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Constructing Commons in the Cultural Environment

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Constructing Commons in the Cultural Environment*

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Abstract

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 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 only get us 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 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 between cultural commons in different industries, disciplines, and knowledge domains and shed light on the underlying contextual reasons for such differences.

The proposed approach would draw upon case studies from a wide range of disciplines. Among other things, we argue that a theoretical approach 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 whether there is a specified purpose to the arrangement.

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I. Introduction

The Maine lobster fishery has been recognized as a successful example of a managed natural resource commons. In order to ensure an ongoing supply of lobster in the face of threats to the fishery from unregulated over-fishing, over a period of years Maine lobster fishermen crafted a set of formal and informal rules to determine, as one might imagine, "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.⁴

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 information: copyrighted works of authorship, patented inventions, and other forms of information and knowledge that may be, but need not be, aligned with formal systems of intellectual property 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, the Article develops and argues for the use of a theoretical framework to systematize case-study-based research exploring 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 largely been regarded 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. Some initial

⁴ See generally JAMES M. ACHESON, CAPTURING THE COMMONS: DEVISING INSTITUTIONS TO MANAGE THE MAINE LOBSTER INDUSTRY (2003).

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. The patents in question typically relate to complementary technologies, where the exercise of patent rights by one holder “blocks” the exercise of related rights by a different holder. Pooled patents are typically available to all members of the pool and are available on standard licensing terms to non-members.⁵ A well-known example of an early patent pool in the United States is the Manufacturer’s Aircraft Association (MAA), which was formed in 1917 and encompassed nearly all American aircraft manufacturers. Major patents on aircraft technology were held by the Wright Company and the Curtiss Company, but Wright and Curtiss did not hold all 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 cost and in a short time. 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 agreed to cross-licensing of the patents to one another on what was, in the main, a royalty-free basis.⁶ 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 the Macintosh OS, was produced and is still maintained by a volunteer collaborative of individual programmers. 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 document. Unlike proprietary computer programs, which are distributed to users in object code or executable format only, as an open source program Linux is made available in source code form, so that members of the Linux community may modify their copies and, under the terms of the governing license, publish their modifications for use by others. Members of that 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

⁵ See Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard-Setting*, in *INNOVATION POLICY AND THE ECONOMY* vol. 1. (A. Jaffe, J. Lerner & S. Stern eds., 2001).

⁶ See Harry T. Dykman, *Patent Licensing within the Manufacturer’s Aircraft Association (MAA)*, 46 J. PAT. OFFICE SOC’Y 646 (1964); Robert P. Merges, *Contracting into Liability Rules: Intellectual Property Rights and Collective Rights Organizations*, 84 CAL. L. REV. 1293, 1343-46 (1996); *Manufacturers Aircraft Ass’n, Inc. v. United States*, 77 Ct. Cl. 481 (1933).

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 built on Linux. The rules governing 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.⁷ 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 volunteer community.

- *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.⁸ Wikipedia is not the product of unregulated, potentially chaotic openness, however.⁹ There is a governance structure among "Wikipedians" that modulates the openness of the project and operates as a kind of law.¹⁰ Not all additions and edits to Wikipedia automatically get added to the site. Moreover, the GNU Free Documentation License, the copyright license that governs the contents of Wikipedia, places restrictions on use of the contents of the site.¹¹ Wikipedia also has a dispute resolution system that plays an important role

⁷ The organizational structure of open source software projects is the subject of a thorough recent book. See CHRISTOPHER M. KELTY, *TWO BITS: THE CULTURAL SIGNIFICANCE OF FREE SOFTWARE* (2008).

⁸ See *Wikipedia*, <http://www.wikipedia.org> (last visited Mar. 1, 2009). For discussions of this and other examples of collective production see CHRIS DEBONA, MARK STONE, AND DANESE COOPER, *OPEN SOURCES 2.0: THE CONTINUING EVOLUTION* (2006); Michael J. Madison, *Social Software, Groups, and Governance*, 2006 MICH. ST. L. REV. 153.

⁹ In part due to perceptions of Wikipedia as unregulated, open, and chaotic, Wikipedia presents a puzzle for scholars, as reflected in the oft-quoted maxim, "Wikipedia works in practice, not in theory." "[T]he 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, "the exact way in which the members of the digital commons are to be herded and coordinated into a workable community has remained a mystery. Wikipedia is 'the canonical bee that flies despite scientists' skepticism that the aerodynamics add up.'" David Hoffman & Salil Mehra, *Wikitruth Through Wikiorder*, Working Paper (2009) (on file with authors) (quoting JONATHAN L. ZITTRAIN, *THE FUTURE OF THE INTERNET--AND HOW TO STOP IT* 148 (2008)).

¹⁰ See JONATHAN L. ZITTRAIN, *THE FUTURE OF THE INTERNET--AND HOW TO STOP IT* 143-46 (2008).

¹¹ See *WIKIPEDIA: TEXT OF THE GNU FREE DOCUMENTATION LICENSE*, http://en.wikipedia.org/wiki/Wikipedia:Text_of_the_GNU_Free_Documentation_License (last visited Feb. 12, 2009).

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in sustaining the commons.¹² The site is open, but with limits.

- *The Associated Press.* For more than a century the AP has been the leading American wire service for newspapers. It offers a compelling example of a constructed cultural commons that is not grounded in formal intellectual property rights. As factual material, the news itself cannot be copyrighted (though there is an important but narrow "hot news misappropriation" tort rule¹³). 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 investment 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. Cooperative members could both upload to the wire service material that they originated locally, and download from the wire service material that was produced by other members.¹⁴ 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 were initially shared via physical media and are now shared using online archives (organized via the website and organization known as etree.org). Sharing is encouraged by the bands so long as fans comply with informal rules that are set by the bands and honored and policed by the fan

¹² See Hoffman & Mehra, *supra* note 9, at 8-16, 30-40 (examining the Wiki dispute resolution system).

¹³ See *International News Service v. Associated Press*, 248 U.S. 215 (1918).

¹⁴ For histories of the Associated Press, see ASSOCIATED PRESS, *BREAKING NEWS: HOW THE ASSOCIATED PRESS HAS COVERED WAR, PEACE, AND EVERYTHING ELSE* (2007); Stephen Shmanske, *News as a Public Good: Cooperative Ownership, Price Commitments, and the Success of the Associated Press*, 60 BUS. HIST. REV. 55 (1986); *History/Archives*, <http://www.ap.org/pages/about/history/history.html> (last visited Feb. 12, 2009). 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 behaved monopolistically, and 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* (1852); 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 Perez-Pena, *Some Papers in Financial Trouble Are Leaving the A.P. to Cut Costs*, N.Y. TIMES, Oct. 19, 2008, at p. B1. Any accounting of the history of the Associated Press 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).

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communities themselves.¹⁵ 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 concert recordings by the bands. The commons of jamband recordings is structured not merely by fan expectations that norms will be honored, but also by filesharing 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.

