in the relationship between open source software projects and commercial firms, see Siobhán O'Mahony & Beth A. Bechky, *Boundary Organizations: Enabling Collaboration Among Unexpected Allies*, 53 ADMIN. SCI. Q. 422, 440 (2008).

<sup>7</sup> A recent book thoroughly examines the organizational structure of open source software projects. See CHRISTOPHER M. KELTY, *TWO BITS: THE CULTURAL SIGNIFICANCE OF FREE SOFTWARE* (2008).

*Wikipedia.* This free, online encyclopedia is widely read and cited. It resembles an open source software project in many respects. Volunteer authors create and edit Wikipedia entries; anyone with Internet access can read and use the contents of Wikipedia.<sup>8</sup> Wikipedia is not the product of unregulated, potentially chaotic openness, however.<sup>9</sup> A governance structure exists among “Wikipedians” that modulates the openness of the project and operates as a kind of law.<sup>10</sup> For example, not all additions and edits to Wikipedia are automatically added to the site. Moreover, the GNU Free Documentation License, the copyright license that governs the contents of Wikipedia, restricts the use of the contents of the site.<sup>11</sup> Wikipedia also has a dispute-resolution system that plays an important role in sustaining the commons.<sup>12</sup> The site is open, but with limits.

*The Associated Press.* For more than a century, the Associated Press (AP) has been the leading American wire service for newspapers.<sup>13</sup> It offers a compelling example of a constructed cultural commons that is not grounded in formal IP rights. As factual material, the news itself cannot be copyrighted (though there is an important but narrow “hot news misappropriation” tort rule<sup>14</sup>). Local newspapers could not afford to cover all of the stories that their readers wanted to read, yet the ease with which news stories can be appropriated served as a disincentive to invest in reporting—a classic free-rider dilemma. The solution was a not-for-profit cooperative, owned by the participant news organizations, which partnered originally with Western Union.<sup>15</sup> Co-

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<sup>8</sup> See Wikipedia, <http://www.wikipedia.org> (last visited Mar. 15, 2010). For discussions of this and other examples of collective production, see OPEN SOURCES 2.0: THE CONTINUING EVOLUTION (Chris DiBona et al. eds., 2005); Michael J. Madison, *Social Software, Groups, and Governance*, 2006 MICH. ST. L. REV. 153.

<sup>9</sup> In part due to perceptions of Wikipedia as unregulated, open, and chaotic, Wikipedia presents a puzzle for scholars. “The most common criticism of Wikipedia over the years stemmed from simple disbelief: ‘That can’t work.’” CLAY SHIRKY, HERE COMES EVERYBODY: THE POWER OF ORGANIZING WITHOUT ORGANIZATIONS 115 (2008). As David Hoffman and Salil Mehra note, “Wikipedia is ‘the canonical bee that flies despite scientists’ skepticism that the aerodynamics add up.’” David A. Hoffman & Salil Mehra, *Wikitruth Through Wikiorder*, 59 EMORY LJ. 151, 155 (2009) (quoting JONATHAN ZITTRAIN, THE FUTURE OF THE INTERNET—AND HOW TO STOP IT 148 (2008)).

<sup>10</sup> See ZITTRAIN, *supra* note 9, at 143–46 (2008).

<sup>11</sup> See Wikipedia: Text of the GNU Free Documentation License, [http://en.wikipedia.org/wiki/Wikipedia:Text\\_of\\_the\\_GNU\\_Free\\_Documentation\\_License](http://en.wikipedia.org/wiki/Wikipedia:Text_of_the_GNU_Free_Documentation_License) (last visited Mar. 9, 2010).

<sup>12</sup> See Hoffman & Mehra, *supra* note 9, at 163–75 (examining the Wiki dispute-resolution system).

<sup>13</sup> See REPORTERS OF THE ASSOCIATED PRESS, BREAKING NEWS: HOW THE ASSOCIATED PRESS HAS COVERED WAR, PEACE, AND EVERYTHING ELSE 18 (2007).

<sup>14</sup> See Int'l News Serv. v. Associated Press, 248 U.S. 215, 239–43 (1918); see also Wendy J. Gordon, *Harmless Use: Gleaning from Fields of Copyrighted Works*, 77 FORDHAM L. REV. 2411, 2421–23 (2009) (discussing the structure of the tort doctrine).

<sup>15</sup> See Stephen Shmanske, *News as a Public Good: Cooperative Ownership, Price Commitments, and the Success of the Associated Press*, 60 BUS. HIST. REV. 55, 56–57, 59 n.3 (1986).

operative members could both upload to the wire service material that they originated locally and download from the wire service material that other members produced.<sup>16</sup> Local papers were able to carry AP reports on national and international news that they otherwise could not have afforded to produce. The AP itself was a structured commons managed by its members.

*Jamband fan communities.* Musical groups known as jambands “jam,” or improvise heavily, during live performances. Beginning with fans of the first and best-known jamband, the Grateful Dead, jamband fan communities have long been encouraged by the artists themselves to produce and share their own concert recordings. These recordings initially were shared via physical media and now are shared using on-line archives (organized via the website and organization etree.org).<sup>17</sup> The bands encourage this sharing, provided that the fans comply with informal rules that are set by the bands and honored and policed by the fan communities themselves.<sup>18</sup> For example, as Mark Schultz describes in his detailed case study of the jamband phenomenon, fan communities generally undertake not to interfere with commercial exploitation of the bands’ own concert recordings.<sup>19</sup> The commons of jamband recordings is structured not merely by fan expectations that norms will be honored but also by file sharing and archiving technologies that reinforce the commercial/noncommercial distinction, by intermediary institutions that host jamband archives, and by the bands, which cooperate with and nurture their fan communities.<sup>20</sup>

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16 For histories of the AP, see REPORTERS OF THE ASSOCIATED PRESS, *supra* note 13; Shmanske, *supra* note 15; The Associated Press, AP History/Corporate Archives, <http://www.ap.org/pages/about/history/history.html> (last visited Mar. 11, 2010). The thumbnail sketch presented above necessarily omits important details about the history of the AP, including allegations that its content was biased politically and that it behaved monopolistically, as well as information about its current, troubled state. On its history, see ALEXANDER JONES, HISTORICAL SKETCH OF THE ELECTRIC TELEGRAPH: INCLUDING ITS RISE AND PROGRESS IN THE UNITED STATES (New York, George P. Putnam 1852), and Margaret A. Blanchard, *The Associated Press Antitrust Suit: A Philosophical Clash over Ownership of First Amendment Rights*, 61 BUS. HIST. REV. 43 (1987). On its current struggles, see Richard Pérez-Peña, *Some Papers in Financial Trouble Are Leaving the A.P. to Cut Costs*, N.Y. TIMES, Oct. 20, 2008, at B1. Any accounting of the history of the AP should include its rivalry with United Press and the International News Service, which merged in the 1950s to form United Press International. See RICHARD M. HARNETT & BILLY G. FERGUSON, UNIPRESS: COVERING THE 20TH CENTURY (2003).

17 See Mark F. Schultz, *Fear and Norms and Rock & Roll: What Jambands Can Teach Us About Persuading People to Obey Copyright Law*, 21 BERKELEY TECH. L.J. 651, 674, 679 n.116 (2006); see also etree.org, <http://www.etree.org> (last visited Mar. 18, 2010).

18 See Schultz, *supra* note 17, at 653, 658.

19 See *id.* at 675–76.

20 See *id.* at 679–80.

These examples are illustrative of constructed cultural commons phenomena studied in isolation from each other.<sup>21</sup> At first glance, these examples may appear to be disparate and unrelated—like comparing apples to oranges to plums to pears, and so forth. Standing alone, each example is important and worth studying. Nonetheless, a systematic, comprehensive, and theoretically informed research framework offers significant potential for learning within and across these commons phenomena.<sup>22</sup>

The framework described in this Article provides a means to investigate the social role and significance of cultural commons institutions. This investigation is relevant to property law, in particular, and social ordering, more generally. The conventional view of property scholars, particularly those with interests in IP law, is that resource production and consumption are—and ought to be—characterized primarily by entitlements to individual resource units, held individually and allocated via market mechanisms.<sup>23</sup> To the extent that those market mechanisms are inadequate to optimize the welfare of society—in other words, in the event of market failure—government intervention may be appropriate. Intellectual property rights themselves are generally justified on precisely this basis.<sup>24</sup> Creative works and new inventions are characterized as public goods, whose intangibility prevents their originators from excluding potential users and thus recouping their investments via pricing.<sup>25</sup> Copyright and patent laws create artificial but legally sanctioned forms of exclusion, restoring a measure of market control to creators and innovators. Communal and collectivist institutions, particularly those that blend informal normative structures with formal government rules, are gen-

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<sup>21</sup> To illustrate the potential breadth of the concept of the constructed cultural commons, we note a few additional examples, such as (i) medieval guilds, which provided a structured environment for sharing expert trade knowledge among members, see Robert P. Merges, *From Medieval Guilds to Open Source Software: Informal Norms, Appropriability Institutions, and Innovation* 14 (Conference on the Legal History of Intellectual Property, Working Paper, 2004), available at <http://ssrn.com/abstract=661543>; (ii) the modern research university and the departmental and disciplinary structures that lie within it and above it, see Michael J. Madison, Brett M. Frischmann & Katherine J. Strandburg, *The University as Constructed Cultural Commons*, 30 WASH. U. J.L. & POL'y 365 (2009); and (iii) the Request for Comments (RFCs) series that defines the technical protocols of the Internet, see RFC Editor Homepage, <http://www.rfc-editor.org> (last visited Mar. 11, 2010). For other historical examples of technological commons, see Robert C. Allen, *Collective Invention*, 4 J. ECON. BEHAV. & ORG. 1 (1983).

<sup>22</sup> See *infra* Part I. Likewise, pomology, the study of fruit, offers something more than studying apples, oranges, plums, and pears independently.

<sup>23</sup> See Merges, *supra* note 21, at 4–7.

<sup>24</sup> See Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 TEX. L. REV. 1031, 1073 (2005).

<sup>25</sup> See *id.* at 1050–55.

erally regarded as exceptional and dependent upon preexisting property entitlements.<sup>26</sup>

The framework for collecting and analyzing case studies of constructed cultural commons across a wide range of domains that we describe below offers a method for assessing the validity of this property-focused narrative. We suspect that over time the constructed cultural commons framework will yield a far larger and richer set of commons cases in the cultural context than one might discover by focusing only on patent law or scientific research or software development. We anticipate that social ordering both depends on and generates a wide variety of formal and informal institutional arrangements, and that the logical and normative priority assigned to proprietary rights and government intervention may turn out to be misplaced.

Part I of this Article describes prior approaches to theoretical understanding of intellectual production based on juxtaposition of IP regimes with a conception of the public domain. It highlights how recent case studies demonstrate the need for a more textured theoretical approach. Part II introduces the Institutional Analysis and Development framework pioneered by Elinor Ostrom in the natural resources context and presents our proposed adaptation of the framework to constructed cultural commons.

## I

### THE BACKDROP: INTELLECTUAL PROPERTY THEORY, COMMONS, AND THE NEED FOR A RESEARCH FRAMEWORK

This Part reviews our motivation to produce the constructed cultural commons framework and highlights the key theoretical regimes to which the framework connects. We explain why a research framework is needed in this domain and justify the type of framework and case study-driven approach we develop in Part II. We begin with a discussion of IP law and the theoretical problems and solutions that typically characterize IP regimes. In particular, we explain the conventional functionalist account of intellectual property, highlight some of its flaws, and suggest that a more nuanced functional account is needed to better understand the cultural environment. Next, we explain why the functionalist approach of Ostrom and her colleagues,

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<sup>26</sup> Carol M. Rose, *Big Roads, Big Rights: Varieties of Public Infrastructure and Their Impact on Environmental Resources*, 50 ARIZ. L. REV. 409, 423–28 (2008) [hereinafter Rose, *Big Roads*] (emphasizing the idiosyncratic character of “community-based property rights structures”); Carol Rose, *The Comedy of the Commons: Custom, Commerce, and Inherently Public Property*, 53 U. CHI. L. REV. 711, 718–23 (1986) [hereinafter Rose, *Comedy*] (describing “inherently public property” in the context of an “exception to the general rule favoring private property”).

developed in the context of the natural environment, provides a useful starting point but needs adjustment to account for differences between the natural environment and the cultural environment. Finally, we suggest that narrative and metaphorical accounts of property institutions and social ordering might complement a functional approach and enrich the constructed-cultural-commons framework we develop in Part II.

### A. Functionalist Intellectual Property Theory and Its Limits

Intellectual property law scholarship has typically viewed invention, creative expression, innovation, and related or subsidiary activities (such as research and development) as a special set of practices for which extra encouragement is warranted. Despite considerable variation and nuance, these activities all can be understood to present a simple core problem: as public goods, the “output” from these activities—whether described as information, expression, invention, innovation, research, ideas, or otherwise—is naturally nonrivalrous, meaning that consumption of the resource does not deplete the amount available to other users, and nonexcludable, meaning that knowledge resources are not naturally defined by boundaries that permit exclusion of users.<sup>27</sup> As a result, such resources

face the well-known supply-side problem, common to public goods: the inability to (cheaply) exclude competitors and nonpaying consumers (free riders) presents a risk to investors perceived *ex ante* (prior to production of the good), and this risk *may* lead to under-supply. Essentially, in the absence of [some institutional solution], there would be a significant underinvestment in (some types of) [intellectual resources] because of the risk that competitors would appropriate the value of the [resources].<sup>28</sup>

Two standard solutions to this problem are IP rights and government subsidies. These solutions heavily influence the framing and perception of the cultural environment.

As a result, the conventional functionalist approach to information law and policy divides the information environment into two domains. First, there is the domain of exclusion, in which producers of

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<sup>27</sup> On the public-good nature of intellectual resources (ideas, information, expression, and knowledge), see Brett M. Frischmann & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257, 272–73 (2007). On how those resources generate different types of externalities, see Brett M. Frischmann, *Speech, Spillovers, and the First Amendment*, 2008 U. CHI. LEGAL F. 301, 310–21; Frischmann & Lemley, *supra*, at 258–61. On public goods and externalities generally, see RICHARD CORNES & TODD SANDLER, THE THEORY OF EXTERNALITIES, PUBLIC GOODS, AND CLUB GOODS 40–43 (2d ed. 1996) (describing externalities as the absence of markets and the effect of externalities on property rights).

<sup>28</sup> Brett M. Frischmann, *The Pull of Patents*, 77 FORDHAM L. REV. 2143, 2156 (2009) (footnote omitted).

creative and innovative things employ proprietary rights sanctioned by law to control their development, distribution, and exploitation. Private rights and private market exchange serve to limit, by law, the natural shareability of knowledge and innovation. At the core of IP law, as traditionally conceived, is the right to exclude, without which it is assumed that some producers would abandon their efforts for fear of free riding (unlicensed sharing) by competitors.<sup>29</sup> Without exclusion, competition facilitated by sharing would undermine incentives to invest in the production, development and/or dissemination of some resources in the first place. Intellectual property law constructs and assigns these exclusive rights and encourages their exploitation through market exchange.

Second, there is the public domain, a vast collection of openly accessible resources for which exclusion is disallowed under existing intellectual property systems (for example, due to express exclusion from the system<sup>30</sup> or expiration of rights<sup>31</sup>) or not practiced (for example, because potential owners dedicate their resources to the public or because exclusion is practically impossible).<sup>32</sup> For some types of resources, overconsumption and underinvestment problems associated with unlicensed sharing are solved through direct or indirect provisioning by the public sector using a combination of grants to researchers; tax credits or subsidies to researchers and enterprises that employ them; prizes; and production and distribution of knowledge and innovation by the government itself, either by organizing research enterprises or by purchasing and distributing private research. These alternative solutions often, though not always, supply resources to the public domain.<sup>33</sup>

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29 See *id.*

30 See, e.g., 17 U.S.C. §§ 102, 107 (2006) (providing for limits on the scope of copyrightable subject matter and for the fair use defense); 35 U.S.C. §§ 101, 102, 103 (2006) (providing for limits on the scope of patentable subject matter); *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) (noting that the laws of nature, physical phenomena, and abstract ideas are not patentable); see also WILLIAM M. LANDES & RICHARD A. POSNER, THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW 147–66, 302–10 (2003) (discussing limits on copyright and patent); Frischmann & Lemley, *supra* note 27, at 284–93 (same).

31 See U.S. CONST. art. I, § 8, cl. 8 (“limited times”); 17 U.S.C. § 302 (establishing the duration of a copyright); 35 U.S.C. § 154(a)(2) (establishing the duration of a patent).

32 See Pamela Samuelson, Lecture, *Enriching Discourse on Public Domains*, 55 DUKE L.J. 783, 816–28 (2006) (exploring dedication to the public domain).

33 Consider, for example, university patenting of federally funded research. See, e.g., CAPITALIZING KNOWLEDGE: NEW INTERSECTIONS OF INDUSTRY AND ACADEMIA (Henry Etzkowitz et al. eds., 1998); INDUSTRIALIZING KNOWLEDGE: UNIVERSITY-INDUSTRY LINKAGES IN JAPAN AND THE UNITED STATES (Lewis M. Branscomb et al. eds., 1999); Ajay Agrawal, *University-to-Industry Knowledge Transfer: Literature Review and Unanswered Questions*, 3 INT'L J. MGMT. REV. 285 (2001); Wesley M. Cohen et al., *Industry and the Academy: Uneasy Partners in the Cause of Technological Advance*, in CHALLENGES TO RESEARCH UNIVERSITIES 171 (Roger G. Noll ed., 1998); Rebecca S. Eisenberg, *Public Research and Private Development: Patents and Technology Transfer in Government-Sponsored Research*, 82 VA. L. REV. 1663 (1996); J.H.