These examples are illustrative of constructed cultural commons phenomena studied in isolation from each other.¹⁶ At first glance, these examples may appear to be disparate and unrelated—like comparing apples to oranges to plums to pears, and so on. 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.¹⁷

The framework described in this Article provides a means to investigate the social role and significance of constructed 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 intellectual property 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.¹⁸ To the extent that those market mechanisms are inadequate to optimize the welfare of

¹⁵ 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 (2006).

¹⁶ 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 (Conf. on the Legal Hist. of Intell. Prop., 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 (forthcoming 2009); and (iii) the series of Requests For Comment (RFCs) that define the technical protocols of the Internet. See *RFP-Editor Webpage*, <http://www.rfc-editor.org> (last visited Aug. 25, 2008). For other historical examples of technological commons, see R.C. Allen, *Collective Invention*, 4 J. ECON. BEHAVIOR AND ORG. 1 (1983); R.C. Allen, *Collective Invention*, 4 J. ECON. BEHAVIOR AND ORG. 1 (1983).

¹⁷ See *infra* Part II. Likewise, pomology, the study of fruit, offers something more than studying apples, oranges, plums, and pears independently.

¹⁸ See Merges, *supra* note 16.

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. 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.¹⁹ 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 generally regarded as exceptional and dependent upon pre-existing property entitlements.²⁰

Collecting and analyzing case studies of constructed cultural commons across a wide range of domains, using the framework that we describe below, offers a critical 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 II of this Article describes prior approaches to theoretical understanding of intellectual production based on juxtaposition of intellectual property regimes with a conception of the public domain. It highlights how recent case studies demonstrate the need for a more textured theoretical approach. Part III introduces the Institutional Analysis and Development pioneered by Elinor Ostrom in the natural resources context and presents our proposed adaptation of the framework to constructed cultural commons. Part IV concludes.

II. The Backdrop: Intellectual Property Theory, Commons, and the Need for a Research Framework

This Part reviews our motivation to produce the constructed commons framework and highlights the key theoretical regimes to which the constructed commons framework connects. We explain why a research framework is needed

¹⁹ Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 TEX. L. REV. 1031 (2005).

²⁰ Carol Rose, *The Comedy of the Commons: Custom, Commerce, and Inherently Public Property*, 53 U. CHI. L. REV. 711 (1986); Carol M. Rose, *Big Roads, Big Rights: Varieties of Public Infrastructure and Their Impact on Environmental Resources*, 50 ARIZ. L. REV. 409 (2008).

in this domain and justify the type of framework and case-study driven approach we develop in Part III. We begin with a discussion of intellectual property 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, 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 linguistic 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 III.

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 can all be understood to involve a simple core problem: As public goods, the “output” from these activities—whether described as information, expression, invention, innovation, research, ideas, and so on—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.²¹ As a result, such resources “face a 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), and this risk may lead to undersupply. 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.”²² Two standard solutions to this problem are intellectual property rights and government subsidies. These solutions heavily influence the framing and perception of the cultural environment.

²¹ On the public good nature of intellectual resources (ideas, information, expression, and knowledge), see Brett Frischmann & Mark Lemley, *Spillovers*, 107 COLUM. L. REV. 257, 272-73 (2007). On how those resources generate different types of externalities, see *id.* at 258-61; Brett M. Frischmann, *Speech, Spillovers, and the First Amendment*, 2008 U. CHICAGO LEGAL FORUM 301, 310-21. On public goods and externalities generally, see, RICHARD CORNES & TODD SANDLER, *THE THEORY OF EXTERNALITIES, PUBLIC GOODS, AND CLUB GOODS* 40-43 (1986).

²² Brett M. Frischmann, *The Pull of Patents*, FORDHAM L. REV. [draft at p. 35] (forthcoming 2009).

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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 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 intellectual property 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. 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 or expiration of rights) or not practiced (for example, because potential owners dedicate their resources to the public or because exclusion is practically impossible). For some types of resources, overconsumption and underinvestment problems associated with unlicensed sharing are solved by 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 supply the public domain, though not always.²³

The conventional functionalist paradigm is woefully inadequate as a descriptive matter.²⁴ Essentially, it is a caricature, an oversimplified account that roughly describes some cultural practices and productive activities but leaves

²³ 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. Reichman & Paul F. Uhlir, *A Contractually Reconstructed Research Commons For Scientific Data in a Highly Protectionist Intellectual Property Environment*, 66 LAW & CONTEMP. PROBS., Winter/Spring 2003, at 315 (2003).

²⁴ *See, e.g.*, Julie E. Cohen, *Creativity and Culture in Copyright Theory*, 40 U.C. DAVIS L. REV. 1151 (2007).

much too much out-of-frame, unexamined, and unaccounted-for. (Consider, for a moment, how many creative/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 explain this further 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 other social institutions that structure the cultural environment and shape normative outcomes. While our undertaking is emphatically positive/descriptive, we believe significant normative implications should flow from a better understanding of the cultural environment.²⁵

Over the last decade, scholars have recognized increasingly 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.²⁶ The information environment is riddled with so-called “semicommons,”²⁷ complex combinations of private rights and commons, some of which are constructed at the “macro, system level” of law²⁸ and some of which are constructed at the “micro, contextual level” of constructed 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 open and freely available to all,²⁹ and in part, they support public capabilities to use resources in ways that generate

²⁵ See Brett M. Frischmann, *Cultural Environment and the Wealth of Networks*, 74 U. CHI. L. REV. 1083 (2007).

²⁶ See Frischmann & Lemley, *supra* note 22; Frischmann, *supra* note 22, at 310-21.

²⁷ See Henry E. Smith, *Semicommon Property Rights and Scattering in the Open Fields*, 29 J. LEGAL STUD. 131 (2000). 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 occupied by his vehicle.

²⁸ Frischmann and Lemley explain how copyright and patent law are semicommons. Frischmann & Lemley, *supra* note 22, at 282, 284-85, 290-91.

²⁹ On the public domain, see Pamela Samuelson, *Enriching Discourse on Public Domains*, 55 DUKE L.J. 783 (2006).

spillovers.³⁰

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 semi-commons 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. 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 and overlapping variety of formal and informal institutional structures.³¹ Indeed, social production of cultural goods has become more salient and more economically important as a result of globalization and of the communications revolution symbolized by the Internet.³² 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 to encourage the growth and persistence of creative, sustainable, and

³⁰ See Frischmann & Lemley, *supra* note 22, 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.”).

³¹ 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 our 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 construction of cultural things by law, see Michael J. Madison, *Law as Design: Objects, Concepts, and Digital Things*, 56 *CASE W. RES. L. REV.* 381 (2005).