The conventional functionalist paradigm is woefully inadequate as a descriptive matter.<sup>34</sup> Essentially, it is a caricature—an oversimplified account that roughly describes some cultural practices and productive activities but leaves much too much out of frame, unexamined, and unaccounted for. (Consider, for a moment, how many creative and inventive activities involve much more than “public goods production” or how often participation in such activities is outside of and inexplicable in terms of IP incentives or government subsidies.) We further explain this view below, but first we must emphasize how much rests on the descriptive account: it shapes—if not determines—the set of baseline premises that undergird the legal and social institutions that structure the cultural environment and shape normative outcomes. Although our undertaking is emphatically positive and descriptive, we believe significant normative implications should flow from a better understanding of the cultural environment.<sup>35</sup>

Over the last decade, scholars increasingly have recognized that many of the most interesting and important aspects of the information environment exist in the area between these private and public extremes precisely because of what Brett Frischmann and Mark Lemley characterize as “spillovers”: social benefits that flow from uses and reuses of information resources and sustain the dynamic character of the information environment.<sup>36</sup> The information environment is riddled with so-called “semicommons”<sup>37</sup>—complex combinations of private rights and commons, some of which are constructed at the “macro, system level” of law,<sup>38</sup> and some of which are constructed at the “micro, contextual level” of cultural commons.

At the macro level, the rights of exclusion that comprise the default regimes of patent and copyright law are, by design, not absolute. Intellectual property regimes moderate their exclusionary principles with limitations and exceptions. In part, those limitations and exceptions are designed to construct a public domain of resources that are

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Reichman & Paul F. Uhlig, *A Contractually Reconstructed Research Commons for Scientific Data in a Highly Protectionist Intellectual Property Environment*, 66 LAW & CONTEMP. PROBS. 315 (2003).

<sup>34</sup> See, e.g., Julie E. Cohen, *Creativity and Culture in Copyright Theory*, 40 U.C. DAVIS L. REV. 1151, 1155–62 (2007).

<sup>35</sup> See Brett M. Frischmann, *Cultural Environmentalism and The Wealth of Networks*, 74 U. CHI. L. REV. 1083, 1084–85 (2007) (reviewing YOCHAI BENKLER, *THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM* (2006)).

<sup>36</sup> See Frischmann, *supra* note 27, at 310–21; Frischmann & Lemley, *supra* note 27, at 268–71, 282–84.

<sup>37</sup> See Henry E. Smith, *Semicommon Property Rights and Scattering in the Open Fields*, 29 J. LEGAL STUD. 131 (2000). Henry Smith gives the example of a highway, which is a commons in that its most significant aspect is its openness to all users—yet the individual driver has private rights with respect to the moving portion that his vehicle occupies. *Id.* at 132.

<sup>38</sup> Frischmann and Lemley explain how copyright and patent law are semicommons. See Frischmann & Lemley, *supra* note 27, at 282, 284–85, 290–91.

open and freely available to all,<sup>39</sup> and in part, they support public capabilities to use resources in ways that generate spillovers.<sup>40</sup>

In addition to these macro-constructions, intellectual property rules also are used at a micro-level, in conjunction with contracts and social norms, to construct a wide variety of semicommons or limited commons of cultural resources that are partly open and partly closed, usable by members and sometimes by the public at large, though not always on a purely “free” basis. Examples include such diverse institutions as public lending libraries and open source software programs. Default rules of intellectual property thus may be combined with licenses and contracts, with social norms, and with cultural and other institutional forms to construct these cultural commons, which depend on—but are built alongside and on top of—the basic forms of knowledge and culture, on the one hand, and intellectual property rules, on the other hand.

## B. Commons in Culture and the Need for a Research Framework

Our focus on constructed cultural commons emerges from the proposition that cultural production is an inherently social phenomenon, taking place over a wide range of scales and within a complex, overlapping variety of formal and informal institutional structures.<sup>41</sup> Indeed, social production of cultural goods has become more salient and more economically important as a result of globalization and the communications revolution symbolized by the Internet.<sup>42</sup> We are thus beginning to grapple with the realization that legal facilitation of innovation and creative production is not—and cannot—be confined to a simple set of property rules to incentivize individual innovative and creative efforts. Innovation and creativity are matters of governance of a highly social cultural environment. The question for both public policy and legal theory becomes how best to use legal and other tools

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<sup>39</sup> On the public domain, see generally Samuelson, *supra* note 32 (exploring various conceptions of the public domain).

<sup>40</sup> See Frischmann & Lemley, *supra* note 27, at 286–88 (explaining fair use in these terms); Michael J. Madison, *Rewriting Fair Use and the Future of Copyright Reform*, 23 CARDOZO ARTS & ENT. L.J. 391, 409 (2005) (“Fair use is fair, after all, because (we assume) that it generates social benefits that the market can’t otherwise produce.”).

<sup>41</sup> Cultural works and information goods have always been socially constructed in many senses, meaning that they do not arise “naturally” or inevitably but, instead, are the products of human actions and interactions with each other, social institutions and systems, and the physical environment. The traditional, economically inspired realm of production around which intellectual property protection is designed cannot be treated as independent of the larger cultural environment within which it is situated. On the legal construction of cultural things, see Michael J. Madison, *Law as Design: Objects, Concepts, and Digital Things*, 56 CASE W. RES. L. REV. 381, 447–63 (2005).

<sup>42</sup> See BENKLER, *supra* note 35, at 466–67 (2006); Frischmann, *supra* note 35, at 1107–10 (reviewing BENKLER, *supra* note 35).

to encourage the growth and persistence of creative, sustainable, and equitable cultural environments.<sup>43</sup>

Much of the scholarly debate in IP law has pitted proponents of privatization as a means of incentivizing production of intellectual goods against proponents of a widely available public domain upon which cultural goods can be built. The discussion has often devolved into a disagreement over the relative importance of incentives and access for production of ideas and creative expression.<sup>44</sup> As technology has evolved to facilitate an increasingly extensive, varied landscape of social and cooperative projects that enable creativity and innovation, a third perspective has emerged. Books, articles, and scholarly discussion of such projects, of which open source software has become the poster child, increasingly extol community production as a solution to the free-rider problems of cultural production.<sup>45</sup> The danger is that the amorphous idea of “community production” will become the new one-size-fits-all panacea approach in rivalry with privatization, public subsidy, and the public domain.

Fortunately, ours is not the first scholarly enterprise to confront the realization that common-property regimes are more complex and various than had been appreciated. A group of scholars of commons regimes in the natural environment, spearheaded by Ostrom and her collaborators, has eschewed a simplistic approach and developed a framework for synthesizing studies of various and diverse natural resource commons. We argue that now is the time to recognize that the lessons learned by these scholars of the natural environment caution against an overly simplistic view of community cultural production.<sup>46</sup> The primary lesson of their years of case studies of commons regimes, which culminated in Ostrom receiving the 2009 Nobel Prize in Economics,<sup>47</sup> is that the devil is in the details. Complex environments

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<sup>43</sup> We use the term “cultural environment” advisedly, following the work of James Boyle. See James Boyle, *A Politics of Intellectual Property: Environmentalism for the Net?*, 47 DUKE L.J. 87, 108–12 (1997). The environmental metaphor should not lead scholars to rely uncritically on the assumption that there is anything “natural” about the cultural environment. As we discuss, one of the most important differences between natural resource commons and cultural commons is the degree to which cultural resources are manufactured, both by humans and by law. Natural resources, typically, are given. Yet we also caution against going too far in the other direction. Although the natural environment is given and not made by humans, it is continuously and unavoidably affected by humans and, in a sense, made and remade and unmade with irreversible consequences through those interactions. And although the cultural environment is always made by humans, it is also inherited, subject to considerable path dependencies that can have irreversible consequences, and contingent on human interactions with the physical environment.

<sup>44</sup> See, e.g., LANDES & POSNER, *supra* note 30, at 11–12.

<sup>45</sup> See, e.g., BENKLER, *supra* note 35, at 36–37; SHIRKY, *supra* note 9, at 240–53.

<sup>46</sup> Cf. Elinor Ostrom et al., *Going Beyond Panaceas*, 104 PROC. NAT'L ACAD. SCI. U.S. 15176 (2007) (arguing against oversimplification and reflexive appeal of panaceas).

<sup>47</sup> Professor Ostrom’s citation in connection with her recent receipt of the 2009 Nobel Memorial Prize in Economic Sciences focuses on “her analysis of economic govern-

demand a more contextual empirical and theoretical approach.<sup>48</sup> The complexity of natural and cultural environments and the futility of analyzing them with one-size-fits-all theories or legal approaches create the challenge of developing appropriate conceptual understanding and policy prescriptions. Here is where and why we think that an adaptation of Ostrom's approach to the systematized study of natural resource commons may be particularly helpful for intellectual property scholarship.

As we describe in detail in Part II.A, Ostrom's approach represents a starting point, but one that requires significant modifications. Those modifications, discussed in Part II.B, are woven into the baskets of questions we propose to use to interrogate constructed cultural commons. Those baskets of questions reflect an intentional reliance on two approaches to intellectual property that are sometimes thought to conflict: a functionalist account and a metaphorical or narrative approach.

The functionalist aspect of our proposed framework mirrors the functionalist approach that Ostrom and her colleagues take with respect to regimes governing the sharing and exploitation of natural resources. Despite the many virtues of functionalist accounts, their focus on a handful of variables or factors often limits them. A focus on excludability as a solution to public goods problems can lead to isolated analysis of boundary problems.<sup>49</sup> A focus on appropriability mechanisms may lead to narrow analysis of resource definition issues. A focus on transaction costs may lead to myopic consideration of in-

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ance, especially the commons.” The Nobel Foundation, The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2009, [http://nobelprize.org/nobel\\_prizes/economics/lauriates/2009/index.html](http://nobelprize.org/nobel_prizes/economics/lauriates/2009/index.html) (last visited Mar. 9, 2010).

<sup>48</sup> Our point coincides well with J.B. Ruhl’s work on the uses of complexity theory in environmental regulation. See JOHN COPELAND NAGLE & J.B. RUHL, THE LAW OF BIODIVERSITY AND ECOSYSTEM MANAGEMENT 335–61 (2d ed. 2006); J.B. RUHL ET AL., THE LAW AND POLICY OF ECOSYSTEM SERVICES 18–20 (2007); J.B. Ruhl, *Complexity Theory as a Paradigm for the Dynamical Law-and-Society System: A Wake-Up Call for Legal Reductionism and the Modern Administrative State*, 45 DUKE L.J. 849, 867–73 (1996).

<sup>49</sup> In a recent article, Frischmann argued that a myopic focus on excludability leads to biased analyses:

[P]ossible free riding drives analysts to focus on supply-side considerations, and more specifically, to correct market-driven supply problems by designing property-based institutions to lessen the costs of exclusion and minimize free riding. As I have argued elsewhere, nonexcludability is not a necessary condition for market failure; markets may fail for many other reasons. Nor, however, does exclusion fix all market failures. In fact, exclusion may aggravate other failures of the market. Even if an owner can exclude users from a nonrival resource and therefore meter use by charging a fee, dynamic inefficiencies still may abound. Simply put, property rights and other institutions that lessen the costs of exclusion and facilitate market-driven provision of nonrival goods are no panacea.

Brett M. Frischmann, *An Economic Theory of Infrastructure and Commons Management*, 89 MINN. L. REV. 917, 948–49 (2005) (footnotes omitted).

formation-forcing and limiting mechanisms. Such approaches can effectively highlight strengths and weaknesses of policy prescriptions in their respective domains, but these approaches frequently fail to deal adequately with systemic issues or with dynamic changes. Ostrom's approach to natural resource commons addresses the limitations of functionalism by expanding the number of variables considered.

In the context of the cultural environment, the sharing/exclusion and cooperation/competition dichotomies present especially interesting and challenging puzzles to a functionalist approach. This is so for three reasons.

First, those who create, invent, innovate, and participate in similar intellectually driven, productive activities necessarily borrow from or share with others.<sup>50</sup> It is impossible to divest oneself of that to which one has been exposed. Inevitably, the intellectual products of past and contemporary "producers" (a term that we use as a shorthand to refer to creators, inventors, innovators, thinkers, and the like) serve as inputs into each of our own productive activities. We necessarily borrow and share. Second, as discussed above, the resources that shape the cultural environment are by their nature naturally nonrivalrous and nonexcludable, meaning that knowledge resources are not naturally defined by boundaries that permit exclusion of users.<sup>51</sup> Third, unlike resources in the natural world, resources of information and expression must be created before they can be shared. Because of the public goods character of these resources, a cultural commons must manage both use and production of cultural resources.

These features of cultural resources, practices, and environment add to the range of variables that must be considered when studying commons institutions. Moreover, although natural resource management often focuses on sustainability, in the cultural commons the goal generally goes beyond sustainability to innovation, growth, and progress.<sup>52</sup> This shift in focus means that in assessing any particular constructed-cultural-commons arrangement, we must expand the

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<sup>50</sup> Frischmann & Lemley, *supra* note 27, at 258–61.

<sup>51</sup> On the point that these resources have no natural boundaries and that, as a result, boundaries are necessarily constructed, see Frischmann & Lemley, *supra* note 27, at 274; Madison, *supra* note 41, at 401–04.

<sup>52</sup> Progress in the cultural environment should not be equated with innovation or economic growth. Progress may encompass much more. See Margaret Chon, *Postmodern "Progress": Reconsidering the Copyright and Patent Power*, 43 DEPAUL L. REV. 97, 101–03 (1993) (arguing that the definition of "progress" is socially constructed and should be shaped by social values and human priorities); Frischmann, *supra* note 35, at 1095–96 (arguing that "we know too little about that which we seek to promote" with intellectual property, that the functionalist approach to intellectual property follows from an impoverished view of the cultural environment, and that "[w]e might, for example, imagine Progress as measured by the degree of participation in creative and inventive activities").

framework used in studying natural resources to consider not only how resources are managed and shared within the community but also how and if resources are *created within* and *transferred outside* of the community. Dynamic effects are central to this analysis. The constructed-cultural-commons framework we propose in Part II reflects these functionalist distinctions between Ostrom's approach to natural resource commons and our modified approach to intellectual-resource institutions.

A second and equally important way to address the limitations of functionalist theory in the cultural commons context is to examine a system of social ordering in expressive terms rather than purely functional terms, looking to the construction and evolution of meaning in the system, as reflected in symbol and narrative. In proper proportion, a humanistic and metaphorical inquiry into information policy, on one hand, and a functional approach grounded in social science models, on the other hand, are complementary and can be effectively unified in a framework of research questions to yield accurate descriptive summaries of commons phenomena and eventual policy prescriptions.

We draw on narrative and metaphorical approaches to legal and sociological questions, specifically by examining the metaphorical dimensions of the information "environment" and the knowledge "commons."<sup>53</sup> The environmental metaphor for information law and

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<sup>53</sup> Scholars of many stripes have focused increased attention over the last decade on the role of language and metaphor in structuring analysis of legal and policy problems, both in connection with IP law and otherwise. For a recent review of the Law and Literature movement, see Bernadette Meyler, *The Myth of Law and Literature*, 8 LEGAL ETHICS 318 (2005) (reviewing THANE ROSENBAUM, THE MYTH OF MORAL JUSTICE: WHY OUR LEGAL SYSTEM FAILS TO DO WHAT'S RIGHT (2004)) (suggesting that Law and Literature should focus on the role of literature in understanding the institutions of law). Other scholars have emphasized connections between language and metaphor, on the one hand, and cognitive processes that drive behavior and experience, on the other hand. See GEORGE LAKOFF & MARK JOHNSON, METAPHORS WE LIVE BY 3–6 (1980). James Boyle focuses on the rhetoric of authorship and invention metaphors in order to expose the political character of property law. See Boyle, *supra* note 43, at 87–91. Carol Rose focuses on narratives of property law to demonstrate the essentially social character of the law. See CAROL M. ROSE, PROPERTY AND PERSUASION: ESSAYS ON THE HISTORY, THEORY, AND RHETORIC OF OWNERSHIP 35–42 (1994). A number of intellectual property scholars draw on environmental and spatial metaphors in their discussions of information law and policy. See, e.g., Frischmann, *supra* note 35, at 1084–85, 1088–97 (reviewing the use of cultural environmentalism as a metaphor in information policy discussions and arguing that, to be analytically useful, "we need to know more about what the cultural environment is, how it works, how it is constructed, how we interact with it, how we change it, how we are a part of it, and how it relates and interacts with other environments"); David Lange, *Recognizing the Public Domain*, 44 LAW & CONTEMP. PROBS. 147, 158–59 (1981) ("[T]he law of trademarks . . . has begun to spill over its boundaries and encroach into territories in which trademark protection amounts to trespass."); Michael J. Madison, *Legal-Ware: Contract and Copyright in the Digital Age*, 67 FORDHAM L. REV. 1025, 1029 (1998) (discussing "open space"); Samuelson, *supra* note 32, at 804–05 (describing the public domain).

policy—focusing on cultural and knowledge resources rather than physical or natural resources—offers an especially illuminating and useful starting point for our project. Relying on this metaphor offers the ability to explore connections within and between interconnected and interdependent natural and constructed resource systems; to differentiate growth and progress from stewardship, conservation, and sustainability; to describe the differences between natural and constructed environments and the differences between open and closed or “gated” or “managed” environments; to describe different versions of concepts based on adjacent metaphors, such as the public domain and the commons; to identify and describe important patterned behaviors that correspond to different kinds of environments; and to draw lessons from a variety of regulatory and governance structures in other environmental contexts (public and private, legislative and administrative, oriented toward individual entitlements and collectivist, and so forth).

The environmental metaphor also illuminates the importance of the nesting process that Ostrom identifies as a salient feature of commons.<sup>54</sup> By “nesting,” we mean that a particular commons phenomenon might be analyzed at many levels; these levels may interact strongly with one another. One of the issues that must be resolved in any particular inquiry is the appropriate level of complexity at which a particular commons should be studied. Ostrom analogizes this nested analysis to a set of maps at different levels of detail,<sup>55</sup> such as one sees when using the zoom function in Google Maps.<sup>56</sup> All of these maps are accurate, but the usefulness of a particular map depends on the question one seeks to answer. Moreover, some questions can be answered by focusing only at street level, while others may require zooming back and forth to different levels. Similarly, analyzing a commons institution may require more or less detailed knowledge of the larger cultural institutions within which it resides.

This Article begins to explore how this nesting process can and should be examined in the cultural context. Our combined functionalist and expressive framework is deliberately intended for application to the cultural commons in environments that are structured not only by IP law but also by other legal rules, such as the rules of contract and license, and by informal cultural institutions and social practices. A structured inquiry is needed to make progress in understanding the complex and diverse commons arrangements that may be constructed in the cultural environment.

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<sup>54</sup> ELINOR OSTROM, *UNDERSTANDING INSTITUTIONAL DIVERSITY* 58–62 (2005).

<sup>55</sup> *Id.* at 8.

<sup>56</sup> See Google Maps, <http://maps.google.com> (last visited Mar. 26, 2010).

## II

DEVELOPING A FRAMEWORK FOR THE STUDY OF COMMONS IN  
THE CULTURAL ENVIRONMENT

This Part sets out our proposed framework for analyzing constructed cultural commons using a case study approach.

A. Learning and Building from Ostrom's Institutional Analysis and Development Framework

As discussed above, we base our proposed framework on the work of the political scientist Ostrom and her colleagues, who have for decades been studying commons in the natural resource environment.<sup>57</sup> Examples include not only the lobster fishery with which we began the Article but also numerous instances of grazing pastures, forests, and irrigation systems.<sup>58</sup> In each case, a similar underlying problem was diagnosed: what property scholars, following Garrett Hardin, refer to as a "tragedy of the commons."<sup>59</sup> Given a pool of physical resources that is presumptively open to all comers, such as a meadow for grazing sheep, and absent a mechanism for coordinating the actions of resource users, that is, the owners of the sheep, resources are likely to be overconsumed and underproduced.<sup>60</sup> Eventually, the pool will collapse under the weight of individuals acting rationally in pursuit of their own self-interest, without regard for the costs imposed on other existing and future resource users. The tragedy of the commons illustrates a standard externality problem that manifests a failure of collective action.<sup>61</sup>

This argument is often coupled with an argument that such "tragic" situations give rise to solutions grounded in regimes of exclusionary property rights.<sup>62</sup> The leading alternative to privatization and

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<sup>57</sup> See, e.g., Elinor Ostrom, *A Diagnostic Approach for Going Beyond Panaceas*, 104 PROC. NAT'L ACAD. SCI. U.S. 15181, 15181 (2007) (studying the problems of overuse or destruction of resources in social-ecological systems).

<sup>58</sup> See, e.g., ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION 58–88 (1990) (describing commons case studies).

<sup>59</sup> E.g., Rose, *Big Roads*, *supra* note 26, at 411; see also Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243 (1968).

<sup>60</sup> See Hardin, *supra* note 59, at 1244.

<sup>61</sup> The tragedy of the commons can be explained in terms of externalities, as a collective-action problem, or in game-theory terms as a prisoners' dilemma. See, e.g., Wayne Eastman, *Telling Alternative Stories: Heterodox Versions of the Prisoners' Dilemma, the Coase Theorem, and Supply-Demand Equilibrium*, 29 CONN. L. REV. 727, 749–51 (1997) (describing the tragedy of the commons as a "multi-person Dilemma").

<sup>62</sup> See Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347, 348 (1967); Brett M. Frischmann, *Evaluating the Demsetzian Trend in Copyright Law*, 3 REV. L. & ECON. 649, 660 (2007); Harold Demsetz, *Frischmann's View of "Toward a Theory of Property Rights,"* 4 REV. L. & ECON. 127, 127–28 (2008); see also R.H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 43–44 (1960) (adding well-defined property rights to the menu of options for dealing with externalities).

allocation of property rights via markets is government intervention and regulation.<sup>63</sup> A key insight of Ostrom's approach to the natural environment was recognition of the important role for institutions intermediate between private property and the state in solving problems of collective action.<sup>64</sup> These intermediate institutions are sometimes called "common property" or "limited commons" and generally are collective (but not necessarily governmental or even formal) means for sharing and making productive and sustainable use of resources such as fish, water, trees, and so forth.<sup>65</sup> The research of Ostrom and other scholars demonstrates that solutions to these resource-sharing problems are various and highly contextual. Standard theoretic models, whether or not grounded in the presumption that a tragedy of the commons is present, can therefore be only the beginning of a much more complex analysis. The temptation to seek out regulatory panaceas based on universal models, whether through private property, state action, or even notions of community, must be resisted in favor of a more nuanced approach.<sup>66</sup>

In response to the inadequacy of one-size-fits-all approaches, Ostrom's method for systematizing the investigation of commons regimes focuses on the nested, multitier character of the natural resource commons.<sup>67</sup> Her Institutional Analysis and Development (IAD) framework is used to structure a common set of research questions to apply in diverse contexts, with the eventual goal of coming to some conclusions about the significance and interactions of various factors in facilitating effective management of common resources.<sup>68</sup> Our objective is to do the same in the cultural context.

To implement the IAD framework, Ostrom and her collaborators employed a three-pronged approach:

- First, they engaged in a broad range of case studies of natural resource commons to form a basis for a bottom-up practice-based taxonomy of successful and unsuccessful approaches to resource management.
- Second, they developed a framework, based on the initial case studies, for identifying the variables that are significant in deter-

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<sup>63</sup> See CORNES & SANDLER, *supra* note 27, at 68, 72–78; ARTHUR CECIL PIGOU, THE ECONOMICS OF WELFARE 29–30 (Transaction Publishers 2002) (1952).

<sup>64</sup> See OSTROM, *supra* note 58, at 103.

<sup>65</sup> See *id.* at 88–90.

<sup>66</sup> See generally Elinor Ostrom & Charlotte Hess, *A Framework for Analyzing the Knowledge Commons*, in UNDERSTANDING KNOWLEDGE AS A COMMONS: FROM THEORY TO PRACTICE 41 (Charlotte Hess & Elinor Ostrom eds., 2007) (describing relevance of Institutional Analysis and Development framework to studies of knowledge and information commons); Ostrom et al., *supra* note 46.

<sup>67</sup> See Ostrom et al., *supra* note 46.

<sup>68</sup> See Ostrom, *supra* note 57, at 15181–82.

mining the success or failure of a commons enterprise and of the viability of institutions in particular contexts.

- Third, they preserved flexibility in their framework so that it could be adapted and revised in response to learning derived from the case studies.<sup>69</sup>

Based on the information obtained by applying their framework to structured case studies, they developed theories and models for particular commons situations, designed experiments to test those theories, and advanced a set of design principles for successful natural resource commons.<sup>70</sup>

The framework approach recognizes the crucial importance of the interplay between the characteristics of a commons resource and the social, political, economic, and institutional arrangements for its governance in which it is embedded.<sup>71</sup> This approach also walks the difficult line between overly simplistic theoretical models, which paper over important complexities, and a fragmented taxonomy of diverse situations. As Ostrom explains, frameworks, theories, and models have different roles to play:

The development and use of a general *framework* helps to identify the elements (and the relationships among these elements) that one needs to consider for institutional analysis. Frameworks . . . provide the most general set of variables that should be used to analyze all types of settings relevant for the framework. . . . They attempt to identify the *universal* elements that any relevant theory would need to include. . . .

The development and use of *theories* enable the analyst to specify which components of a framework are relevant for certain kinds of questions and to make broad working assumptions about these elements. Thus, theories focus on parts of a framework and make specific assumptions that are necessary for an analyst to diagnose a phenomenon, explain its processes, and predict outcomes. . . . Microeconomic theory, game theory, transaction cost theory, social choice theory, public choice, constitutional and covenantal theory, and theories of public goods and common-pool resources are all compatible with the IAD framework discussed in this book.

The development and use of *models* make precise assumptions about a limited set of parameters and variables. Logic, mathematics, game theory models, experimentation and simulation, and other means are used to explore the consequences of these assumptions systematically on a limited set of outcomes. Multiple models are compatible with most theories. . . .

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<sup>69</sup> See *id.*

<sup>70</sup> See COMM. ON THE HUMAN DIMENSIONS OF GLOBAL CHANGE, NAT'L RESEARCH COUNCIL, THE DRAMA OF THE COMMONS *passim* (Elinor Ostrom et al. eds., 2002); OSTROM, *supra* note 54; OSTROM, *supra* note 58.

<sup>71</sup> See Ostrom, *supra* note 57, at 15182–83.

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.... One needs a common framework and family of theories in order to address questions of reforms and transitions. Particular models then help the analyst to deduce specific predictions about likely outcomes of highly simplified structures. Models are useful in policy analysis when they are well-tailored to the particular problem at hand. Models are used inappropriately when applied to the study of problematic situations that do not closely fit the assumptions of the model ....<sup>72</sup>

In the cultural environment context, the need for a framework to systematize theoretical and empirical research is readily apparent. The conventional functionalist explanation of public goods leads to a rather constrained set of theories and models and a consequently constrained set of prescriptions and knowledge. The theories and models work well for some observed phenomena but not for many other phenomena. Yet identifying or developing other relevant theories or models (or even knowing when to look outside the proverbial box) can be difficult.<sup>73</sup> A framework can help researchers to develop and choose among different theories. For example, club theory may be helpful in understanding the dynamics of patent pools but poorly suited to understanding Wikipedia. Patent pools are less open in terms of membership, and they manage shared resources in a fashion that is much less focused on sustaining joint production. Wikipedia, by contrast, is quite open in terms of membership, contributions, and participation in various aspects of the project largely because it focuses on sustaining joint production. Consequently, club theory is not likely to be particularly helpful for a researcher studying Wikipedia. Other theories of cooperation might be better suited to the task. A research framework such as ours aims to systematize the investigation, facilitate a more rigorous evaluation by matching and testing of theories and models with observed phenomena, and, most generally, enable learning over time. By design, the IAD framework remains a work in progress in the natural resource domain,<sup>74</sup> which is one of its strengths. We follow that tradition.

The IAD framework for natural resource commons is illustrated in Figure 1.<sup>75</sup> It divides the investigation of a commons regime into a set of inquiries into groups of underlying factors. The first group, including biophysical characteristics, community attributes, and what Ostrom and her collaborators denote “rules-in-use,” or governance

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<sup>72</sup> OSTROM, *supra* note 54, at 28–29.

<sup>73</sup> Recent study of peer production in online environments provides a promising example of efforts to move beyond the conventional set of theories. See *supra* notes 9, 35, 42, and accompanying text.

<sup>74</sup> Ostrom, *supra* note 57, at 15186.

<sup>75</sup> This illustration is modeled on Ostrom & Hess, *supra* note 66, at 44 fig. 3.1.

mechanisms, are denoted by Ostrom as “exogenous variables.” These attributes of a particular commons are fixed, at least with respect to the analysis of a particular situation.<sup>76</sup> In the case of the lobster fishery, for example, these attributes might include the relevant biological characteristics of lobsters, such as the rates at which they age and reproduce; attributes of the community of fishermen, such as the proximity in which they live to others, the existence of familial relationships, and the skill sets needed for lobster fishing; and the rules—explicit or informal—that govern fishing.<sup>77</sup> The second group focuses on what Ostrom calls the “action arena.” An action arena “refers to the social space where participants with diverse preferences interact, exchange goods and services, solve problems, dominate one another, or fight (among the many things that individuals do in action arenas)”<sup>78</sup>—in other words, the place at which the exogenous variables combine in particular instances, leading over time to observed patterns of interactions and outcomes.

Ostrom’s work emphasizes the diversity of possible combinations of exogenous variables that determine what actually happens in particular instances and, hence, the outcomes that result.<sup>79</sup> The rules governing lobster fishing contribute to the activity’s long-term sustainability, for example, but the patterns of interaction actually observed depend on the richness of the particular environment for lobsters, the degree to which rules are actually enforced, seasonal factors such as weather, and interaction with outside influences such as pollution<sup>80</sup> and the state of the larger economy.<sup>81</sup> Understanding the observed success or failure of a commons enterprise such as a lobster fishery may require accounting for all of these factors, even though it may turn out that outcomes are relatively impervious to some of them.

A simple illustration of the framework might be a soccer league. The formal rules of soccer are fixed, but the rules-in-use clearly vary somewhat between a professional league and a recreational league, between a children’s league and an adult league, and so forth. A specific soccer league is also characterized by the relationships among the players (whether neighbors, professional competitors, or friends), by the attributes of the fields on which games are played, and even by the

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<sup>76</sup> Of course, as Ostrom herself recognizes, variables that are treated as exogenous or fixed for the analysis of a particular institution (laws relating to a fishery, for example) may be the outcomes of another (a legislature, for example). See OSTROM, *supra* note 54, at 13.

<sup>77</sup> See Ostrom, *supra* note 57, at 15184–85.

<sup>78</sup> See OSTROM, *supra* note 54, at 14.

<sup>79</sup> See Ostrom, *supra* note 57, at 15181.

<sup>80</sup> See *id.* at 15184–85.

<sup>81</sup> See Abby Goodnough, *Seeking Salve for the Wound of an Ailing Industry*, N.Y. TIMES, Aug. 23, 2009, at A16 (describing conflicts among fishermen arising from the recent economic crisis).

climate of the places where the games take place. The action arena—soccer games—depends on complex and specific interactions among all of these characteristics. Nonetheless, the outcomes over time in a particular league are the patterns of interaction that are clearly identifiable as “professional soccer,” “friendly weekend game,” “children’s soccer league,” and the like. Moreover, some leagues will be successful, lasting for years even as players come and go, while others will fail. The goal of applying the Ostrom framework of analysis in this context would be to use studies and analysis of many different soccer leagues to come to an understanding of success and failure as a function of specific context.

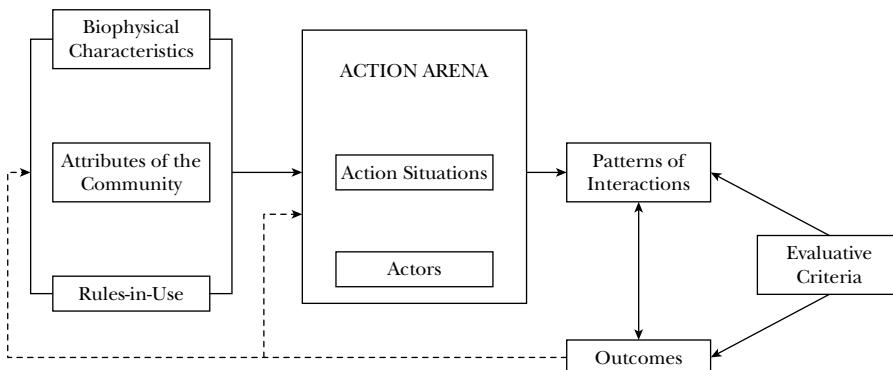


Figure 1<sup>82</sup>

The foundation of the Ostrom analysis is asking related questions in clusters about the exogenous variables, the action arena, and the patterns of interactions and outcomes.<sup>83</sup> Questions about the biophysical characteristics, attributes of the community, and rules-in-use, for example, include the following:

- What boundaries define the resource pool? What is the source of supply and sustainability of the resource units? Under what conditions may resource units be appropriated from the pool?
- How does the population monitor and enforce rules regarding contribution and appropriation? What sorts of sanctions are available, and what sanctions are actually used? What conflict-resolution mechanisms are in place?
- If the community relies on other populations in some respects, or if the population delegates some functions to subsidiary populations, what is the character of these relationships?
- In all instances, to what extent are these attributes inscribed in formal institutions of the state? To what extent are they inscribed in other formal, legal institutions, and to what extent are they inscribed in social norms or other social or cultural structures?

<sup>82</sup> See OSTROM, *supra* note 54, at 15.

<sup>83</sup> See *id.* at 13–14.

We think that the IAD concept has proven sufficiently fruitful to make it worth adapting for our purposes.<sup>84</sup> The nested, multi-tiered character of sustainable cultural environments and the diversity of attributes that contribute to successful governance regimes are keys to understanding cultural commons as mechanisms for knowledge production, collection, and distribution in the context of modern information and IP law regimes.

Ostrom and her colleagues have taken preliminary steps toward understanding how these methods might be relevant to investigating certain cultural commons.<sup>85</sup> Ostrom and Hess have analyzed the management of digital collections of existing knowledge resources, an admirable first step that signals the need for and plausibility of extending the IAD framework to the cultural environment.<sup>86</sup> As our discussion of the categories of questions below reveals, we argue that the IAD framework must be extended to account adequately for the wide variety of constructed commons in the cultural environment.<sup>87</sup>

Most importantly, unlike commons in the natural resource environment, cultural commons arrangements usually must create a governance structure within which participants not only share existing resources but also engage in *producing* those resources.<sup>88</sup> This characteristic of cultural commons produces a more intertwined set of exogenous variables because separating the managed resources from the attributes and rules-in-use of the community that produces them is impossible. Cultural commons are also *nested* within and interact with more complex systems of natural and socially constructed environments.

To see the point, consider a copyright or patent pool, such as the MAA described in the Introduction, to which IP rights holders agree to contribute patents or copyrights that those same holders may exploit on standardized terms specified as part of the construction of the pool.<sup>89</sup> This arrangement creates an environment for pool members that facilitates sharing and use internally and interacts simultaneously with the external environment and shapes relationships with non-members. In other words, patent and copyright laws construct particular environments with default boundaries governing access to and

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<sup>84</sup> See, e.g., *Commons Sense*, ECONOMIST, Aug. 2, 2008, at 76 (paying tribute to the commons research of Ostrom and her colleagues and emphasizing the need for a study of “new commons” of the sort we focus on here).

<sup>85</sup> See Ostrom & Hess, *supra* note 66.

<sup>86</sup> See *id.* at 54–59.

<sup>87</sup> Frischmann presented an earlier draft of this paper at the 12th Biennial Conference of the International Association for the Study of Commons in 2008, and this was a topic of extensive discussion.

<sup>88</sup> See Madison, Frischmann & Strandburg, *supra* note 21, at 368–69.

<sup>89</sup> See Dykman, *supra* note 5, at 648–51.

use of certain forms of knowledge. Commons arrangements grounded in those laws involve contextually specific deviations from the default given by IP law. These constructed cultural commons may lead to creativity, innovation, and improvement that would not be attainable either in the so-called “natural” state of information without intellectual property protection or in the state of information with “full” intellectual property protection.