³² See YOCHAI BENKLER, *THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM* (2006); Frischmann, *supra* note 27 (reviewing BENKLER, *supra*).

equitable cultural environments.³³

Much of the scholarly debate in intellectual property 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.³⁴ As technology has evolved to facilitate an increasingly extensive and varied landscape of social and cooperative creative and innovative projects, however, 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.³⁵ There is a danger 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 Elinor Ostrom and 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.³⁶

³³ 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 (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 in the text, 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. While 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 while 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.

³⁴ See, e.g., WILLIAM M. LANDES & RICHARD A. POSNER, *THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW* 11-12 (2003).

³⁵ See, e.g., BENKLER, *supra* note 34; CLAY SHIRKY, *HERE COMES EVERYBODY: THE POWER OF ORGANIZING WITHOUT ORGANIZATIONS* (2008).

³⁶ *C.f.* Elinor Ostrom, Marco A. Janssen & John M. Anderies, *Going beyond panaceas*, 104 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 15176 (2007) (arguing against oversimplification and reflexive appeal to panaceas).

The primary lesson of their years of case studies of commons regimes is that the devil is in the details. Complex environments demand a more contextual empirical and theoretical approach.³⁷ Once one acknowledges the complexity of an environment, whether natural or cultural, and the futility of applying one-size-fits-all theories or legal approaches, one is confronted with the difficult question of how to develop both appropriate conceptual understanding and policy prescriptions. Here is where and why we think that 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 III.A, Ostrom's approach represents a starting point, but one that requires significant modifications. Those modifications, discussed in Part III.B, are woven into the baskets of questions we propose to use to interrogate constructed cultural commons. Our proposals draw an explicit connection between two approaches to intellectual property that are sometimes thought to conflict: a functionalist account and a metaphorical or narrative approach.

The functionalist account of intellectual property mirrors the functionalist approach that Ostrom and her colleagues take with respect to regimes governing sharing and exploitation of natural resources. In the field of intellectual property, the sharing/exclusion and cooperation/competition dichotomies present especially interesting and challenging puzzles. 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. It is impossible to divest oneself from that to which one has been exposed, and, 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 so on) 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.³⁸ Third, unlike resources in the natural world, resources of information and expression must be created before they can

³⁷ Our point coincides well with J.B. Ruhl's work on the uses of complexity theory in environmental regulation. See J.B. Ruhl, *Complexity Theory as a Paradigm for the Dynamical Law-and-Society System: Wake-Up Call for Legal Reductionism and the Modern Administrative State*, 45 DUKE L.J. 849 (1996); J.B. RUHL ET AL., *THE LAW AND POLICY OF ECOSYSTEM SERVICES* (2007); JOHN COPELAND NAGLE & J.B. RUHL, *THE LAW OF BIODIVERSITY AND ECOSYSTEM MANAGEMENT* (2d ed. 2006).

³⁸ On the point that the resources have no natural boundaries and that as a result, boundaries are necessarily constructed, see Madison, *supra* note 33; Frischmann & Lemley, *supra* note 22 at 274.

be shared. Because of the public goods character of these resources, a cultural commons must manage both use and production of cultural resources.

This means that in assessing any particular constructed cultural commons arrangement, we must expand the framework used in studying natural resources to include consideration not only of how resources are managed and shared within the community but also how and if resources are *created within* and *transferred outside* of the community. The constructed cultural commons framework as we propose it reflects these functionalist distinctions between Ostrom's approach to natural resource commons and our modified approach to intellectual resource institutions.

Despite the many virtues of functionalist accounts, they are limited by their necessary focus on a handful of variables or factors. A focus on excludability as a solution to public goods problems may lead narrowly to analysis of boundary problems in isolation.³⁹ A focus on appropriability mechanisms may lead narrowly to analysis of resource definition issues. A focus on transactions costs concerns may lead narrowly to analysis of information-forcing and limiting mechanisms. Such approaches can effectively highlight strengths and weaknesses of policy prescriptions in their respective domains, but they frequently fail to deal adequately with systemic issues or with dynamic changes.

One way to address those limitations is to expand the number of variables in the model and expressly to look for dynamic change. We have attempted to do both in the specification of the constructed commons framework.

A second and equally important way to address those limitations is to

³⁹ 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 Frischmann, *An Economic Theory of Infrastructure and Commons Management*, 89 MINN. L. REV. 917, 948-49 (2005).

examine a system of social ordering in expressive terms, rather than functional terms, looking to the construction and evolution of meanings of the system, in symbolic and narrative terms, as well as its operation. In proper proportion, a humanistic and metaphorical inquiry into information policy, on the one hand, and a functional approach grounded in social science models, on the other hand, are complementary and can be effectively unified in research questions that yield accurate descriptive summaries of commons phenomena as well as policy prescriptions.

We draw on linguistic and metaphorical approaches to legal and sociological questions, specifically by examining the metaphorical dimensions of the information “environment” and the knowledge “commons.”⁴⁰ The environmental metaphor for information law and policy – focusing on cultural and knowledge resources, rather than physical or natural resources – offers an especially illuminating and useful starting point for our project. We define the cultural environment, metaphorically as well as functionally, as a system of interconnected and interdependent resources that includes both natural and built resource systems.⁴¹ Relying on this metaphor offers the ability to explore connections within and between those systems; to differentiate growth and progress from stewardship, conservation, and sustainability; to describe the differences between natural and constructed environments and 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

⁴⁰ 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 intellectual property law and otherwise. For a recent review of the Law and Literature movement, see Bernadette A. 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 the project of 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* (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 4. Carol Rose focuses on narratives of property law in order to demonstrate the essentially social character of the law. See CAROL M. ROSE, *PROPERTY AND PERSUASION: ESSAYS ON THE HISTORY, THEORY AND RHETORIC OF PROPERTY* (1994). A number of intellectual property scholars draw on environmental and spatial metaphors in their discussions of information law and policy. See Frischmann, *supra* note 27; Pamela Samuelson, *Enriching Discourse on Public Domains*, 55 *DUKE L.J.* 783 (2006); Michael J. Madison, *Legal-Ware: Contract and Copyright in the Digital Age*, 67 *FORDHAM L. REV.* 1025 (1998); David L. Lange, *Recognizing the Public Domain*, 44 *LAW & CONTEMP. PROBS.* 147 (1981).

⁴¹ See Frischmann, *supra* note 27.

variety of regulatory and governance structures in other environmental contexts: public and private; legislative and administrative; oriented toward individual entitlements and collectivist, and so on.