Our proposed modified framework for constructed cultural commons, which reflects the iterative and constructed character of the commons community, its cultural resources, and its governing “rules-in-use,” is illustrated in Figure 2. Figure 2 differs from Figure 1 in that it illustrates the interactions among and constructed nature of the cultural resources themselves.

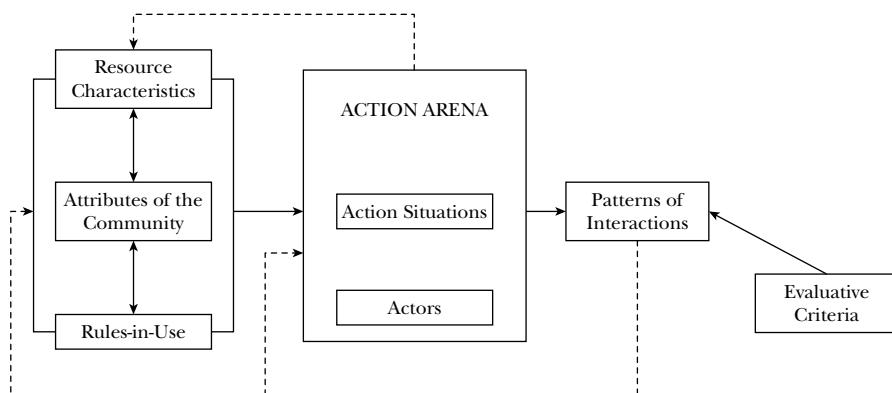


Figure 2

Figure 2 also reflects a second modification to Ostrom’s IAD framework, the collapse of the distinction between outcomes and “patterns of interaction” that results from the intersection between the commons “action arena” and community attributes, resource attributes, and rules-in-use. We argue that given the role of both formal law and informal rule systems in commons governance, these patterns of interactions are inseparable from the outcomes of commons systems. How people interact with rules, resources, and each other, in other words, is itself an outcome that is inextricably linked with the form and content of the knowledge or informational output of the commons. In an open source software project, for example, the existence and operation of the open source development collaborative, the identity of the dynamic thing called the open source software program, and the existence and operation of the relevant open source software license are constitutive of one another.<sup>90</sup> Because of the

<sup>90</sup> See *Jacobsen v. Katzer*, 535 F.3d 1373, 1381–82 (Fed. Cir. 2008) (concluding that violations of an open source software license can be remedied by injunction, in order to preserve the productive character of the open source community).

more complex relationships among resources, participants, and governance structures in cultural commons, relevant attributes may not divide as neatly into categories as they do when one is describing a pooling of natural resources. Nonetheless, as we describe in the next Section, we believe that a structured interrogation of specific examples of constructed cultural commons is both possible and likely to be fruitful.

## B. Specifying the Framework for Studying Constructed Cultural Commons

This Section describes in greater detail our proposed framework for approaching case studies of particular constructed cultural commons, building on the concepts reflected in Figure 2, above, and focusing on the character of the questions that should guide any specific investigation. We begin in Section 1 with some comments on important distinctions between our framework and the IAD framework for natural resource commons, namely that the cultural environment itself differs in certain fundamental respects from the natural resource environment. In Section 2, we describe how those distinctions drive the appropriate set of inquiries into basic characteristics of the commons. This section is the heart of our analysis. In Section 3, we briefly discuss how the expansion of the framework affects the analysis of patterns of interaction and outcomes of the action arenas arising in culturally constructed commons.

### 1. *The Background Environment: An Initial Conundrum*

When seeking to apply the Ostrom approach to constructed cultural commons, we immediately confront a conceptual challenge. Ostrom's inquiry begins by asking questions about the "biophysical characteristics" of the resources involved in the limited commons in question. This inquiry assumes, implicitly, a natural environment containing natural resources that are to be shared and managed. In describing a constructed cultural commons, we must take a step back before describing the relevant characteristics of the shared resources to ask how we should define the environmental backdrop against which a commons is constructed. As is generally true for understanding constructed cultural commons, there may not be one correct answer to this question. There is no clean way to separate a particular cultural commons from the "natural" cultural background, because cultural activity is always grounded in human social interaction, the material environment, laws, and norms. Although there may not be one right answer, it is important to choose a starting point for investigation in a particular case. Asking the question ensures the salience of the choice of the background against which further description is

made. Importantly, that choice frames the larger environment within which a particular commons and related institutions and practices are nested, leading to a better description of the sources and significance of the social, political, and economic aspects of commons.<sup>91</sup>

We identify two reasonable points of “natural environment” reference for the investigation of constructed cultural commons: a “natural” cultural environment without intellectual property and a “default” intellectual-property-based cultural environment. These two starting points correspond roughly to the public domain and to a propertized environment, respectively. Which starting point is most appropriate to use for a particular inquiry will depend on which most closely approximates the cultural commons in a particular case. In a context such as a patent pool<sup>92</sup> or the jamband phenomenon that emerged around the recorded performances of the Grateful Dead,<sup>93</sup> for example, describing a constructed cultural commons according to how it deviates from the default IP regime may be the most useful approach. In other contexts, such as the shared journalism resource constructed by the AP,<sup>94</sup> describing a cultural commons according to its differences from a completely open public domain may be the most useful approach. In still other contexts, such as the sharing of magic tricks among the community of magicians,<sup>95</sup> secrecy may provide the most natural backdrop. Here we comment briefly on the “natural” cultural environment and on the copyright and patent law default propertized environments before moving on to suggest additional questions that should be pursued in analogy to Ostrom’s framework.

#### a. *The “Natural” Cultural Environment*

Despite what appears to be the expanding scope of IP law, a significant range of activities, practices, and intellectual resources remain outside the intended scope of even the most expansive IP regimes. When cultural commons are constructed in these arenas, the most appropriate choice for the “natural environment” is a cultural environment unmediated by rights of exclusion or other regulation. This “natural” cultural environment may also be the appropriate starting point for discussing constructed cultural commons in which IP rights, though available, play a marginal role.

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<sup>91</sup> See *supra* notes 54–55 and accompanying text (noting the role of nesting in Ostrom’s framework).

<sup>92</sup> See *supra* notes 2–5 and accompanying text.

<sup>93</sup> See *supra* notes 17–20 and accompanying text.

<sup>94</sup> See *supra* notes 13–16 and accompanying text.

<sup>95</sup> See Jacob Loshin, *Secrets Revealed: Protecting Magicians’ Intellectual Property Without Law*, in *LAW AND MAGIC: A COLLECTION OF ESSAYS* 123, 135–37 (Christine A. Corcos ed., 2010).

The contours of the “natural” cultural environment are not uncontested. The major IP regimes exclude many different types of intellectual resources based on many different criteria and doctrines. Some would describe the complete set of nonenclosed resources as the public domain, including not only matter excluded on subject-matter grounds but also matter subject to rights of fair use or fair dealing,<sup>96</sup> or as to which IP rights have expired.<sup>97</sup> The “natural” environment then can be seen as a vast pool of cultural resources that are openly accessible and openly usable by anyone without the permission of anyone else.<sup>98</sup>

Julie Cohen has argued that a purely natural resources conception of the public domain, and one that relies on the distinction between permitted use and use that does not require a rights owner’s permission, may lead to a misleading follow-on analysis too closely tied to geographic concepts—that is, a conception of the public domain as a separate place.<sup>99</sup> Cohen argues persuasively for a more contextual understanding of the “common in culture,” a cultural landscape that is informed and shaped by cultural practices.<sup>100</sup>

Our conception of the “natural” environment relates to Cohen’s cultural landscape model as it similarly integrates a more dynamic and contextual understanding of intellectual resources. We might say that the “natural” cultural environment encompasses all that we *inherit* and *experience*. We *inherit* the natural physical environment—live within, use, interact with, and change it—and we pass it on to future generations. Similarly, we inherit, live within, use, interact with, change, and pass on an intellectual and cultural environment, which is itself comprised of many overlapping sub-environments of science and art, among other things. *Experience* constitutes an important intellectual resource that simultaneously relates human beings to their inherited and evolving environment(s) and constitutes a resource that may shape the intellectual environment. Experience (or perception or observation) is not enclosed within IP regimes except when expressed and embodied in a particular qualifying form, such as a copyrightable work of authorship or a patentable invention.<sup>101</sup>

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<sup>96</sup> See Samuelson, *supra* note 32, at 798.

<sup>97</sup> See *id.* at 789–90.

<sup>98</sup> On different versions of the public domain, see *id.* at 789–813.

<sup>99</sup> See Julie E. Cohen, *Copyright, Commodification, and Culture: Locating the Public Domain*, in THE FUTURE OF THE PUBLIC DOMAIN: IDENTIFYING THE COMMONS IN INFORMATION LAW 121, 135–37 (Lucie Guibault & P. Bernt Hugenholtz eds., 2006).

<sup>100</sup> See *id.* at 157–66.

<sup>101</sup> Commenting on an earlier draft of this paper after a presentation, Mario Biagioli offered a metaphor grounded in the work of Edward Young. See EDWARD YOUNG, CONJECTURES ON ORIGINAL COMPOSITION 9–12 (Scolar Press Ltd. 1966) (1759). Biagioli suggested that the cultural environment might be seen as a garden and the processes of inheritance and experience as cultivation. Nevertheless, he cautioned against taking the notion of a

In sum, the natural intellectual environment consists of a vast pool of open intellectual resources within which and with which we experience life and engage in a wide variety of activities and practices. The salience of specific features of a “natural” background will depend on the context of the inquiry. In many cases, constructed cultural commons arrangements build directly on this nonpropertized “natural” background. Examples of constructed cultural commons for which the “natural” environment is the most appropriate baseline likely include the commons of scientific research results and tools in the basic sciences, the facts and related information that are compiled not only by journalists via the AP but also in online creations such as Wikipedia, and devices invented by and shared among sports enthusiasts.<sup>102</sup>

The “natural” environment may be the most appropriate baseline for viewing a cultural commons even if intellectual property protection is available for the resources contributed to the commons, and even if IP law plays some role in its construction. For example, the AP, which was constructed initially as a means of managing the sharing of an intellectual resource (news) that was not protected by the standard forms of IP law (the First Amendment generally precludes copyright protection for facts) was the plaintiff in the leading case that established an intellectual-property-like “hot news” doctrine regulating a very specific type of misappropriation of factual information important to the AP constructed commons.<sup>103</sup> The importance of a constructed cultural commons analysis is that it recognizes that creative environments are constructed by deviating from both the purely “natural” and the purely propertized extremes. Indeed, once we have identified the background environment and shared resources of a particular cultural commons, the bulk of the analysis will focus on the institutions that are constructed to govern deviations from that background structure.

#### b. *The Default Proprietary Environments*

The two principal regimes of IP law—patent and copyright law—are the most salient alternatives to the “natural” environmental baseline described above.

Patent grants are justified generally on the ground that the natural shareability of technological ideas undermines incentives to pro-

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“natural” cultural environment too far. Our discussion of choosing an appropriate baseline should make clear that we have heeded his advice.

<sup>102</sup> See, e.g., Nikolaus Franke & Sonali Shah, *How Communities Support Innovative Activities: An Exploration of Assistance and Sharing Among End-Users*, 32 RES. POL’Y 157, 169 (2003) (studying how individuals in a community of sports enthusiasts share information freely).

<sup>103</sup> See *supra* note 14 and accompanying text.

duce and distribute more and superior forms of innovation.<sup>104</sup> This basic conception highlights an important difference between constructed cultural commons and commons in the natural resource context. Constructed cultural commons must be concerned not only with managing and sustaining existing resources but also with providing institutions to encourage the creation of new resources.

Patent rules vary somewhat from country to country, but generally time-limited patent rights are granted to the developers of an “invention” after an appropriate government agency examines a patent application.<sup>105</sup> The applicant must demonstrate to the satisfaction of the patent examiner that the innovation represented by the invention is new (or “novel,” in the language of patent law) in that no one has invented the device before; useful; nonobvious (in the language of American patent law) or possessing an “inventive step” (in most European systems), such that the invention represents a technical advance over the existing art;<sup>106</sup> and adequately described in the application for the benefit of future adopters and adapters of the technology.<sup>107</sup> The holder of a valid patent possesses a statutory right to exclude all others from producing or selling the invention,<sup>108</sup> subject to extremely limited exceptions for experimentation and research on the subject matter of the patent.<sup>109</sup> Notably, however, patent rights expire after a relatively short term, typically twenty years.<sup>110</sup> The material covered by the patent then passes into the public domain. An example of a constructed cultural commons for which a patented environment serves as an appropriate baseline is a patent pool.

Copyright law departs from the “natural environment” norm for the cultural environment in ways that resemble patent law, and for the same reasons, but with respect to material forms of artistic and creative cultural expression rather than technological and technical innovation. As with patent law, copyright statutes vary in their details from country to country yet generally embody a set of core principles.<sup>111</sup> The author of an “original” or creative work is granted a statutory entitlement to exclude others from reproducing, adapting, performing or distributing copies of that work to the public. Unlike patent law, copy-

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<sup>104</sup> See, e.g., ROBERT P. MERGES ET AL., INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE 119 (rev. 4th ed. 2007) (explaining incentive justification).

<sup>105</sup> For an overview of U.S. patent doctrine, see *id.* at 124–27.

<sup>106</sup> See Convention on the Grant of European Patents art. 52(1), Oct. 5, 1973, 13 I.L.M. 270 (as amended by Revision Act of Nov. 29, 2000), available at <http://www.epo.org/patents/law/legal-texts/epc.html> [hereinafter European Patent Convention] (“inventive step”).

<sup>107</sup> See MERGES ET AL., *supra* note 104, at 124.

<sup>108</sup> See *id.* at 126.

<sup>109</sup> See *id.* at 321–25.

<sup>110</sup> See *id.* at 126.

<sup>111</sup> For an overview of copyright doctrine, see *id.* at 388–89.

right generally embeds a broad range of exceptions and exclusions, including exclusions of subject matter that is functional rather than expressive (and therefore the subject of patent law) or that is too broad or abstract to be identified clearly as the specific product of a specific author. In the United States, the copyright holder is subject to a user's power to engage in "fair use" of copyrighted material.<sup>112</sup> In the Commonwealth countries, a copyright typically is subject to a somewhat more limited "fair dealing" exception.<sup>113</sup> Other countries specify a range of exceptions, exclusions, and compulsory licenses for a variety of specific purposes.<sup>114</sup> Finally, as with patents, expiration of the copyright delivers the covered material to the public domain. In general the term of copyright lasts far longer than the term of patent—the life of the author plus fifty years, in most countries, and the life of the author plus seventy years in the United States and European Union countries.<sup>115</sup> Examples of constructed cultural commons for which copyright is an appropriate baseline are the General Public License (GPL) for open source computer software<sup>116</sup> and open access repositories for academic publishing.<sup>117</sup>

## 2. Basic Characteristics of the Constructed Cultural Commons

The next step after choosing an appropriate characterization of the "natural" environment in which a particular cultural commons resides is to identify basic characteristics relevant to the function of that commons in producing, managing, and disseminating intellectual goods. Here we suggest, as a starting point, a series of nested inquiries that we hope, when applied to and refined by a series of case studies, will assist researchers to identify the attributes that define successful and sustainable cultural-commons regimes and distinguish them from unsuccessful regimes.

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<sup>112</sup> See 17 U.S.C. § 107 (2006).

<sup>113</sup> See, e.g., Copyright, Designs and Patents Act, 1988, c. 48, § 29 (Eng.).

<sup>114</sup> See European Patent Convention, *supra* note 106, art. 52; INT'L CTR. FOR TRADE AND SUSTAINABLE DEV. & U.N. CONFERENCE ON TRADE AND DEV., EXCEPTIONS TO PATENT RIGHTS IN DEVELOPING COUNTRIES, Issue Paper No. 17, at 19–42 (Oct. 2006) (prepared by Christopher Garrison), available at <http://ictsd.net/i/publications/11716/> (reviewing exceptions to patent rights).

<sup>115</sup> See Council Directive 2001/29, 2001 J.O. (L 167) (EU); MERGES ET AL., *supra* note 104, at 388.

<sup>116</sup> For an explanation of the basic principles of the GPL, see Brett Smith, *A Quick Guide to GPLv3*, Jan. 8, 2009, <http://www.fsf.org/licensing/licenses/quick-guide-gplv3.html>. For the terms of the GPL, see Free Software Foundation, GNU General Public License (June 29, 2007), <http://www.fsf.org/licensing/licenses/gpl.html>. A preliminary examination of the open source license as a managed environment appears in Michael J. Madison, *Reconstructing the Software License*, 35 LOY. U. CHI. L.J. 275 (2003).

<sup>117</sup> For a discussion of open access publishing in the context of the norms of an academic community, see Michael J. Madison, *The Idea of the Law Review: Scholarship, Prestige, and Open Access*, 10 LEWIS & CLARK L. REV. 901 (2006) (exploring open access in legal scholarship).

By analogy to Ostrom's inquiries, we propose and discuss in this Section the following initial inquiries, which we refer to as "baskets" of research questions:

- particular subject matter, resources pooled and so forth;
- particular activities undertaken and the actors who perform them;
- goals and objectives of the cultural commons;
- degree of "openness" of the cultural commons; and
- governance or "rules-in-use" of the cultural commons.

These inquiries are related to the Resource Characteristics, Attributes of Community, and Rules-in-Use section of Figure 2.<sup>118</sup>

#### a. *Resources and Community*

After choosing an appropriate baseline environment, the next step in investigating a constructed cultural commons is to identify the set of resources being pooled and the relevant community of actors. The resources might appear to be obvious, such as patents in a patent pool, news items for a news service, recordings for a database of music, or recipes shared within the community of French chefs.<sup>119</sup> Or, it may take some consideration to identify the most salient description of the relevant resources. What resources are pooled and shared in an open source software community? Ideas? Code? Coding expertise? Debugging opportunities? In many contexts, and perhaps even in patent pools and French cooking, multiple types of resources are being shared within a community. The dynamic character of intellectual and knowledge resources means that shared resources may not be fully independent of one another both in the sense that the value of one shared resource may depend on its relationship to other shared resources, and in the sense that any shared resource may arise from or be developed from a different shared resource. The multiple contributions to a single open source software project demonstrate both features. The durability of shared resources must be considered. Patents and copyrights expire; tangible objects may wear out or be consumed. Our framework aims to be inclusive and thus aware of the variety of resources collected in cultural commons. We avoid a myopic focus on intellectual property assets.

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<sup>118</sup> We refer to these as "basic characteristics" rather than Ostrom's "exogenous variables" because, as discussed above, here, much more than in the natural resources context, it is unreasonable to regard important characteristics of the resources themselves as "exogenous" to the commons structure. See OSTROM, *supra* note 54, at 13.

<sup>119</sup> See Christopher J. Buccafusco, *On the Legal Consequences of Sauces: Should Thomas Keller's Recipes Be Per Se Copyrightable?*, 24 CARDozo ARTS & ENT. L.J. 1121, 1151–55 (2007); Emmanuelle Fauchart & Eric von Hippel, *Norms-Based Intellectual Property Systems: The Case of French Chefs*, 19 ORG. SCI. 187 (2008).

Similarly, the identity of community members may be clear—as it is in a patent pool—or questions may exist about how the community is constituted. Does the open source software community consist of programmers alone? Does it include users of the code? People who submit comments or assist with debugging? Entrepreneurs who initiate meetings and dialogue or organize the community? People who develop, disseminate, and manage the relevant licenses? Those who monitor compliance with license terms? People who develop tools, host websites, and otherwise support the community?<sup>120</sup> Rather than seeking a single answer, our inquiry leads us to identify each of these constituencies and describe their specific roles. Critically, asking who is part of a particular constructed cultural commons sharpens the inquiry and helps pave the way for inquiries into institutions, governance, and sustainability.

Cultural commons exist on a spectrum. At one end of this spectrum are collective organizations that manage copyrights or patent pools. This subset is useful to work with because the set of pooled resources is easily identifiable, as is the relevant community of actors. Specifically, the set of resources is comprised of rather discrete, propertized, intellectual works, such as patented inventions, and the community is comprised of those who own those works and wish to reuse them.<sup>121</sup> At the other end of the spectrum are more complex examples. For example, the sharing and development of ideas, skills, tacit knowledge, and even the intellectual and cultural components of social capital within a university research community constitutes a constructed cultural commons.<sup>122</sup> This example invites significant variation among case studies based on the particular resources and subset of the university community targeted for study. Depending on the resources under investigation, the relevant community may be defined broadly in terms of the university as an institution, more narrowly in terms of a particular university or academic discipline, or most narrowly in terms of a specific academic unit, department, or school. Even something as seemingly mundane as an academic conference or scholarly presentation or an e-mail listserv among colleagues in a specific discipline might be usefully analyzed using our constructed cultural commons framework.

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<sup>120</sup> For studies of open source software, see STEVEN WEBER, *THE SUCCESS OF OPEN SOURCE* (2004).

<sup>121</sup> See *supra* note 2 and accompanying text.

<sup>122</sup> See Brett M. Frischmann, *Commercializing University Research Systems in Economic Perspective: A View from the Demand Side*, in 16 UNIVERSITY ENTREPRENEURSHIP AND TECHNOLOGY TRANSFER: PROCESS, DESIGN, AND INTELLECTUAL PROPERTY 155, 169–73 (Gary D. Libecap ed., 2005); Madison, Frischmann & Strandburg, *supra* note 21, at 378–402.

b. *Identifying Goals and Objectives*

Before describing the “rules-in-use” or governance structure of a constructed cultural commons, it is important to identify the particular problem or problems that a given commons is constructed to address. In the natural resource context, this question does not often come to the fore because common-pool resources are defined by the problem of subtractability or rivalrousness (e.g., removing lobsters from the pool results in fewer lobsters for everyone else) and the risk that a common-pool resource will be exhausted by uncoordinated self-interested activity (e.g., unmanaged harvesting may jeopardize the sustainability of the lobster population).<sup>123</sup>

Intellectual commons address different problems, which are defined initially by the fact that, as public goods, intellectual resources are not rivalrously consumed.<sup>124</sup> A copyrighted work or patented invention can be “used” simultaneously by many people while it is part of a commons without diminishing its availability for others. For example, the news remains available on the AP wire even after a particular member newspaper publishes an AP-generated story. The various problems that cultural commons institutions solve are not merely, or even primarily, problems of overuse. The problems addressed by cultural commons include the production of intellectual goods to be shared, the overcoming of transaction costs leading to bargaining breakdown among different actors interested in exploiting the intellectual resource, the production of commonly useful platforms for further creativity, and so forth.<sup>125</sup>

More generally, we can distinguish among different types of cultural commons based on their core purposes. Some such commons arise as solutions to collective action, coordination, or transactions cost problems that exist apart from IP rights (and perhaps would not be solvable without these rights). These solutions might involve instances of cooperative behavior where members construct an open environment to pool resources and use those resources themselves for some specific purpose. Open source software projects, mediated by formal free and open source licenses and by informal communal structures for determining what code becomes part of the “authorized” code base, are examples of this type.<sup>126</sup> Standard-setting enter-

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<sup>123</sup> See *supra* note 1 and accompanying text.

<sup>124</sup> See *supra* note 27 and accompanying text.

<sup>125</sup> See Merges, *supra* note 5, at 1295–1301; Robert P. Merges, *A Transactional View of Property Rights*, 20 BERKELEY TECH. L.J. 1477, 1515–19 (2005).

<sup>126</sup> See Merges, *supra* note 21, at 19 (noting that “[i]ndividual contributions [to open source software projects] are evaluated and integrated by a central organization or informal group entrusted with maintaining and authorizing ‘official’ versions of the software”).

prises also fit into this category,<sup>127</sup> as do joint ventures for scientific research and development.<sup>128</sup> These cultural commons depend on each member's possessing certain intellectual property interests as a facilitator of participation.

A second type of commons or pooling arrangement is intended to solve collective action, coordination, or transactions cost problems that exist only because of the IP rights themselves.<sup>129</sup> In some of these cases, a commons is constructed as a defense against potential privatization of commonly useful resources. Examples of such arrangements might include constructed commons for basic biological building blocks such as the Single Nucleotide Polymorphism (SNP) consortium<sup>130</sup> or the publicly available databases of genomic sequences that are part of the Human Genome Project.<sup>131</sup> Formal licenses and related agreements assure that participants in the commons become part of what amounts to a mutual nonaggression pact that is necessary precisely because of the possibility that intellectual resources may be propertized. So long as the resource is in the commons, it can be shared among commons members, and neither commons members nor outsiders are able to appropriate that resource, patent it, and then assert a patent claim against a commons member. Within the commons, research proceeds more or less as it otherwise would, according to informal disciplinary norms and free of (or at least, less burdened by) undue anxiety about propertization and potential holdup.

A third type of cultural commons may be designed to mediate among communities with different default norms. Technology transfer institutions, which enable universities and other nonprofit research enterprises to deliver information resources (such as the technical knowledge described in patent specifications) to the private

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127 See 2 HERBERT HOVENKAMP ET AL., IP AND ANTITRUST: AN ANALYSIS OF ANTITRUST PRINCIPLES APPLIED TO INTELLECTUAL PROPERTY LAW § 35.4 (Supp. 2009); Merges, *supra* note 125, at 1515–16; Shapiro, *supra* note 2, at 136–42.

128 See HOVENKAMP ET AL., *supra* note 127, § 36; JEAN TIROLE, THE THEORY OF INDUSTRIAL ORGANIZATION 413–14 (1988).

129 See Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621, 625 (1998) (noting that “[g]overnments can create too many property rights and too many decisionmakers who can block use”).

130 See, e.g., DON TAPSCOTT & ANTHONY D. WILLIAMS, WIKINOMICS: HOW MASS COLLABORATION CHANGES EVERYTHING 166–69 (2006); Michael Morgan, *New Paradigms in Industry: The Single Nucleotide Polymorphism Consortium*, in THE ROLE OF SCIENTIFIC AND TECHNICAL DATA AND INFORMATION IN THE PUBLIC DOMAIN: PROCEEDINGS OF A SYMPOSIUM 194, 194–97 (Julie M. Esanu & Paul F. Uhlig eds., 2003).

131 For discussions of “open source” approaches to biology, see, for example, Sapna Kumar & Arti Rai, *Synthetic Biology: The Intellectual Property Puzzle*, 85 TEX. L. REV. 1745 (2007); Arti K. Rai, “Open and Collaborative” Research: A New Model for Biomedicine, in INTELLECTUAL PROPERTY RIGHTS IN FRONTIER INDUSTRIES: SOFTWARE AND BIOTECHNOLOGY 131 (Robert W. Hahn ed., 2005).

market, are examples of this type of commons.<sup>132</sup> The cultural environment inside the university is typically characterized by information sharing not governed by IP rights, even if IP rights are present as matters of form.<sup>133</sup> The environment outside the university is governed largely by IP rights. Technology transfer institutions may constitute an institutional pool or commons that mediates these two regimes.<sup>134</sup> Similarly, open source projects have developed “boundary organizations” to mediate their relations with commercial firms.<sup>135</sup>

By specifying these distinct types of cultural commons, we are probably setting up a more sharply delineated field of institutions than is really obtained in practice. In any given commons, it may be the case—and may even likely be the case—that the motivation for the pool arises from a variety of considerations, that is, some do not arise from the character of intellectual property interests themselves, and some do.

Pooling arrangements also may exist for less socially salutary reasons. Most obvious is the case of members colluding to restrict competition, and it is certainly within the purview of our approach that commons should be evaluated in part by reference to the possibility of anticompetitive behavior and other possible costs. But by requiring as an initial matter that an intellectual commons operate via sharing of intellectual resources, we distinguish this project from investigations of cartels as such, which operate by sharing price and output information and which pose significant and obvious risks of anticompetitive behavior without offsetting welfare benefits.<sup>136</sup> The functional purpose of cartels is different from the cultural commons arrangements noted above; that is, cartels are not designed to create an open environment within which resources may be shared and productively used by members or to sustain individual members. But just as the line

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<sup>132</sup> See Patrick L. Jones & Katherine J. Strandburg, *Technology Transfer and an Information View of Universities: A Conceptual Framework for Academic Freedom, Intellectual Property, Technology Transfer and the University Mission* 13–17 (Feb. 22, 2010) (unpublished manuscript, on file with authors).

<sup>133</sup> See Madison, Frischmann & Strandburg, *supra* note 21, at 378–89; John P. Walsh et al., *Where Excludability Matters: Material Versus Intellectual Property in Academic Biomedical Research*, 36 RES. POL’Y 1184, 1199–1200 (2007).

<sup>134</sup> See Philip E. Auerswald & Lewis M. Branscomb, *Start-ups and Spin-offs: Collective Entrepreneurship Between Invention and Innovation*, in THE EMERGENCE OF ENTREPRENEURSHIP POLICY: GOVERNANCE, START-UPS, AND GROWTH IN THE U.S. KNOWLEDGE ECONOMY 61, 79–80 (David M. Hart ed., 2003).

<sup>135</sup> See O’Mahony & Bechky, *supra* note 6; Siobhán O’Mahony & Fabrizio Ferraro, *Managing the Boundary of an ‘Open’ Project* 18 (IESE Bus. Sch., Univ. of Navarra, Working Paper No. 537, 2004).

<sup>136</sup> See, e.g., W. KIP VISCUSI ET AL., ECONOMICS OF REGULATION AND ANTITRUST 116–32 (4th ed. 2005); Peter Z. Grossman, *Introduction: What Do We Mean by Cartel Success?*, in HOW CARTELS ENDURE AND HOW THEY FAIL: STUDIES OF INDUSTRIAL COLLUSION 1, 1–7 (Peter Z. Grossman ed., 2004).

between different types of intellectual commons may be difficult to draw consistently, the line between commons and cartels similarly may be difficult to draw. Antitrust regulators have long faced the challenge of identifying illegitimate cartels disguised as legitimate patent pools and other knowledge-sharing institutions.<sup>137</sup>

### c. Degrees of Openness and the Character of Control

Commons regimes are defined both by the *degree of openness and control* that they exhibit with respect to contributors, users, and resources, and by the *assignment of control, or custody of the power to administer access*. The rules-in-use of a constructed cultural commons will delineate its degree of openness, particularly with respect to use of the resources by outsiders who do not contribute to resource creation. Again, this inquiry is less relevant to natural resource commons arrangements. Natural resources generally are finite, potentially rivalrous in consumption, often congested, and subject to tragic overconsumption.<sup>138</sup> Consequently, it is often necessary to limit access to a common-pool resource to a defined community. The boundaries of the community sharing a resource tend to be coextensive with the boundaries of commons self-governance.<sup>139</sup> Thus, in many cases, the commons is open to members and closed to everyone else, and that is the end of the story. Intellectual resources, by contrast, are not subject to the same natural constraints and are naturally shareable without a risk of congestion or overconsumption. Rarely does “too much information” diminish the value of individual items of information.<sup>140</sup>

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<sup>137</sup> See HOVENKAMP ET AL., *supra* note 127, §§ 30.4, 34.2.

<sup>138</sup> Complications arise here because of distinctions between “natural resources” like oil, wood, and other purely rivalrous resources that are necessarily depleted and nonrenewable, and “natural resources” like forests, lakes, or other common-pool resources that are not necessarily depleted and are potentially renewable if managed sustainably. See RUHL ET AL., *supra* note 48, at 52, 64–65 (describing a “threshold of irreversibility,” noting that “once thresholds are crossed, it can take enormous spans of time to rebuild natural capital through ecological processes,” and describing the risk of congestion); Brett M. Frischmann, *Environmental Infrastructure*, 35 ECOLOGY L.Q. 151, 155, 166–68 (2008) (examining differences in the degree of rivalrousness for different natural resources and distinguishing between rival natural resources like oil and partially (non)rival natural resources like the atmosphere).

<sup>139</sup> See Ostrom, *supra* note 58, at 61–88 (describing various examples illustrating this point).

<sup>140</sup> See Dennis S. Karjala, *Congestion Externalities and Extended Copyright Protection*, 94 GEO. L.J. 1065 (2006) (critiquing William M. Landes & Richard A. Posner, *Indefinitely Renewable Copyright*, 70 U. CHI. L. REV. 471, 484–88 (2003) (suggesting some instances of congestion)); see also Frank Pasquale, *Copyright in an Era of Information Overload: Toward the Privileging of Categorizers*, 60 VAND. L. REV. 133, 166–71 (2007) (considering congestion effects associated with information overload). Trademark dilution is a controversial area in which overuse of a particularly famous and distinctive mark arguably leads to congestion-type effects. See LANDES & POSNER, *supra* note 30, at 222–28; Giovanni B. Ramello, *What’s in a Sign? Trademark Law and Economic Theory*, 20 J. ECON. SURVEYS 547, 555–56 (2006).

It is entirely possible and desirable for a community to produce and/or manage a cluster of cultural goods that is accessible to outsiders.<sup>141</sup> One of the measures of the social benefit of a constructed cultural commons may be the degree to which it disseminates the intellectual goods it produces to a wider audience.

### i. *Openness as Applied to Resources*

What do we mean by openness? Little ambiguity exists in most everyday contexts (e.g., an open door), but openness can be a confusing concept when used to describe an intellectual resource. Openness describes our capacity to relate to a resource by accessing and using it. In other words, openness describes the extent to which there are barriers to possession or use. Openness varies according to the costs of surmounting barriers (in terms of money, conditions, or other restrictions) to exploitation. Openness in this sense may encompass joint or shared access to and use of the resource.<sup>142</sup>

Barriers to possession or use of a resource may be natural or constructed. A resource may be open naturally because its characteristics prevent it from being possessed, owned, or controlled by anyone.<sup>143</sup> Frischmann provides one example:

[F]or most of the earth's history, the oceans and the atmosphere were natural commons . . . [b]ecause, for example, exercising dominion over such resources was beyond the ability of human beings or simply was unnecessary because there was no indication of scarcity.

A resource also may be open . . . as the result of social construction. That is, laws or rules may prohibit ownership or ensure [a certain degree of openness] . . .<sup>144</sup>

For example, copyright law grants protection over creative expression but excludes protection for ideas in order to maintain open access and use of ideas. Patent law likewise excludes abstract ideas from patentability. Openness may arise through norms and customs among owners and users and through institutional design.<sup>145</sup>

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<sup>141</sup> Frischmann refers to this as “leveraging” the “nonrivalry” of intellectual resources. Brett Frischmann, *Spillovers Theory and Its Conceptual Boundaries*, 51 WM. & MARY L. REV. 801, 810 (2009) (“In the context of intellectual property law, society [encourages participation in activities that generate spillovers] through a variety of legal arrangements that enable sharing and productive use of nonrival resources—in essence, *leveraging nonrivalry*.”).

<sup>142</sup> See Joel West, *Seeking Open Infrastructure: Contrasting Open Standards, Open Source and Open Innovation*, 12 FIRST MONDAY (2007), <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1913/1795> (discussing the various meanings of “open” in system-based industries).

<sup>143</sup> Frischmann, *supra* note 49, at 936.

<sup>144</sup> *Id.* at 936–37 (footnotes omitted).

<sup>145</sup> *See id.*

Openness and the vesting of control over openness are related. In part, both concepts may simply reflect choices regarding how best to manage resources. In the context of intellectual property pools, for example, management of the pooled resources may be vested in a central institution created specifically for that purpose, or it may be decentralized and vested in the hands of individual IP rights holders.<sup>146</sup>

Openness and the sources of control also reflect power and its distribution among potential possessors and users. Openness may be measured by the degree of control over the terms of access and use of a specific resource. Such control is exercised by human beings on human beings. Openness is relational, and it relies on social institutions.

In sum, openness is a functional variable that describes the degree to which possession and use of a resource is controlled, and it is a relational variable that describes the structure of relationships among potential resource users.