The environmental metaphor also illuminates the importance of the nesting process that Ostrom identifies as a salient feature of commons. By nesting, we mean that there are many levels at which a particular commons phenomenon might be analyzed and 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 it should be studied. Ostrom analogizes this nested analysis to a set of maps at different levels of detail, such as one sees when using the “zoom” function in Google Maps.⁴² 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 functionalist and expressive framework is expressly intended for application to the cultural commons in environments that are structured not only by intellectual property law but also by other legal rules, such as the rules of contract and license, and by informal cultural institutions and social practices. The concept of the constructed cultural commons includes a broad swath of industry-specific and market-specific structural innovations, collective enterprises, thickets, pools, portfolios, and legal forms that exhibit blended private and public attributes. These constructed commons are, like intellectual property regimes themselves, socially constructed institutions that allocate rights to control access to and use of *some* intellectual and cultural resources. The design, allocation, and circumscription of these rights reflect social choices about how to manage or delegate management of intellectual works, and how to structure relationships among resource owners and potential resource users. In sum, the cultural environment displays multiple tiers of construction both in regard to the absence and presence of different forms of legal regulation, and also in regard to the relevant objects of analysis within that environment. A structured inquiry is needed in order to make progress in understanding the complex and diverse commons arrangements that may be constructed in the cultural environment.

III. Developing a Framework for the Study of Commons in the Cultural Environment

⁴² ELINOR OSTROM, GOVERNING INSTITUTIONAL DIVERSITY 8 (2005).

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

We base our proposed framework on the work of the political scientist Elinor Ostrom and her colleagues, who have for decades been studying commons in the natural resource environment. Examples include not only the lobster fishery with which we began the Article, but also numerous instances of grazing pastures, forests, and irrigation systems.⁴³ In each case, a similar underlying problem was diagnosed: what property scholars, following Hardin, refer to as a "tragedy of the commons."⁴⁴ Given a pool of physical resources that is presumptively open to all comers, such as a meadow for grazing sheep, and in the absence of a mechanism for coordinating the actions of resource users, that is, the owners of the sheep, resources are likely to be overconsumed and underproduced. 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.⁴⁵

This argument is often coupled with an argument that such “tragic” situations give rise to solutions grounded in regimes of exclusionary property rights.⁴⁶ The leading alternative to privatization and allocation of property rights via markets is government intervention and regulation.⁴⁷ 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

⁴³ See, e.g., ELINOR OSTROM, *GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION* 49-87 (1990) (describing commons case studies).

⁴⁴ See Garrett Hardin, *The Tragedy of the Commons*, 162 *SCIENCE* 1243 (1968).

⁴⁵ 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 Version of the Prisoners’ Dilemma, the Coase Theorem, and Supply-Demand Equilibrium*, 29 *CONN. L. REV.* 727, 749–51 (1997).

⁴⁶ See Harold A. Demsetz, *Toward a Theory of Property Rights*, 57 *AM. ECON. REV.* 347 (1967); Brett M. Frischmann, *Evaluating the Demsetzian Trend in Copyright Law*, 3 *REV. L & ECON.* 649 (2007); Harold A. Demsetz, *Frischmann’s View of “Toward a Theory of Property Rights,”* 4 *REV. L. & ECON.* 127 (2008). See also Ronald H. Coase, *The Problem of Social Cost*, 3 *J.L. & ECON.* 1 (1960) (adding well-defined property rights to the menu of options for dealing with externalities).

⁴⁷ See RICHARD CORNES & TODD SANDLER, *THE THEORY OF EXTERNALITIES, PUBLIC GOODS AND CLUB GOODS* 72–78 (1996); A. C. PIGOU, *THE ECONOMICS OF WELFARE* (MacMillan & Co. 4th ed 1932).

problems of collective action.⁴⁸ 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.⁴⁹ 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, whether through private property, state action, or even notions of community, must be resisted in favor of a more nuanced approach.⁵⁰

In response to the inadequacy of one-size-fits-all approaches, Ostrom and her collaborators developed a three-pronged attack:

- 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 determining 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.

This approach recognizes the crucial importance to the success or failure of commons management 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. It also walks the difficult line between overly simplistic theoretical models that paper over important complexity and a fragmented taxonomy of diverse situations. By design, the approach remains a work in progress in the natural resource domain, which is one of its strengths.

Ostrom’s method for systematizing the investigation of commons regimes,

⁴⁸ See OSTROM, *supra* note 45.

⁴⁹ *Id.*

⁵⁰ See Elinor Ostrom & Charlotte Hess, *A Framework for Analyzing the Knowledge Commons*, in UNDERSTANDING KNOWLEDGE AS A COMMONS: FROM THEORY TO PRACTICE (Charlotte Hess & Elinor Ostrom eds., 2007); Ostrom et al., *supra* note 38.

focuses on the nested, multi-tier character of the natural resource commons.⁵¹ Her Institutional Analysis and Development (“IAD”) framework is used to structure a common set of research questions to be applied 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. To be clear, our objective is to do the same in the cultural context.

The IAD framework for natural resource commons is illustrated in Figure 1.⁵² 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 mechanisms are denoted by Ostrom “exogenous variables.” These are attributes of a particular commons that are fixed, at least with respect to the analysis of a particular situation.⁵³ 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 whether they live close to one another, whether they have familial relationships, and the skill sets needed for lobster fishing; and the rules – whether explicit or informal – that govern fishing. The second set of inquiries 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),” in other words, the place at which the exogenous variables combine in particular instances, leading over time to observed patterns of interactions and outcomes.⁵⁴

The emphasis in Ostrom’s work is on the diversity of possible combinations of exogenous variables that determine what actually happens in particular instances and hence the outcomes that result. The rules governing lobster fishing are one contributor to whether the activity can be sustained over time, 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 on the environment such as pollution. Understanding the observed

⁵¹ See Elinor Ostrom, *A diagnostic approach for going beyond panaceas*, 104 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 15181 (2007).

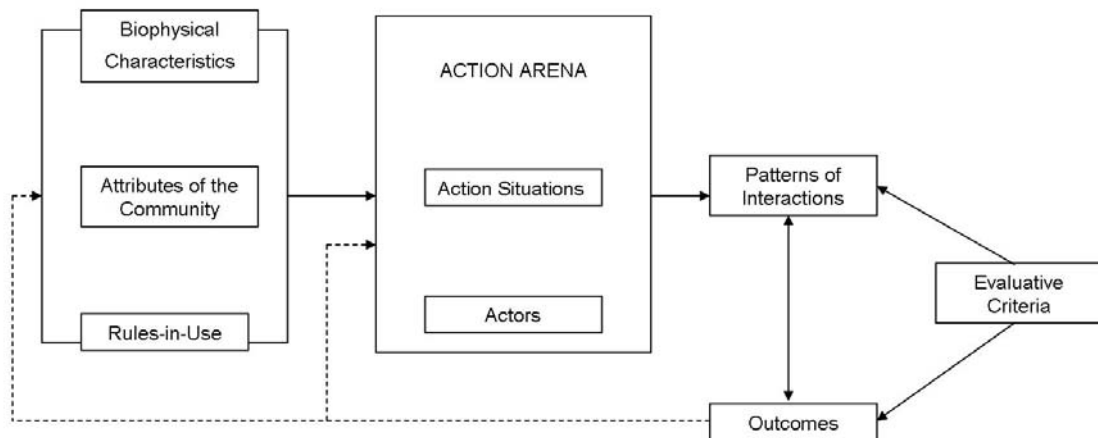
⁵² This illustration is modeled on Ostrom & Hess, *supra* note 52.

⁵³ 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). OSTROM, *supra* note 4244, at 13.

⁵⁴ *Id.* at 14.

success or failure of a commons enterprise such as a lobster fishery may require taking account of all of these factors or 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 rule-in-use clearly vary somewhat between a professional league and recreational league, between children's leagues and adult leagues, and so forth. A specific soccer league is also characterized by the relationships between the players (neighbors, professional competitors, friends, etc.), by the attributes of the fields on which games are played, and even by the 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 so forth. Moreover, some leagues may 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]

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

- 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?

We think that the IAD concept has proven sufficiently fruitful to make it worth adapting for our purposes.⁵⁵ 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 intellectual property legal regimes.

Ostrom and her colleagues have taken preliminary steps toward understanding how these methods might be relevant to investigating certain cultural commons.⁵⁶ Ostrom and Hess have analyzed the management of existing digital collections of knowledge resources, an admirable first step that signals the need for and plausibility of extending the IAD framework to the cultural environment.⁵⁷ As our discussion of the categories of questions below reveals, we argue that the IAD framework must be extended to account adequately and fully for the wide variety of constructed commons in the cultural environment.⁵⁸ 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. This characteristic of cultural commons produces a more intertwined set of exogenous variables, since it is impossible to separate the managed resources from the attributes and rules-in-use of the community that produces

⁵⁵ See, e.g., *Commons Sense*, THE ECONOMIST (July 31, 2008) (paying tribute to the commons research of Ostrom and colleagues and emphasizing the need for study of “new commons” of the sort we focus on here).

⁵⁶ See UNDERSTANDING KNOWLEDGE AS A COMMONS, *supra* note 52.

⁵⁷ Ostrom & Hess, *supra* note 52.

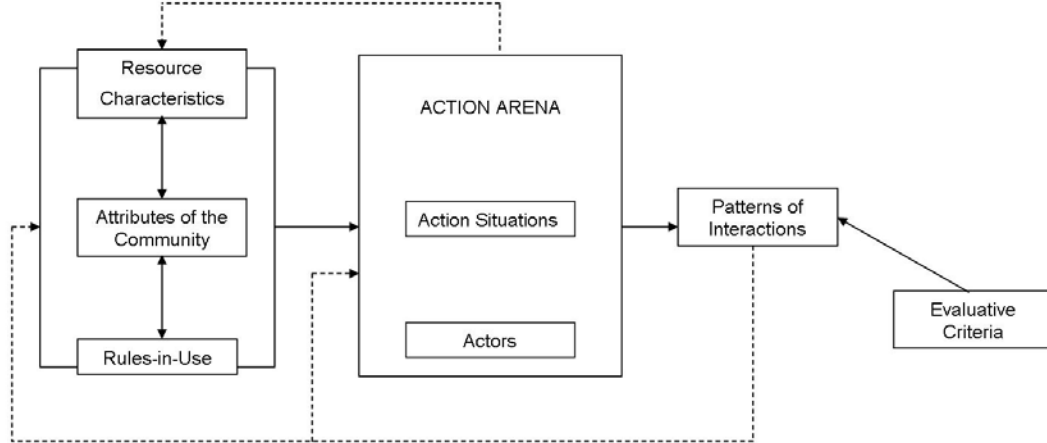
⁵⁸ One of the authors presented an earlier draft of this paper at the 12th Biennial Conference of the International Association for the Study of Commons, and this was a topic of extensive discussion.

them. It also produces an even tighter coupling between the exogenous Cultural commons are also *nested* within and interact with still more complex systems of natural and socially constructed environments.⁵⁹

To see the point, consider a copyright or patent pool, such as the Manufacturers' Aircraft Association described in the Introduction, to which intellectual property 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. This arrangement creates an environment for pool members that facilitates sharing and use internally, and simultaneously interacts with the external environment and shapes relationships with nonmembers. In other words, patent and copyright laws construct particular environments with default boundaries governing access to and use of certain forms of knowledge. Commons arrangements grounded in those laws involve contextually-specific deviations from the default given by intellectual property 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 between and constructed nature of the cultural resources themselves.

⁵⁹ In future work, we will examine both the interior space and the boundaries with the exterior that pooling arrangements create. The interior is open in the sense that members can borrow and share resources, but what does the interior/exterior boundary look like? It varies by context, and it is important to examine the variations and causes for structural differences among them.



[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 result 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 a form of output or 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.⁶⁰ Because of the more complex relationships between 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

⁶⁰ See *Jacobsen v. Katzer*, 535 F.3d 1373 (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).

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 be no one right answer to this question. There is no clean way to separate a particular constructed commons from the "natural" cultural background, since cultural activity is always grounded in human social interaction, the material environment, laws, and norms. Though there may be no 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 its social, political, and economic aspects.⁶¹

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 upon which

⁶¹ See *supra* note 44 and accompanying text (noting the role of nesting in Ostrom's framework).

most closely approximates the constructed commons in a particular case. In a context such as a patent pool or the jamband phenomenon that emerged around the recorded performances of the Grateful Dead, for example, it may be most useful to describe a constructed cultural commons according to how it deviates from the default intellectual property regime. In other contexts, such as shared journalism resource constructed by the Associated Press, it may be most useful to describe a constructed commons according to its differences from a completely open public domain. In other contexts, such as the sharing of magic tricks among the community of magicians,⁶² 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 intellectual property law, a significant range of activities, practices and intellectual resources remain outside the intended scope of even the most expansive intellectual property 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 intellectual property rights, though available, play a marginal role.

The contours of the “natural” cultural environment are not uncontested. The major intellectual property regimes exclude many different types of intellectual resources based on many different criteria and doctrines. Some would describe the complete set of non-enclosed 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, or as to which intellectual property rights have expired. The “natural” environment then can be seen as a vast pool of cultural resources openly accessible and openly usable without seeking the permission of anyone else.⁶³

Julie Cohen, on the other hand, has argued that a purely natural resources

⁶² See Jacob Loshin, *Secrets Revealed: How Magicians Protect Intellectual Property Without Law*, in *LAW AND MAGIC: A COLLECTION OF ESSAYS* (Christine A. Corcos ed., 2008), available at <http://ssrn.com/abstract=1005564>.

⁶³ On different versions of the public domain, see Samuelson, *supra* note 42 (surveying different conceptions of the public domain).

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, to a conception of the public domain as a separate place.⁶⁴ She argues persuasively for a more contextual understanding of the “common in culture,” a cultural landscape that is informed and shaped by cultural practices.

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 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 intellectual property regimes, except when expressed and embodied in a particular qualifying form, such as a copyrightable work of authorship, or a patentable invention.⁶⁵

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 upon the context of the inquiry. In many cases, constructed cultural commons arrangements build directly on this non-propertyized “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 Associated Press but also in online creations such as Wikipedia, and devices

⁶⁴ 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* (L. Guibault & P.B. Hugenholtz eds., Netherlands: Kluwer Law International 2006).