## ii. *Openness as Applied to a Community*

As a resource or set of resources may have an open character, so may a community. As openness is applied to resources, openness of a community is defined partly in functional terms, by natural and constructed attributes that define membership in the community, and partly in terms of power and other bases for relations among participants.<sup>147</sup> Above, we defined the cultural environment as a set of interdependent and interconnected systems and resources.<sup>148</sup> As with openness applied to resources, openness with regard to a community describes our capacity to relate to that community as a contributor or user of resources that comprise in part the cultural commons. Thus, openness describes the extent to which there are criteria for or barriers to membership or participation in the creative or innovative processes that the cultural commons is intended to support. Openness also describes the extent to which a particular community is accessible to and interconnected with related context, institutions, and social practices.

Openness with respect to a community has an internal dimension as well as an external one, as it reflects the degree to which participants in the cultural commons collaborate with one another or otherwise share human capital as well as (or rather than) resources. For

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<sup>146</sup> See *supra* notes 2–5 and accompanying text.

<sup>147</sup> Accordingly, we focus much less on whether some social context is or is not a “community” according to predefined criteria and much more on the functional characteristics of that context.

<sup>148</sup> See *supra* text accompanying note 48.

example, the participants in an intellectual property pool may specify rules regarding how resources are contributed to and withdrawn from the pool. The General Public License for open source computer programs specifies that membership in the community defined by users of the program is open to anyone.<sup>149</sup> Anyone may add to, use, or redistribute the licensed program. Redistributors, however, must abide by the license term that they make the full source code of the program accessible to further users of the program. Moreover, in most open source software projects, only certain contributions are accepted into “official” versions of the code.<sup>150</sup> Thus, although use and modification of the code for personal use are open to anyone, the ability to contribute to the shared resource is regulated.

In describing and assessing the degrees of openness and control that characterize a cultural commons or pool, one should bear in mind more than just the conventional producer perspective by which information and knowledge shareability problems often are analyzed. Hardin’s “tragedy of the commons”<sup>151</sup> is typically understood as challenging markets and governments to offer ways to supply resources in the face of cooperation and competition problems.<sup>152</sup> In analyzing openness with respect to resources and communities, accordingly, it is tempting to limit the analysis to openness with respect to actual and potential resource producers.

In information and knowledge environments, those resources are “naturally” given only in part. The cumulative and aggregative character of knowledge is fundamental to human culture. Producers of knowledge and culture resources are therefore simultaneously users and consumers. In analyzing openness, it is important to consider the degree to which openness expresses the interests of users, as matters of both function and relation. In particular, a constructed commons in the cultural environment may function as infrastructure.<sup>153</sup> In the cultural environment, the tragedy of the commons that Hardin described may refer not to an undersupply of a resource prompted by overconsumption but instead to an undersupply prompted by the failure of the private market to aggregate user or consumer preferences for certain fundamental or “infrastructural” resources. This situation occurs, for example, in the context of basic research conducted within

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<sup>149</sup> See *supra* note 116 and accompanying text.

<sup>150</sup> See KELTY, *supra* note 7, at 27–31 (describing open source software collectives as “recursive publics”).

<sup>151</sup> See *supra* note 59 and accompanying text.

<sup>152</sup> See Elinor Ostrom, *Tragedy of the Commons*, in THE NEW PALGRAVE DICTIONARY OF ECONOMICS (Steven N. Durlauf & Lawrence E. Blume eds., 2d ed. 2008), available at [http://www.dictionaryofeconomics.com/article?id=pde2008\\_T000193](http://www.dictionaryofeconomics.com/article?id=pde2008_T000193).

<sup>153</sup> See Frischmann, *supra* note 49, at 974–78.

and across universities.<sup>154</sup> To the extent that the Internet itself constitutes a commons, it is likely better characterized as an infrastructural resource that solves certain problems of consumption rather than problems of production.

d. *Governance or “Rules-in-Use”*

Having identified a cultural commons, chosen an appropriate description of the background environment within which the commons is nested, and assessed the characteristics of associated resources and populations, goals and objectives, and the degree and character of openness and control, the next task is to investigate more specifically the characteristics of the cultural commons that relate to its governance and the way it functions. Here we identify several relevant clusters or “buckets” of variables that will be important to explore:<sup>155</sup>

- history and narrative;
- entitlement structures and resource provisions;
- institutional setting (including markets and related firm and collective structures, social structures that describe the roles and interests of individual actors in the commons, and boundary organizations or mechanisms mediating internal governance of the commons with external markets, the public domain, and other institutions);
- legal structures (including intellectual property rules, subsidies, contract and licensing law, antitrust provisions); and
- governance mechanisms of the commons (membership rules, resource contribution or extraction standards and requirements, conflict resolution mechanisms, sanctions for rule violation).

i. *History and Narrative*

What is the relevant history and narrative of a given commons? Above, we noted the importance of language and metaphor in understanding the information environment.<sup>156</sup> Any given knowledge pool depends in an important sense on its creation narrative. That narrative depends in turn on a variety of linguistic and metaphor resources: the vocabulary and syntax that participants and observers use in describing the construct are keys to unlocking its origins, its operation, and even its future. Carol Rose has written of property as a

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<sup>154</sup> See Frischmann, *supra* note 28; Katherine J. Strandburg, *Curiosity-Driven Research and University Technology Transfer*, in 16 UNIVERSITY ENTREPRENEURSHIP AND TECHNOLOGY TRANSFER: PROCESS, DESIGN, AND INTELLECTUAL PROPERTY 93, 97–99 (2005); sources cited *supra* note 33; *supra* note 122 and accompanying text.

<sup>155</sup> The clusters of questions that follow are analogous to Ostrom’s inquiries into the descriptive characteristics of a commons regime. See Ostrom & Hess, *supra* note 66.

<sup>156</sup> See *supra* text accompanying notes 53–55.

story.<sup>157</sup> Michael Madison<sup>158</sup> and Jessica Silbey<sup>159</sup> have both described the creation myths that accompany default regimes of intellectual property. The very phrase “patent pool,” for example, itself has come to signify a specific set of legal expectations and criticisms. If one says “patent pool,” an informed commentator thinks immediately of (i) a self-governing arrangement and (ii) antitrust considerations, rather than intellectual property problems and solutions. (In part, we aim to realign that point of view.) Calling something a “knowledge commons,” or recharacterizing certain patent pools as solutions to “anticommons” problems, triggers a different set of expectations. The rhetorical frame shifts primarily to dynamic problems in information and information property, rather than to largely static output concerns. A commons is a rhetorically open place. A “pool” emphasizes the resources themselves and how those resources are bounded.

Explicitly giving attention to creation narratives also encourages attention to evolutionary processes. Changes in the narrative over time, or conflicts embedded within a narrative, can illustrate debates over purpose, which can illuminate the normative foundations of commons and highlight points of conflict. Looking at history can help answer the question of how the commons changes and adapts over time, in light of changes in firm structure, market structure, and resources (such as emergent legal structures, background legal entitlements, and temporal features like limitations on duration) that are built into those entitlements. History and narrative also emphasize the importance of contextual details that are ignored or marginalized in an overly rationalist account of institutional design. For example, within this cluster, we would like to uncover details concerning the influence of power, politics, and personalities that are often necessary to understanding commons. This cluster of questions provides an important link back to the earlier discussion of community and objectives.<sup>160</sup>

## ii. *Entitlement Structures and Resource Provisions*

In any resource pool, the resources that are part of the commons have to come from somewhere. This cluster is intended to capture an array of questions concerning the boundaries around the resources themselves and how those boundaries are socially constructed. Thus,

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<sup>157</sup> See CAROL M. ROSE, *Property as Storytelling: Perspectives from Game Theory, Narrative Theory, Feminist Theory*, in PROPERTY AND PERSUASION: ESSAYS ON THE HISTORY, THEORY, AND RHETORIC OF OWNERSHIP 25, 25–45 (1994).

<sup>158</sup> See Michael J. Madison, *Comment: Where Does Creativity Come from? and Other Stories of Copyright*, 53 CASE W. RES. L. REV. 747 (2003).

<sup>159</sup> See Jessica Silbey, *The Mythical Beginnings of Intellectual Property*, 15 GEO. MASON L. REV. 319 (2008).

<sup>160</sup> See *supra* text accompanying notes 119–23.

moving beyond, or at least complicating, the initial set of questions concerning *what* resources are contributed and subject to the commons arrangement, we would like to better understand *how* the resources are delineated and *how* they are contributed and made part of the commons.

The “natural” information environment contains an abundance of raw information resources, including inherited and experienced knowledge. Those resources often become information “works” and, therefore, resources in the pool via some cultural construct, such as the default copyright or patent law systems, via some other institution, such as a publishing industry producing books, films, or songs, or via some combination of these and other things, such as cultural practices or norms. Understanding the construction of cultural commons therefore requires understanding the mechanisms by which resources are provisioned to the commons, whether via legal entitlements or otherwise, and the nature of entitlements to use and consume those resources while they are part of that commons. A patent pool offers an obvious example. The patents themselves are resources constructed via rights of exclusion offered by patent law. As pool members develop follow-on inventions based on the pooled resources, the agreement by which the pool is constituted may obligate members to contribute patents covering those inventions to the pool.<sup>161</sup>

As with some natural resource pools that (when suitably managed) are self-sustaining and thus supply their own resources, in the cultural context the commons resources themselves may be sources of additional resources. The follow-on invention is an obvious example. An essential attribute of the governance of a cultural commons, therefore, is the way in which it allocates resources as they are produced dynamically.

Boundaries in an information environment are likewise more obviously culturally constructed than their counterparts in the field of natural resources. Oceans, lakes, and rivers have beds and shores; forests yield to fields. Boundary maintenance is an important part of commons management in natural resources, but the maintenance question often has a reference point in naturally occurring boundaries. In the information environment, all boundaries ultimately depend on cultural constructs.<sup>162</sup> Accordingly, this cluster is intended to help flesh out the connections between the construction of both resources and commons governance systems and the situatedness (or

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<sup>161</sup> Such grantbacks may raise antitrust concerns. See U.S. DEP’T OF JUSTICE & FED. TRADE COMM’N, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY § 5.6 (1995), available at <http://www.usdoj.gov/atr/public/guidelines/0558.pdf>.

<sup>162</sup> For a study of boundary maintenance in the open source software context, see O’Mahony & Bechky, *supra* note 6, at 431–50.

nestedness) of both resources and commons in broader systems. The cluster provides an important link back to the earlier discussion of baselines and degrees of openness.<sup>163</sup>

### iii. *Institutional Setting*

Pools and commons in the cultural environment are functional entities; they often serve markets, industries, and firms. It is important to understand the identities and roles of those institutions and how their own functions relate to the pool and its members. What are those markets, and how do they relate to the pool? The MAA, an example of an early, well-known patent pool, was organized in large part to facilitate the production of aircraft for military use during World War I.<sup>164</sup>

The institutional and social setting of a cultural commons may include related collectivist enterprises. Members of a pool may be part of a network structure that extends to related collectives, firms, individuals, groups, and social structures, including disciplines and social norms.<sup>165</sup> Research scientists may be organized formally into pools or commons structures within firms and other formal institutions, such as universities. Their functional network will include both members of their own technical art and related arts and other researchers in different arts who share a related but distinct set of social norms related to sharing of information and knowledge. Networks in not-for-profit or educational research settings will overlap to a degree with related networks in commercial environments. Researchers in university science departments will be interested in sharing information resources with researchers in corporate research-and-development groups.<sup>166</sup> Pools may bridge gaps created by the edges of formal institutional structures.<sup>167</sup>

Constructed cultural commons are often situated in nonhierarchical and distributed institutional settings, in which participants are only loosely connected and sometimes are connected only by their

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<sup>163</sup> See *supra* text accompanying notes 138–41.

<sup>164</sup> See *supra* text accompanying notes 4–5.

<sup>165</sup> See Katherine J. Strandburg et al., *Law and the Science of Networks: An Overview and an Application to the “Patent Explosion”*, 21 BERKELEY TECH. L.J. 1293, 1301 (2006).

<sup>166</sup> See Katherine J. Strandburg, *User Innovator Community Norms: At the Boundary Between Academic and Industry Research*, 77 FORDHAM L. REV. 2237 (2009) (discussing the sharing of research tools and materials between researchers in academic and industrial settings); *Norms and the Sharing of Research Materials and Tacit Knowledge*, in WORKING WITHIN THE BOUNDARIES OF INTELLECTUAL PROPERTY (Rochelle C. Dreyfuss et al. eds.) (forthcoming 2010).

<sup>167</sup> Cf. Frischmann, *supra* note 28; Peter Lee, *Interface: The Push and Pull of Patents*, 77 FORDHAM L. REV. 2225 (2009) (examining the role of patents as an “interface” between universities and industry).

participation in a particular project.<sup>168</sup> The range of institutional settings likely to be observed in case studies of cultural commons is thus likely to be considerably broader than the range observed in natural resource commons. The institutional setting will, of course, constrain and determine the ways in which rules for production and sharing of resources are both put into place and applied.

#### iv. *Legal Structures that Affect the Pool Itself*

Although industry, market, and networked institutional structures are essential reference points for many knowledge commons, positive law and direct government involvement with a particular cultural commons are likewise keys to understanding it. We distinguish between law that creates and enforces the entitlements that create and sustain information works, on the one hand, and law that is specifically addressed to cultural commons themselves, on the other hand. Here, legislators and judges often find that law can reinforce and sustain a pool that is determined to be welfare-enhancing. An exemption or more deferential treatment from antitrust scrutiny for parties engaged in a form of concerted activity, or intended to engage in concerted activity, may be adopted.<sup>169</sup> Market conditions or technologies may develop to the point where observers recognize that some kind of information collective would be useful, but fear of prosecution under antitrust law or relevant IP law may be a barrier to the emergence of the pool. A safe harbor of a sort may emerge, either via legislation or judicial decision. The 1984 judgment of the Supreme Court of the United States in *Sony Corp. of America v. Universal City Studios, Inc.*,<sup>170</sup> upholding the legality of distributing videotape recorders over the objection that they facilitated copyright infringement, may be characterized as creating a form of judicial safe harbor for innovative technologies for reproducing and distributing copyrighted works.

Legal rules may create subsidies or safe harbors in ways other than relieving at-risk parties from potential liability. For example, income-tax regimes may permit (or limit) the deductibility of research expenses by firms, nonprofit enterprises, and/or research collectives. In the United States patent statute, the section that bars patenting inventions that are “obvious” in light of prior art in the relevant technical field includes a subsection that suspends the rule if the inventor and the producer of the relevant prior art are part of a common “joint research agreement.”<sup>171</sup> Laws designed for one purpose may contrib-

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<sup>168</sup> See, e.g., BENKLER, *supra* note 35, at 59–90 (providing various examples of “commons-based peer production”).

<sup>169</sup> See HOVENKAMP ET AL., *supra* note 127, § 36 (discussing research joint ventures).

<sup>170</sup> 464 U.S. 417 (1984).

<sup>171</sup> 35 U.S.C. § 103(c)(2) (2006).

ute differently to promoting collaborations or collectives in ways not intended by the drafters of the law. Such a rule becomes part of the constitution of a commons, even if it was not designed to do so in the first place. Jessica Litman uses this proposition to analyze the persistence of a legal regime subsidizing jukeboxes in American copyright law.<sup>172</sup> A compulsory license permitting owners of coin-operated record players to use copyrighted American music was initially incorporated into the copyright statute to prevent holders of those copyrights from monopolizing adjacent markets for performances.<sup>173</sup> Over time, the rationale for the subsidy became less significant, but the statute was retained because a new collective emerged to support its continued existence—companies that manufactured and distributed jukeboxes.

#### v. Governance Mechanisms

A constructed commons is an alternative to proprietary exclusion and to direct government intervention as a means of addressing market failures associated with public goods, externalities, and the tragedy of the commons. Accordingly, understanding the mechanism of governance of a particular commons, in the context of its legal and institutional setting, is at the heart of the analysis. In Ostrom's work, the degree of *self*-governance is an important characteristic of a resource pool.<sup>174</sup> Members have rights not only to contribute to and extract from the pool but also to govern themselves by adopting and modifying the relevant rules of participation.

The attributes to be considered here overlap to some extent with those addressed in the context of determining the scope of the openness of the pool. The focus shifts, however, from access to the resources of the commons to participation in decision making about how the resources will be produced and managed. Who is a member, and who decides who may be a member? How is resource contribution and extraction monitored and, if necessary, limited? What sanctions and dispute resolution mechanisms are provided for misconduct? To what extent do these self-governance mechanisms rely on or incorporate formal legal mechanisms, and to what extent do they rely on or incorporate other, nonlegal institutions or social structures?

For example, in the context of the General Public License for open source computer programs, membership in the commons defined in part by the license is further defined by use of the program itself, which, according to the terms of the license that accompanies

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<sup>172</sup> See Jessica Litman, *War Stories*, 20 CARDZO ARTS & ENT. LJ. 337, 351–53 (2002).

<sup>173</sup> See *id.* at 352–53.

<sup>174</sup> See OSTROM, *supra* note 58, at 29–55.

the programs, constitutes assent to its terms.<sup>175</sup> Violation of those terms, such as onward distribution of a copy of a program without including a copy of the program's source code, constitutes a license violation and automatically terminates that membership.<sup>176</sup> Actual enforcement of that regime, however, typically is not pursued by individual contributors to the open source commons but instead by an independent entity, the Free Software Foundation, which operates as a freestanding nonprofit organization dedicated to advocacy on behalf of "free" software and accompanying open source license terms.<sup>177</sup>

Research on natural resource pools emphasizes that effective self-governance typically requires formal access to public sanctioning and/or enforcement mechanisms. Without the threat of seizure or attachment or injunction, community-based or purely norm-based mechanisms may lack sufficient bite to sustain the pool. In the context of cultural commons, effective connections between self-governing collectives and formal sanctioning authorities have not yet been identified. In the open source computer software area, only recently have courts begun to consider the enforceability of the licenses.<sup>178</sup> Conflict resolution mechanisms within a pool depend on monitoring mechanisms. Before the emergence of the Internet, research on self-governing communities emphasized size and distance as key variables in a monitoring system. As Benkler<sup>179</sup> and Cohen<sup>180</sup> each argue, networking technology offers not only the potential for community development and resource aggregation but also the potential for monitoring and enforcement. Examination of a pool should include assessment of whether and how it is embedded in network technologies that perform some or all of the pool's governance functions.