⁶⁵ Commenting on an earlier draft of this paper after a presentation, Mario Biagioli offered a metaphor for this process grounded in the work of Edward Young. See EDWARD YOUNG, *CONJECTURES ON ORIGINAL COMPOSITION* (1759). Biagioli suggested that the cultural environment might be seen as a garden and the processes of inheritance and experience as cultivation. He cautioned against taking the notion of a “natural” cultural environment too far. Our discussion of choosing an appropriate baseline should make clear that we have heeded their advice.

invented by and shared among sports enthusiasts.⁶⁶

The “natural” environment may be the most appropriate baseline for viewing a constructed commons even if intellectual property protection is available for the resources contributed to the commons and even if intellectual property law plays some role in its construction. The Associated Press, for example, 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 intellectual property 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.⁶⁷ 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 constructed 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 intellectual property 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 produce and distribute more and better forms of innovation.⁶⁸ 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 their creation.

Patent rules vary somewhat from country to country, but generally time-limited patent rights are granted to the developers of an “invention” after examination of an application by an appropriate government agency.⁶⁹ The

⁶⁶ 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 (2003).

⁶⁷ See *International News Service v. Associated Press*, 248 U.S. 215 (1918).

⁶⁸ See, e.g., ROBERT P. MERGES ET AL., *INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE* 119 (Rev. 4th ed. 2007) (explaining incentive justification).

⁶⁹ For an overview of patent doctrine, see *id.* at 124-27..

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 this 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; and adequately described in the application for the benefit of future adopters and adapters of the technology. The holder of a valid patent possesses a statutory right to exclude all others from producing or selling the invention, subject to extremely limited exceptions for experimentation and research on the subject matter of the patent. Notably, however, patent rights expire after a relatively short term, typically 20 years. The material covered by the patent passes at that point into the public domain. An example of a constructed cultural commons for which a patented environment is 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.⁷⁰ 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, copyright 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. In the Commonwealth countries, a copyright typically is subject to a somewhat more limited “fair dealing” exception. Other countries specify a range of exceptions, exclusions, and compulsory licenses for a variety of specific purposes. 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 – life of the author plus 50 years, in most countries, and life of the author plus 70 years in the United States and European Union countries. Examples of constructed cultural commons for which copyright is an appropriate baseline are the General Public License for open source computer software,⁷¹ and open access repositories for academic publishing.⁷²

⁷⁰ For an overview of copyright doctrine, see *id.* at 388-89.

⁷¹ For an explanation of the basic principles of the GPL, see *A Quick Guide to GPLv3*, <http://www.fsf.org/licensing/licenses/quick-guide-gplv3.html> (last visited Aug. 25, 2008). For the terms of the GPL see *GNU General Public License*, <http://www.fsf.org/licensing/licenses/gpl.html>

2. Basic Characteristics of the Constructed Cultural Commons

The next step after choosing an appropriate characterization of the “natural” environment in which a particular constructed commons resides is to identify basic characteristics relevant to its function 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.

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 constructed commons
- Degree of “openness” of the constructed commons
- Governance or “Rules-in-Use” of the constructed commons

These inquiries are related to the Resource Characteristics, Attributes of Community, and Rule-in-Use section of Figure 2.⁷³

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

(last visited Aug. 25, 2008). 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).

⁷² 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).

⁷³ 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.

French chefs.⁷⁴ 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? And so on. In many contexts, and perhaps even in patent pools and French cooking, there are multiple types of resources being shared within a community. 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.

Similarly, the identity of community members may be clear—as it is in a patent pool—or there may be questions 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 web sites, and otherwise support the community?⁷⁵ Rather than seeking a single answer, our inquiry leads us to identify each of these constituencies and describe their specific roles. Critically, asking the question of who is part of a particular constructed cultural commons serves to sharpen the inquiry and to help pave the way for inquiries into institutions, governance, and sustainability.

Cultural commons exist on a spectrum. At one end of the spectrum, are collective organizations that manage copyrights, or patent pools. This is a useful subset to work with because the set of pooled resources is easily identified, 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. 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/cultural components of social capital within a university research community constitutes a constructed cultural commons.⁷⁶ This example invites

⁷⁴ See Emmanuelle Fauchart & Eric von Hippel, *Norms-Based Intellectual Property Systems: The Case of French Chefs*, 19 *ORG. SCI.* 187 (2008); Christopher Buccafusco, *On the Legal Consequences of Sauces: Should Thomas Keller's Recipes Be Per Se Copyrightable?*, 24 *CARDOZO ARTS & ENT. L.J.* 1121 (2007).

⁷⁵ For studies of open source software, see STEVEN WEBER, *THE SUCCESS OF OPEN SOURCE* (2004).

⁷⁶ See Madison, Frischmann & Strandburg, *supra* note 16; 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* (Elsevier Science/JAI Press Series: Advances in the Study of Entrepreneurship, Innovation, and Economic Growth Series 2005).

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 email listserv among colleagues in a specific discipline, might be usefully analyzed using our constructed cultural commons framework.

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 subtractibility or rivalrousness (e.g., removing lobsters from the pool means 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).⁷⁷

Intellectual commons address different problems, which are defined initially by the fact that as public goods, intellectual resources are not rivalrously consumed.⁷⁸ A copyrighted work or patented invention can be “used” simultaneously by many 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 to be solved by cultural commons institutions are not merely, or even primarily, problems of overuse. They 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.⁷⁹

More generally, we can distinguish among different types of cultural commons based on their core purposes. Some arise as solutions to collective

⁷⁷ See *supra* note 4 and accompanying text.

⁷⁸ See *supra* note 22 and accompanying text.

⁷⁹ See Merges, *Contracting into Liability Rules*, *supra* note 6.; Robert P. Merges, *A Transactional View of Property Rights*, 20 BERKELEY. TECH. L.J. 1477 (2005).

action, coordination, or transaction cost problems that exist apart from intellectual property rights (and perhaps would not be solvable without intellectual property rights). These 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. Standard-setting enterprises also fit into this category,⁸⁰ as do joint ventures for scientific research and development.⁸¹ These constructed 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 transaction cost problems that exist only because of the intellectual property rights themselves.⁸² 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 SNP consortium⁸³ or the publicly available databases of genomic sequences that are part of the Human Genome Project.⁸⁴ Formal licenses and related agreements assure that participants in the commons become part of what amounts to a mutual non-aggression pact that is necessary precisely because of the possibility that intellectual resources may be propertized. So long as the resource is in the

⁸⁰ Merges, *supra* note 83, at 1515-16; Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard-Setting*, in 1 *INNOVATION POLICY AND THE ECONOMY* (A. Jaffe, J. Lerner & S. Stern eds., Cambridge, MA: MIT Press 2001); HERBERT HOVENKAMP, MARK D. JANIS, MARK A. LEMLEY, *IP AND ANTITRUST: AN ANALYSIS OF ANTITRUST PRINCIPLES APPLIED TO INTELLECTUAL PROPERTY LAW* § 35.4 (2008).

⁸¹ See HOVENKAMP et al., *supra* note 84, at § 36; JEAN TIROLE, *THE THEORY OF INDUSTRIAL ORGANIZATION* 413-414 (MIT Press 1988).

⁸² See Michael Heller, *The Tragedy of the Anticommons: Property in Transition from Marx to Markets*, 111 *HARV. L. REV.* 621 (1998).

⁸³ See, e.g., Michael Morgan, *The Single Nucleotide Polymorphism Consortium*, in *THE ROLE OF SCIENTIFIC AND TECHNICAL DATA AND INFORMATION IN THE PUBLIC DOMAIN: PROCEEDINGS OF A SYMPOSIUM*, Eds. Julie M. Esanu, Paul F. Uhlir, National Research Council (U.S.). Steering Committee on the Role of Scientific and Technical Data and Information in the Public Domain (National Academies Press, 2003); DON TAPSCOTT & ANTHONY D. WILLIAMS, *WIKINOMICS: HOW MASS COLLABORATION CHANGES EVERYTHING* 166- 69 (, 2006).

⁸⁴ For discussions of "open source" approaches to biology, see, e.g., Arti Rai, *Open and Collaborative Research: A New Model for Biomedicine*, in *IP RIGHTS IN FRONTIER INDUSTRIES* at 131-158 (Robert W. Hahn ed. 2005); Sapna Kumar & Arti Rai, *Synthetic Biology: The IP Puzzle*, 85 *TEX. L. REV.* 1745 (2007).

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 constructed commons may be designed to mediate between communities with different default norms. Technology transfer institutions, which enable universities and other non-profit research enterprises to deliver information resources (such as the technical knowledge described in patent specifications) to the private market, are examples of this type.⁸⁵ The cultural environment inside the university is typically characterized by information sharing not governed by intellectual property rights, even if intellectual property rights are present as matters of form.⁸⁶ The environment outside the university is governed largely by intellectual property rights. Technology transfer institutions may constitute an institutional pool or commons that mediates these two regimes.⁸⁷ Similarly, open source projects have developed “boundary organizations” to mediate their relations with commercial firms.⁸⁸

By specifying these distinct types of cultural commons, we are probably setting up a more sharply delineated field of institutions than really obtains 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

⁸⁵ 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* (Working Paper 2008; on file with authors).

⁸⁶ See Madison, Frischmann & Strandburg, *supra* note 16; John P. Walsh, Wesley M. Cohen & Charlene Cho, *Where Excludability Matters: Material versus Intellectual Property in Academic Biomedical Research*, 36 RES. POL. 1184 (2007).

⁸⁷ See Philip E. Auerwald & 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* (David M. Hart ed., 2003).

⁸⁸ See Siobhán O’Mahony & Fabrizio Ferraro, *Forthcoming. Managing the Boundary of an Open Project*, in *MARKET EMERGENCE AND TRANSFORMATION* (W. Powell & J. Padgett eds., forthcoming).

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 themselves, we distinguish this project from investigations of cartels as such, which operate via sharing price and output information and which therefore pose significant and obvious risks of anticompetitive behavior without offsetting welfare benefits.⁸⁹ The functional purpose of cartels is different from the 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 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 been faced with the challenge of identifying illegitimate cartels disguised as legitimate patent pools and other knowledge sharing institutions.⁹⁰

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 their creation.. Again, this inquiry is less relevant to natural resource commons arrangements. Natural resources generally are finite, potentially rivalrous in consumption and often congested, and subject to tragic overconsumption.⁹¹ Consequently, it is often necessary to limit access to a

⁸⁹ See, e.g., W. KIP VISCUSI ET AL., *ECONOMICS OF REGULATION AND ANTITRUST* 97-132 (4th ed. 2005); PETER Z. GROSSMAN, *HOW CARTELS ENDURE AND HOW THEY FAIL: STUDIES OF INDUSTRIAL COLLUSION* (2004).

⁹⁰ See HOVENKAMP ET AL., *supra* note 84 at § 34.2.

⁹¹ 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 Brett 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); J.B. RUHL ET AL., *THE LAW AND POLICY OF ECOSYSTEM SERVICES* 52, 64-65 (2007) (describing a “threshold of irreversibility” and noting that “once thresholds are crossed, it can take enormous spans of time to rebuild natural capital through ecological processes” and describing risk of congestion). In some cases, the distinction can be explained in terms of differences between resource systems and extractable resource units, but there are a variety of additional complications that are beyond the scope of this paper. On such complications, see, e.g., A. MYRICK FREEMAN III, *THE MEASUREMENT OF*

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.⁹² 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 there being a risk of congestion or overconsumption. It is rarely the case that "too much information" diminishes the value of individual items of information.⁹³ It is entirely possible and desirable for a community to produce and/or manage a cluster of cultural goods that is accessible to outsiders.⁹⁴ Indeed, one of the measures of social benefit of a constructed cultural commons may be the degree to which it disseminates the intellectual goods it produces to a wider audience.

(1) Openness as Applied to Resources

What do we mean by openness? There is little ambiguity in most everyday contexts (i.e., 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

ENVIRONMENTAL AND RESOURCE VALUES: THEORY AND METHODS (2d ed. 2003); DAVID DRIESEN, *THE ECONOMIC DYNAMICS OF ENVIRONMENTAL LAW* (2003).

⁹² See OSTROM, *supra* note 45 (describing various examples illustrating this point).

⁹³ *But see* William M. Landes & Richard A. Posner, *Indefinitely Renewable Copyright*, 70 U. CHI. L. REV. 471 (2003) (suggesting some instances of congestion); Dennis S. Karjala, *Congestion Externalities and Extended Copyright Protection*, 94 GEO. L.J. (2006) (critiquing Landes and Posner). See also Frank Pasquale, *Copyright in an Era of Information Overload*, 60 VANDERBILT L. REV. (2006) (considering congestion effects associated with information overload). Trademark dilution is a controversial area where overuse of a particularly famous and distinctive mark arguably leads to congestion type effects. See WILLIAM M. LANDES & RICHARD A. POSNER, *THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW* (2003); Giovanni B. Ramello, *What's in a Sign? Trademark Law and Economic Theory*, 20 J. ECON. SURVEYS 547 (2006).