### 3. *Patterns and Outcomes Emanating from a Particular Action Arena*

Finally, as when analyzing natural resource commons, the analysis should include an inquiry into patterns of interactions and outcomes, including:

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<sup>175</sup> See Free Software Foundation, GNU General Public License, *supra* note 116, § 9.

<sup>176</sup> See *id.* § 8.

<sup>177</sup> See Free Software Foundation, What Is Free Software and Why Is It So Important for Society?, <http://www.fsf.org/about/what-is-free-software> (last visited Mar. 12, 2010).

<sup>178</sup> See, e.g., *Jacobsen v. Katzer*, 535 F.3d 1373, 1381–82 (Fed. Cir. 2008). In *Jacobsen*, the open source collective was represented by one of its members, Jacobsen, as assignee of copyright interests in the open source program at issue. *See id.* at 1375–76.

<sup>179</sup> See Benkler, *supra* note 35, at 2–7, 29–127.

<sup>180</sup> See Julie E. Cohen, *Pervasively Distributed Copyright Enforcement*, 95 GEO. L.J. 1, 37–43 (2006).

- solutions to the underlying collective action problem and benefits delivered by the commons (including innovations and creative output, and production, sharing, and dissemination of those innovations and output to a broader audience), along with the dynamics of the social practices that emerge from the interaction of commons resources and commons participants; and
- costs and risks associated with the commons, including, for example, any negative externalities.

A cultural commons should be assessed not only in light of its ostensible purposes but also in light of its consequences. This aspect of the case study approach should both identify the consequences and describe relevant criteria for evaluating them.

The consequences themselves typically will take at least two forms, which in a particular case often will be inextricably linked. With respect to intellectual resources, a cultural commons usually will produce some intellectual or knowledge-related (or material) output. The MAA enabled the production of airplanes. The Linux open source project supports the Linux computer program. Wikipedia produces Wikipedia.org. The AP enables the production of newspapers.

In the case of most cultural-commons examples, moreover, the social patterns that emerge from the construction and governance of the commons may themselves constitute ongoing, constantly refreshed commons outcomes. Many of the companies that were parties to the original MAA agreement combined via merger and acquisition by 1929 to form the Curtiss-Wright Corporation, which is still a significant defense contractor today.<sup>181</sup> The Linux project and Wikipedia are notable not only for the production of complex industrial-scale products but also for the governance of networks of loosely aligned contributors, distributed broadly in space and time.<sup>182</sup> The AP and other wire services have cultivated and retained identities as distinct and productive enterprises in their own right despite the fact that much of what they publish is created by their members.<sup>183</sup> The jamband community is a recognized community that defines itself partly via its practices of archiving and sharing jamband performances.<sup>184</sup>

#### a. *Solutions and Benefits*

We defined constructed commons in the cultural environment as solutions to collective action or other transactions cost problems not arising from the character of intellectual property entitlements them-

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<sup>181</sup> See DONALD M. PATTILLO, PUSHING THE ENVELOPE: THE AMERICAN AIRCRAFT INDUSTRY 35, 80–81 (1998).

<sup>182</sup> See Benkler, *supra* note 35, at 65–74.

<sup>183</sup> An adjunct AP product, the Associated Press Stylebook, is published by the AP itself and is something of a bible for newspaper editors across the industry.

<sup>184</sup> See *supra* notes 17–20 and accompanying text.

selves, as solutions to problems that do arise from those entitlements, as solutions to boundary-spanning dilemmas, and as reactions to an “infrastructure”-type problem—the market’s inability to aggregate individual demand for standards or platform resources—that is the inverse of the standard tragedy-of-the-commons diagnosis.

For any specific cultural commons, the questions involve not only the type of problem that it appears to be designed to solve and precisely how the combination of legal rules and other “openness” constructions propose to solve it, but also the success of the commons in sustaining and generating spillovers and a dynamic cultural environment. Quantifying or otherwise documenting that success is particularly difficult in the cultural environment, because the desired benefits often accrue to populations other than those in direct producer/consumer relationships. Commons can enable spillovers,<sup>185</sup> the dynamic benefits that an information environment can be designed to enable whether in its “natural” state, via the “default” variations on that state as described earlier,<sup>186</sup> or via some pool or other constructed environment. One beneficiary of the MAA patent pool was the American government, which purchased aircraft during World War I.<sup>187</sup> The beneficiaries of an online jamband archive may include ordinary music lovers, who are able to listen to jamband recordings even though they may not count themselves among the jamband community itself.<sup>188</sup> Under some circumstances, the very persistence of an institution may be evidence of the success of a commons regime.<sup>189</sup>

#### b. *Costs and Risks Associated with a Cultural Commons*

Any cultural commons may engender a tradeoff between the benefits anticipated from the commons in terms of dynamic welfare enhancements and the costs and risks associated with that commons. In conventional law-and-economics terms, these costs and risks are fairly well understood (and, importantly, they are generally better understood and easier to describe and quantify in many instances than the downstream benefits that commons may supply). Enabling collaboration and cooperation among firms sharing access to pooled information resources facilitates cooperation along lines that may be anticompetitive and therefore socially harmful: agreements to raise

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<sup>185</sup> See Frischmann & Lemley, *supra* note 27, at 258.

<sup>186</sup> See *supra* Part II.B.1.

<sup>187</sup> See *supra* notes 4–5 and accompanying text.

<sup>188</sup> See Schultz, *supra* note 17, at 676–77 (describing the free distribution of jamband music).

<sup>189</sup> See *supra* note 1 and accompanying text (describing the success of the commons that developed around the Maine lobster industry).

and fix costs and agreements to reduce output.<sup>190</sup> Pools, like other collective arrangements, also involve administrative costs associated with constructing, monitoring, and enforcing compliance with the rules of the pool. From a welfare standpoint, the level of those costs must be compared to the level of administrative costs associated with a system that provisions information resources in the absence of the pool.

In sum, we offer the framework described in this Part as a template for ongoing case study investigations of constructed cultural commons across a broad variety of domains. In many contexts, the existing scholarly literature has undertaken case study investigations of phenomena grounded in social norms,<sup>191</sup> transactions cost economics,<sup>192</sup> and even history and anthropology,<sup>193</sup> all of which may be profitably aggregated and recast as examples of cultural commons. One step in that direction is an application of the framework to analyze universities as cultural commons.<sup>194</sup> Collecting and reconstructing this literature using the clusters of questions listed above will, in our estimation, yield new insights into the emergence and effective functioning of cultural commons.

Going forward, we anticipate developing an inventory of new commons case studies, perhaps beginning with more detailed investigations of some of the examples discussed in the Introduction. We also hope other scholars will consider using this framework as part of their own work. Over time, we anticipate that the results of further case studies will yield not only better information regarding commons themselves but also refinements to the constructed cultural commons framework and to the above baskets of questions. In a real sense, the study of commons is itself a constructed cultural commons, and our own three-part collaboration is a nested commons within the scholarly community that studies commons.

## CONCLUSION

The theoretical discussion of intellectual property policy has been myopically focused on extremes of exclusion and open access, ignoring a wide range of cultural commons that persist between the extremes. It is often divorced from empirical studies of creative and inventive communities. To the extent that case studies are undertaken, they tend to be done in isolated areas (such as open source software or academic publishing) and consider a limited number of

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<sup>190</sup> See, e.g., HOVENKAMP ET AL., *supra* note 127, § 34.2.

<sup>191</sup> See Schultz, *supra* note 17.

<sup>192</sup> See Merges, *supra* note 5.

<sup>193</sup> See KELTY, *supra* note 7.

<sup>194</sup> See Madison, Frischmann & Strandburg, *supra* note 21.

descriptive variables. This narrow focus makes integration and learning from a body of case studies quite difficult, which in turn discourages people from pursuing further case studies. Scholars appear to be aware of the need for a more nuanced and structured approach to these questions but have not yet developed a framework for studying them.

This Article offers precisely such a framework. Applying the environmental metaphor that is increasingly common in studies of information and intellectual property policy, we analogize information and knowledge resources in the cultural environment to physical resources in the natural environment. We identify a set of constructed cultural commons, or pools of information resources, that serve functions in the cultural environment similar to the functions provided by common-pool resources in the natural environment. Those functions consist largely of serving as alternatives to purely private rights of exclusion and to government intervention in solving underproduction and overconsumption problems associated with an unmanaged or “natural” resource. Although constructed commons in the cultural environment exist for a variety of purposes, in general we hypothesize that they are often welfare-enhancing in regard to promoting valuable spillovers of information and knowledge distribution.

Borrowing from Ostrom, we argue that understanding the origins and operation of beneficial cultural commons requires detailed assessments that recognize that they operate simultaneously at several levels, each nested in a level above, and that each level entails a variety of possible attributes that cannot, at this stage of the inquiry, be specified in detail in advance. We suggest a set of buckets or clusters of issues that should guide further inquiry, including the ways in which information resources and resource commons are structured by default rules of exclusion, and the ways in which members of these pools manage participation in the collection, production, preservation, and extraction of information resources. Case studies across disciplines and reviews of existing literature that addresses cultural commons will help specify relevant attributes within each cluster. These variables will help scholars and eventually policymakers assess the level of openness associated with a given commons and determine the extent to which “openness” is, as we hypothesize, associated with pools that are welfare-enhancing.

Beyond our proposal of a framework for studying them, our consideration of constructed cultural commons has highlighted a number of points that are important in the study of intellectual property going forward. Considering constructed cultural commons helps to elevate collective, intermediate solutions to their possible place of significance in accounts of property regimes and should diminish the skepti-

cism of many scholars that collective, norm-driven solutions can work beyond narrowly defined situations. Case studies will also call our attention to the constructed, designed character of both the cultural and the legal environment in regard to knowledge and information policy problems. Finally, as they have done in the study of natural resource management, systematic analyses of cultural commons across a wide range of collected case studies should lead us to doubt panacea prescriptions drawn from overly simplistic models.

## REPLY: THE COMPLEXITY OF COMMONS

*Michael J. Madison, Brett M. Frischmann & Katherine J. Strandburg†*

This Reply responds briefly to some of the challenges to and critiques of our article, *Constructing Commons in the Cultural Environment*, offered by Professors Thráínn Eggertsson,<sup>1</sup> Wendy Gordon,<sup>2</sup> Gregg Macey,<sup>3</sup> Robert Merges,<sup>4</sup> Elinor Ostrom,<sup>5</sup> and Lawrence Solum.<sup>6</sup> We are extremely grateful for the attention these scholars have devoted to our article and find the comments both constructive and complementary to our perspective in ways that substantially contribute to our project. We appreciate these extensions to our project and find that we agree with many of the commenters' suggestions, even if we cannot address all of them in this Reply. Instead, the Reply captures our responses to the most salient points among their comments. Some of those, as noted below, are reflected in modifications to the article itself. The full measure of others can be taken only in time as the research proposed in the article emerges through further commons case studies.

The Reply is organized thematically rather than as a response to each critique in turn. The Sections below address the following topics: First, what are commons? That is, what phenomena do we mean to capture for study? Second, what benefit do we derive from the multidisciplinary character of our framework for studying cultural commons—and at what cost? Third, what additional inquiries do these critiques suggest? Fourth and finally, what explicit and implicit normative assumptions do we make in offering this framework, and what questions about those assumptions do we defer?

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† At the outset, of course, we wish to thank each of these distinguished scholars for careful review of our article and critical engagement with our ideas and proposed framework.

<sup>1</sup> Thráínn Eggertsson, Response, *Mapping Social Technologies in the Cultural Commons*, 95 CORNELL L. REV. 711 (2010).

<sup>2</sup> Wendy J. Gordon, Response, *Discipline and Nourish: On Constructing Commons*, 95 CORNELL L. REV. 733 (2010).

<sup>3</sup> Gregg P. Macey, Response, *Cooperative Institutions in Cultural Commons*, 95 CORNELL L. REV. 757 (2010).

<sup>4</sup> Robert P. Merges, Response *Individual Creators in the Cultural Commons*, 95 CORNELL L. REV. 793 (2010).

<sup>5</sup> Elinor Ostrom, Response, *The Institutional Analysis and Development Framework and the Commons*, 95 CORNELL L. REV. 807 (2010).

<sup>6</sup> Lawrence B. Solum, Response, *Questioning Cultural Commons*, 95 CORNELL L. REV. 817 (2010).

## I

### THE SCOPE OF COMMONS

We start with what appear to be definitional questions. Solum in particular challenges us to specify the criteria by which some phenomena are captured as “cultural commons” but others are not.<sup>7</sup> The “what is commons” question is understandable; our article is slightly vague, and deliberately so, regarding what precisely we mean by “cultural commons.” What is commons; what is culture; and what is cultural commons?

One reason that we hesitate to define the meaning of “commons” is that we do not intend to offer a theory or model that we claim is applicable to all commons. Following Ostrom, we characterize the approach of the main article as a framework,<sup>8</sup> and we have added some clarifications in the article to reflect that theme.

What we mean by a framework is that the article outlines a series of inquiries to pursue in analyzing phenomena that appear to operate as cultural commons. Those inquiries reflect a variety of theoretical dispositions and, in some cases, no theoretical disposition at all. We argue that it is neither possible nor appropriate to apply a theory to these phenomena until more data is available for analysis. As we discuss in the article, some commons phenomena appear to be better explained by club goods theory, others by transactions cost theory, others by game theory, and so on. No single theory appears to be capable of satisfactorily explaining the full range of commons phenomena.<sup>9</sup> The commons framework for collecting case studies is grounded on the premise that existing theories may prove to be inadequate. New theories may need to be developed. By encouraging the collection of studies under a kind of theoretical “big tent,” theorists of different persuasions can look at data grounded in a common framework and, in the best of worlds, inform one another’s work.

This explanation may satisfy the definitional critique only in part. Our project is admittedly grounded in the intuition that there are phenomena that operate as commons and merit study in the context of this framework, but there are other phenomena that do not. The term “commons” generally conjures up the notion of a shared community resource, such as a public park or a common pasture. Although the term is often used loosely to refer to the resources being

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<sup>7</sup> See *id.* at 828–32.

<sup>8</sup> See Ostrom, *supra* note 5, at 809–11; Elinor Ostrom & Charlotte Hess, *A Framework for Analyzing the Knowledge Commons*, in *UNDERSTANDING KNOWLEDGE AS A COMMONS: FROM THEORY TO PRACTICE* 41 (Charlotte Hess & Elinor Ostrom eds., 2007).

<sup>9</sup> See Michael J. Madison, Brett M. Frischmann & Katherine J. Strandburg, *Constructing Commons in the Cultural Environment*, 95 CORNELL L. REV. 657, 678 (2010) (explaining that club theory is useful in examining patent pools but not Wikipedia).

shared, to the community, or to the commons as a thing in itself, “commons” is best understood to refer to a type of resource-management strategy, generally reflected in institutions or a governance regime.<sup>10</sup> Firms, universities, families, government agencies, and even biker gangs practice commons-management strategies for sharing various resources,<sup>11</sup> but this fact does not mean that these organizations or communities *are* solely or essentially commons. Rather, they manage some resources as commons. We have at times used the term “commons” loosely ourselves, but we nonetheless believe firmly that it is important to distinguish among resources, resource-management strategies and institutions used to implement those strategies, and resource managers. Firms, families, universities, and the like are managers; they are not commons. In other words, we do not want to “thingify” commons. In our work on universities, for example, we argue that “the modern research university [is] a constructed cultural commons”—that is, that universities use commons resource-management strategies widely.<sup>12</sup> Indeed, it is obvious to any observer that many resources within universities are not managed as commons. Our focus is on cases of commons governance.<sup>13</sup>

The basic characteristic that distinguishes commons from noncommons is institutionalized sharing of resources among members of a community. “Cultural commons” is shorthand for situations in which the resources shared by members of a community are cultural resources. Our approach to studying commons in the cultural environment deliberately casts a wide net in terms of the types of cultural resources, sharing practices, and communities subject to consideration, and we hesitate to be too specific with respect to these criteria. Instead, we compose sets of questions to interrogate and explore them.

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<sup>10</sup> In law, even legally recognized “things” are not necessarily characterized by what philosophers might recognize as rigorous sets of features. See Michael J. Madison, *Law as Design: Objects, Concepts, and Digital Things*, 56 CASE W. RES. L. REV. 381 (2005). The title of Ostrom’s seminal work on commons reflects that her work focuses on governance. See ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION (1990). The citation in connection with her recent receipt of the 2009 Nobel Memorial Prize in Economic Sciences focuses on “her analysis of economic governance, especially the commons.” The Nobel Foundation, The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2009, [http://nobelprize.org/nobel\\_prizes/economics/laureates/2009/index.html](http://nobelprize.org/nobel_prizes/economics/laureates/2009/index.html) (last visited Mar. 9, 2010).

<sup>11</sup> We thank Christopher Buccafusco and Peter DiCola for asking us to explain whether biker gangs and firms are cultural commons.

<sup>12</sup> See generally Michael J. Madison, Brett M. Frischmann & Katherine J. Strandburg, *The University as Constructed Cultural Commons*, 30 WASH. U. J.L. & POL’Y 365, 378 (2009) (discussing the governance dimensions of the university as a constructed cultural commons).

<sup>13</sup> See *id.* at 378–80.

Treating commons as a governance strategy means that neither the subjects to be studied nor the results to be gathered will be precisely uniform. Although commons typically share certain governance features that have similar purposes, the details of those features and their functions will vary from setting to setting. Rather than debate definitions, we think it is most productive to ask whether analyzing various phenomena through the commons framework is useful. It would be counterproductive to foreclose study of a particular commons prospect because of an assumption, *a priori*, that certain things “are” or “are not” commons. Researchers who adopt the framework should be free to choose their own subjects and reach their own conclusions. Unexpected insights may result.

With respect to defining the resource units of commons analysis, a rigorous approach to comparative institutional questions might suggest that those units be specified (are these the relevant units?) and defined (what are their boundaries?) such that comparative analysis will be most useful.<sup>14</sup> In contrast, we believe that it is premature at this stage to lock in a one-size-fits-all description of cultural resources.

In part, we defer defining units of analysis too precisely for all purposes because different cultural commons contexts will process different species of knowledge and information: copyrights, patents, copyrightable expression, patentable inventions, data (or other information that is not governed by an intellectual property rights regime), and in some contexts, perhaps collections and combinations of these and other things. We offer the cultural commons framework to enable comparison of institutional arrangements that involve copyrights and those that involve patents, for example, whereas in other research, copyright-based institutions would be distinguished from patent-based institutions. In any given commons investigation, research should explore how knowledge and information units are defined and used by commons participants.

We also defer defining the resource set in detail for reasons related to differences between cultural commons and commons in tangible resources. In earlier commons analysis, not involving intellectual or knowledge resources, the scale of the unit as experienced in practice was closely aligned with the scale of the unit as analyzed by the law. In real-property contexts, the law and the marketplace deal in identically sized parcels of land. Firms, individuals, and governments can debate whether and how the boundaries of those parcels might be changed, voluntarily or involuntarily, but the borders of those parcels are largely given by history and practice, and

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<sup>14</sup> See Oliver E. Williamson, *Transaction Cost Economics and Organization Theory*, in *ORGANIZATION THEORY: FROM CHESTER BARNARD TO THE PRESENT AND BEYOND* 207, 225 (Oliver E. Williamson ed., 1995) (stressing the details of the unit of analysis).

validated by law. (That is not to say that in all contexts, borders and boundaries are always perfectly clear.) In the contexts of chattel property and tangibles, the same general scheme applies. In fisheries and forests, fish and trees as units of analysis are generally given by nature and recognized by law.

By contrast, intellectual or cultural resources do not necessarily come to us in “natural” sizes or scales. The definition of an intellectual resource, such as a copyrightable work of authorship, a patentable invention, a book, or a new machine, is clearly molded in part by market and historical considerations, but it is also driven to a significant degree by legal and other public-policy considerations,<sup>15</sup> and these two perspectives may or may not align with each other. Copyrights, for example, are the subjects of extensive transacting, but they have no well-defined *ex ante* scope; patents, which are not valid until a government agency has reviewed and approved a detailed set of legally enforceable “claims,” are subject to significant interpretation and limitation during licensing and litigation. There are intellectual resources that are too small,<sup>16</sup> or too numerous,<sup>17</sup> to be credible or useful in legal contexts. In addition, and perhaps most importantly, intangible resources can overlap, intertwine with one another, and change dynamically in ways that tangible resources typically cannot.

Intellectual property law generally distinguishes the intangible innovation or creativity that is protected by patent or copyright law from its material embodiment, which is not protected. A commons regime may apply at one of these levels but not the other. In some commons contexts, such as scientific research, it may be proper to characterize the relevant resources in terms of streams, continuity, or overlapping of intellectual resources, rather than to try to define discrete units. If discrete units are relevant to commons, then intellectual property transactions are likely to be important as topics for analysis. If information streams are relevant, then it is more likely that the absence of intellectual property rights, or structured limitations on intellectual property rights, will be important.

In sum, identifying intellectual resources and delineating their boundaries are, we suggest, parts of commons governance, rather than definitional processes that take place prior to the creation or

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<sup>15</sup> See, e.g., Brett M. Frischmann & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257, 272–75 (2007) (examining definitional and boundary-setting differences between real and intellectual property).

<sup>16</sup> See Justin Hughes, *Size Matters (or Should) in Copyright Law*, 75 FORDHAM L. REV. 575 (2005) (discussing why size of independent property claims matters in copyright and proposing suggestions for a workable minimum-size principle).

<sup>17</sup> See, e.g., Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621, 625 (1998) (describing how the creation of too many property rights can create anticommons blocking the effective use of a resource).

recognition of commons. Our framework incorporates identification and delineation of resources and their scales as questions to be asked, rather than as premises or assumptions.

## II DISCIPLINARY PERSPECTIVES

The proposed framework is not designed to reflect a single disciplinary foundation. Partly because we borrow from Ostrom's work and partly because of much of our own prior research, the framework relies explicitly on New Institutional Economics, rational choice theory, and transactions costs analysis (among other approaches within economics and law). But we recognize the limitations of each of those approaches, particularly with respect to understanding the dynamics of institutions built in part from intangibles. As Macey points out in his critique,<sup>18</sup> our research framework offers a compelling opportunity to blend the useful aspects of economic analysis with insights from other fields.

Our article suggests that research on commons should be broad and include inquiries into history and tradition, psychology, and sociology. Each of these disciplines sheds light on the sources and uses of intellectual and knowledge resources in commons contexts: where did those resources and associated institutions come from? How did they acquire whatever legitimacy and durability they have? Economic analysis alone may be insufficient for our purposes because it can be inattentive to the complexities of the real world.<sup>19</sup> Other social sciences offer perspectives, tools, and methods for exploring complementary questions associated with the practice of commons. Some scholars associated with New Institutional Economics have suggested that some or all of these perspectives may be validly incorporated into an overarching economics framework.<sup>20</sup> Eggertsson's comment likewise points in that direction.<sup>21</sup>

Our disciplinary eclecticism creates a tradeoff. On the one hand, were we to adopt a framework more directly tied to a single, focused theoretical perspective, commons research using that framework likely would generate a more integrated body of results with abundant

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<sup>18</sup> See Macey, *supra* note 3, at \*\*nn. 775–90.

<sup>19</sup> This brief summary is a point that many scholars have discussed elsewhere at length. The limits of economic models are apparent if one critically examines conventional economic assumptions about individual behavior and cognition; institutional history, dynamics and evolution; and the completeness and independence of markets, among other things. See, e.g., HERBERT A. SIMON, *Rational Choice and the Structure of the Environment*, in MODELS OF MAN: SOCIAL AND RATIONAL 261, 273 (1957).

<sup>20</sup> See, e.g., DOUGLASS C. NORTH, UNDERSTANDING THE PROCESS OF ECONOMIC CHANGE (2005).

<sup>21</sup> See Eggertsson, *supra* note 1, at 726–28, 731–32.

potential for comparative institutional analysis within that field. On the other hand, scholars in other fields largely would be foreclosed from researching commons on those terms, and their own commons research, whatever it might be, would not be organized in a way that would permit easy bridging among disciplines. The result would be two, or three, or more bodies of research that are not set up for comparative analysis, leading to the risk that the myopias inherent in certain disciplines would limit the reach of the investigation.

Our framework is designed for long-term interdisciplinary conversation, and we think that the likely downstream benefits of bringing a greater number of scholars into a single domain—the study of cultural commons—is worth the possible cost in disciplinary conformity.

That we have proposed a framework for the study of commons, rather than a theory or model, is an important, related point. In the article, we have clarified that at this point in our project, we do not argue that commons is a theory or a model of firm or individual behavior. We are not presently identifying predictions to be tested, as a theory of commons would warrant. We are not trying to fit historical data to a single standard, as would be expected if we were proposing a model. There will and should be time, in the future, for developing and testing theories and for proposing and refining models, and theories and models may emerge from commons data in a variety of disciplinary contexts. There is no reason for our project to generate data that can be used only by economists, or only by historians, or only by sociologists. Scholars in each of those disciplines, and in others, may develop models and theories based on the case studies and data generated by this framework. We emphasize that it is a framework precisely because its aim is to generate information that can be used later in more refined ways.

The framework is not and cannot be absolutely agnostic with respect to possible disciplinary applications. Even a framework has to start somewhere, and we acknowledge that we owe heavy debts to economics and rational choice theory. As our commenters encourage us to do, we recognize that economics and rational choice can take us, and future researchers, only so far. In the next Section of this Reply, we take up a handful of the more salient supplementary questions that our framework should address.

### III SUPPLEMENTARY INQUIRIES

Almost all of the commenters suggest one or more specific additional themes, topics, or questions for research in future commons case studies. Some of these are additions to the commons framework

outlined in the article. Many fit within it. The key themes identified in the commentary are the following.

*Sources of commons.* The title of the article uses the phrase, “*constructing commons*.” What work does the term *constructing* do in that phrase, and what does it (or might it) mean? Gordon and Macey in particular point out that commons might exist and be sustained for reasons having little or nothing to do with intentional planning.<sup>22</sup> We agree.<sup>23</sup> Commons can be designed, but commons also happen. Cultural commons are the products of many different factors, some of them arising from deliberate choice, some unintentional or accidental, and some “emergent,” in the sense that the term “emergent” is associated with the science (and related social science) of complex systems. We describe these possibilities in the article, and the framework approaches them under the rubric of questions dealing with commons history, tradition, and narrative. But the comments are well taken, and we have clarified the article in some places to confirm our own intended meaning of “constructing” commons.

*The role of individuals.* In our article, we focus our framework almost entirely on the character and functions of institutions. Although we have built largely on Ostrom’s work, which comes out of the rational-choice tradition, we paid little explicit attention to what models of individual behavior might be implicit in our framework. Comments by Eggertsson and Macey, in particular, rightly highlight ways in which the interplay between individuals and institutions can play key roles in particular commons, and in that sense they confirm our argument that one should not rely only on Professor Ostrom’s Institutional Analysis and Development framework but also go beyond it.<sup>24</sup> Eggertsson highlights the importance of describing and analyzing individual cognitive capacity.<sup>25</sup> In a commons case, what is the evidence regarding how commons governance structures—rules, norms, and so on—are understood and applied by commons participants? Macey points out the possibility of suspending the rational choice assumption altogether.<sup>26</sup> That point is consistent with the possibility that commons may be emergent, rather than chosen. We agree on both counts. In using the commons framework, scholars should observe how people do (or did) behave and should develop models and theo-

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<sup>22</sup> See Gordon, *supra* note 2, at 735 & n.14; Macey, *supra* note 3, at 785–89.

<sup>23</sup> We intend the term *constructing* (and the related *constructed*) to differentiate cultural commons from natural resource commons in the sense of the former being a product of human activity (whether planned or not). Yet in either case, the resource-management regime—that is, commons—is a product of human activity. Thus, on reflection, it appears that we may have reinforced a tendency to conflate resources with management regime.

<sup>24</sup> See Eggertsson, *supra* note 1, at 719–23; Macey, *supra* note 3, at 760, 762–66.

<sup>25</sup> See Eggertsson, *supra* note 1, at 716–25.

<sup>26</sup> See Macey, *supra* note 3, at 763–67.

ries based on those observations. As with the point we made in the preceding Section, we do not propose to use the framework to impose a single theory of behavior on researchers. Do individuals in commons conform to expectations about rational behavior? Or do they not, and is there evidence that permits us to infer their reasons for not doing so? How much attention in a commons case study and, eventually, in theories and models about cultural commons, should be given to behavior, and how much to institutional design? Answers to those questions can be given only after more evidence and data has been collected.

*Types of knowledge resources.* As we note above, the framework emphasizes the fact that the nature of knowledge or intellectual resources must be investigated as part of a commons case rather than accepted as given. Eggertsson adds an important layer to this analysis that we do not emphasize in our article: the respective roles of tacit and codified knowledge.<sup>27</sup> Relatedly, Ostrom and Macey point out the important role of technology in structuring commons—a role that is worth more emphasis than we have given it.<sup>28</sup> “Tacit” knowledge refers to knowledge that is shared informally, without being recorded in a physical or digital medium. Tacit knowledge forms part of each individual’s cognitive apparatus for understanding and interacting with the world, at both conscious and subconscious levels. Tacit knowledge may arise from each individual’s general experience in the world. It may also arise in the context of discipline- or domain-specific learning. Codified knowledge is knowledge that is inscribed in some physical or digital form—that is, in some technology. A book is a type of codified knowledge; in the intellectual property context, a patent is a type of codified knowledge. Technology itself can function as codified knowledge. Both types of knowledge may be managed as commons. Our article emphasizes that intellectual or knowledge resources are nonrivalrous, and that characteristic distinguishes cultural commons from natural resource commons. The distinction between tacit knowledge, which is entirely intangible, and codified knowledge, which has both intangible and tangible dimensions, complicates this account somewhat. In the investigation of knowledge resources, it may be important to distinguish tacit from codified knowledge<sup>29</sup> and to identify and understand the legal rules, technologies, and other processes by which intangible forms of knowledge are distinguished from tangible forms.

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<sup>27</sup> See Eggertsson, *supra* note 1, at 719, 723–25, 730.

<sup>28</sup> See Macey, *supra* note 3, at 786–90; Ostrom, *supra* note 5, at 811, 813–14.

<sup>29</sup> See Dan L. Burk, *The Role of Patent Law in Knowledge Codification*, 23 BERKELEY TECH. L.J. 1009, 1012–19 (2008).

*The importance of discipline, including sanctions, and types of governance.* Gordon devotes much of her Response to a discussion of the importance of understanding sanctioning mechanisms in commons contexts.<sup>30</sup> In the course of arguing that commons research should pay close attention to the costs and benefits of different sanctioning mechanisms, she identifies what we think is a helpful distinction between “sap” problems (in which people invoke sanctioning mechanisms so they can avoid being taken advantage of) and “fondness” problems (in which people avoid invoking sanctioning mechanisms that would preclude allegiances with friends). The scope and operation of sanctions are part and parcel of our series of questions relating to relevant governance rules, and as Gordon notes, gaps in the application of sanctioning mechanisms, and unintended consequence of those mechanisms, can be particularly important.

Macey makes a related point about the importance of networks in commons analysis.<sup>31</sup> Our article highlights the possible role of nested commons institutions as forms of governance. Smaller commons may be nested within larger commons, and that matrix may itself serve as a form of governance. Network analysis adds a useful layer to that perspective, one that fits within the commons framework’s existing focus on relevant social structures. Commons may be nested not only within other, larger commons but also within preexisting legal, structural, and other institutional frameworks (such as intellectual property law, employment law, corporate law, law related to government funding of scientific research, history and tradition, and the like). As social structures, networks are institutions in that sense. They are institutions in their own right in which individual actors are situated, both inside and outside of commons. Networks may connect nested institutions and may impact information dissemination and the shapes of commons communities (these may be nested, or overlapping, for example).<sup>32</sup> Network analysis can also inform how we understand answers to the questions posed above concerning the role of individual intentionality as well as the scope and sources of individual preferences and choice.

#### IV NORMATIVE PAYOFFS AND ASSUMPTIONS

Solum wonders about our normative commitments.<sup>33</sup> He challenges us to lay our normative cards on the table, if we have them.

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<sup>30</sup> See Gordon, *supra* note 2, at 736–49.

<sup>31</sup> See Macey, *supra* note 3, at 783–84, 788–90.

<sup>32</sup> See Katherine J. Strandburg et al., *Law and the Science of Networks: An Overview and an Application to the “Patent Explosion,”* 21 BERKELEY TECH. L.J. 1293 *passim* (2007).

<sup>33</sup> See Solum, *supra* note 6, at 830–34.

Alternatively, he invites us to be explicit that cultural commons research is largely a descriptive inquiry.

As an initial matter, Solum is correct in his suspicion that we are making what philosophers would call a “false necessity” argument. The standard models of innovation represented in the scholarly and policy literature wrongly exclude productive and sustainable models of innovation that are built on shared knowledge resources rather than on exclusivity. This argument is, as he notes, primarily descriptive, and at this stage of the research, it is driven more by intuition and anecdotal observation than by rigorous and comparative examination of data. The latter is exactly what the framework is designed to enable. When do commons work and how? As Macey notes, it is important to catalog not only the benefits of commons but also their costs.<sup>34</sup> Understanding commons may lead not just to understanding when and where they can be useful, but also to understanding when, how, and why to regulate them.

Nonetheless, we are motivated by an intuition that commons are normatively attractive in many situations, in the sense that they are superior, from a social standpoint, to innovation systems grounded solely in exclusive rights. One goal of the project is to conduct comparative commons study using some metric for social welfare, which might be specified by economic efficiency or other optimality conditions. Merges and Gordon offer suggestions for such a metric.<sup>35</sup> The framework is intended to be agnostic as to how one measures social benefit. Other metrics could be applied, depending on the models or theories that emerge from further study. Ostrom, for example, offers guidelines for the production of successful commons in the natural resources context.<sup>36</sup> Similar guidelines for successful commons in the cultural-resources context might be different; identifying such guidelines is a major purpose of studying further cases. Ostrom’s guidelines make clear that applying sustainability and stability as metrics, for example, rather than static efficiency, raise particularly tricky institutional questions. We might suppose (or conclude, after further cases) that the challenges of sustaining commons are of greater interest and importance than the challenges of building commons. Merges and Eggertsson each point in this direction, and we are open to that possibility.<sup>37</sup>

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<sup>34</sup> See Macey, *supra* note 3, at 761–62, 763–65.

<sup>35</sup> See Gordon, *supra* note 2, at 736–37; Merges, *supra* note 4, at 795–96.

<sup>36</sup> See Ostrom, *supra* note 5, at 811; Elinor Ostrom, *A Diagnostic Approach for Going Beyond Panaceas*, 104 PROC. NAT’L ACAD. SCI. U.S. 15181, 15183–85 (2007).

<sup>37</sup> See Eggertsson, *supra* note 1, at 713–14; Merges, *supra* note 4, at 793–94, 795–96, 802. Possible methods of building sustainability in cultural commons include building codified knowledge from tacit knowledge; training and education; and aggregating, generalizing, and sharing knowledge, especially basic research and knowledge. Each of these

Our normative position is modest. We are optimistic that down the road, commons case studies and refined models and theories will lead to public-policy payoffs in the intellectual property context and otherwise. We do not believe that it is necessary to commit to that proposition at this point.

#### CONCLUSION

This Reply has addressed some of the more salient questions and critiques raised in the six outstanding responses. We are grateful for the time and effort that the distinguished commentators have devoted to thinking about our article and for their suggestions and substantial contributions. We look forward to working with them and others in applying and refining the commons framework so that we can begin to understand how law and policy might best harness the creative potential of constructed cultural commons.

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things implies that historical analysis usually should be a key area of inquiry. See, e.g., Robin Cowan et al., *The Explicit Economics of Knowledge Codification and Tacitness*, 9 INDUS. CORP. CHANGE 211 (2000).