⁹⁴ Frischmann refers to this as *leveraging the nonrivalry* of intellectual resources. See Brett M. Frischmann, *Spillovers Theory and Its Conceptual Boundaries*, WILLIAM & MARY L. REV. (forthcoming 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*"); Brett Frischmann, *Spillovers, Capabilities and a New IP Consequentialism* (Working Paper 2009) (on file with authors) (explaining how nonrivalry can be leveraged to support capabilities).

and use of the resource.⁹⁵

Barriers to possession or use of a resource may be natural or constructed.⁹⁶ A resource may be open naturally because its characteristics prevent it from being possessed, owned or controlled by anyone. For most of the earth's history, the oceans and the atmosphere were natural commons. Among other reasons, exercising dominion over such resources was beyond the ability of human beings and was unnecessary because there was no indication of scarcity. A resource also may be open as the result of social construction. Laws or rules may prohibit ownership or ensure a certain degree of openness. 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.

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 may be decentralized and vested in the hands of individual IP rights holders.

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. It 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.

(2) 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

⁹⁵ See Joel West, *Seeking Open Infrastructure: Contrasting Open Standards, Open Source and Open Innovation*, 12(6) FIRST MONDAY (2007), http://www.firstmonday.org/issues/issue12_6/west/index.html.

⁹⁶ This paragraph draws from Frischmann, *supra* note 41., at 936.

relations between participants.⁹⁷ Above, we defined the cultural environment as a set of interdependent and interconnected systems and resources. 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 constructed 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 constructed commons is intended to support. It 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 constructed commons collaborate with one another or otherwise share human capital as well as (or rather than) resources. For 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.⁹⁸ Anyone may add to, use, or re-distribute the licensed program. Re-distributors, however, are required to 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.⁹⁹ Thus, while 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 constructed commons or pool, it is significant to bear in mind not only the conventional producer perspective by which information and knowledge shareability problems often are analyzed. Hardin’s “tragedy of the commons” is typically understood as challenging markets and governments to come up with ways to supply resources in the face of cooperation and competition problems. 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, however, those resources are “naturally” given only in part. The cumulative and aggregative character of

⁹⁷ Accordingly, we focus much less on whether some social context is or is not a “community” according to pre-defined criteria, and much more on the functional characteristics of that context.

⁹⁸ See *supra* note 74 and accompanying text.

⁹⁹ See KELTY, *supra* note 7 (describing open source software collectives as “recursive publics”).

knowledge is fundamental to human culture. Producers of knowledge and culture resources are therefore simultaneously users and consumers. In analyzing openness, therefore, 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.¹⁰⁰ In the cultural environment, the tragedy of the commons which 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 can be seen, for example, in the context of basic research conducted within and across universities.¹⁰¹ 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 “Rule-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 constructed commons that relate to its governance and how it functions. Here we identify several relevant clusters or “buckets” of variables that will be important to explore.¹⁰²

- 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)
- Governance mechanisms of the commons (membership rules, resource

¹⁰⁰ See Frischmann, *supra* note 41.

¹⁰¹ See *supra* note 79 and accompanying text; Brett M. Frischmann, *supra* note 23; Katherine J. Strandburg, *Curiosity-Driven Research and University Technology Transfer*, in 16 *ADVANCES IN THE STUDY OF ENTREPRENEURSHIP, INNOVATION AND ECONOMIC GROWTH* 97 (2005).

¹⁰² 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 52.

contribution or extraction standards and requirements, conflict resolution mechanisms, sanctions for rule violation)

(1) 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. 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 story.¹⁰³ Michael Madison¹⁰⁴ and Jessica Silbey¹⁰⁵ have both described the creation myths that accompany default regimes of intellectual property, some but not all of which are grounded in individual inspiration. The very phrase “patent pool,” for example, itself has come to signify a specific set of legal expectations and criticisms. One says “patent pool” and 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.¹⁰⁶ 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 highlights points of conflict. How does the commons change and adapt over time, in light of changes in firm structure, market structure, and resource changes – such as emergent legal structures and changes to background legal 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,

¹⁰³ See ROSE, *supra* note 42..

¹⁰⁴ See Michael J. Madison, *Where Does Creativity Come From? and Other Stories of Copyright*, 53 CASE W. RES. L. REV. 747 (2003).

¹⁰⁵ See Jessica Silbey, *Mythical Beginnings of Intellectual Property*, 15 GEO. MASON L. REV. 319 (2008).

¹⁰⁶ See *supra* notes 100-106.and accompanying text.

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 provides an important link back to the earlier discussion of community and objectives.

(2) 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, 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, but those things often become information “works” and therefore resources in the pool via some cultural construct, such as the default copyright or patent law systems, for example, or some other institution, such as a publishing industry producing books, films, or songs, or some combination of these and other things. 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.¹⁰⁷

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

¹⁰⁷ Such grantbacks may raise antitrust concerns. See U.S. DEP'T OF JUSTICE & FEDERAL 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>.

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.¹⁰⁸ 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 nestedness) of both resources and commons in broader systems. This provides an important link back to the earlier discussion of baselines and degrees of openness.

(3) Institutional Setting

Pools and commons in the cultural environment are functional entities; they often serve markets and 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 Manufacturers' Aircraft Association, identified above as 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.

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.¹⁰⁹ 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. Pools may bridge gaps created by the edges of formal institutional structures.

¹⁰⁸ For a study of boundary maintenance in the open source software context *see* Siobhan O'Mahony & Beth Bechky, *Boundary Organizations: Enabling Collaboration among Unexpected Allies*, 53 ADMIN. SCI. Q. 422 (2008).

¹⁰⁹ *See* Katherine J. Strandburg, Gabor Csardi, Jan Tobochnik, Peter Erdi & Laszlo Zalanyi, *Law and the Science of Networks: An Overview and an Application to the 'Patent Explosion'*, 21 BERKELEY TECH. L.J. 1293 (2007).

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 participation in a particular project. 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.

(4) Legal Structures That Affect the Pool Itself

While 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 cause information works to come into being and that sustain them, on the one hand, and law that is specifically addressed to cultural commons themselves, on the other hand. Here, it is often the case that legislators and judges find that law can reinforce and itself 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.¹¹⁰ 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 intellectual property law may be a barrier to the emergence of the pool. A safe harbor of a sort may emerge, either via legislation or via judicial decision. The 1984 judgment of the United States Supreme Court in *Sony Corp. of America v. Universal City Studios*,¹¹¹ 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 innovation oriented to technologies for reproducing and distributing copyrighted works.

Legal rules may create subsidies or safe harbors in ways other than relieving parties at risk from potential liability. For example, income tax regimes may permit (or limit) the deductibility of research expenses by firms, non-profit enterprises, and/or research collectives. In the United States patent statute, the section that bars patenting inventions that are “nonobvious” 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

¹¹⁰ See HOVENKAMP ET AL., *supra* note 84, at § 36 (research joint ventures).

¹¹¹ 464 U.S. 417 (1984).

research agreement.”¹¹² It should be noted that that laws designed for one thing may contribute, 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 Litman¹¹³ uses this proposition to analyze the persistence of a legal regime subsidizing jukeboxes in American copyright law. A compulsory license permitting owners of coin-operated record players to use copyrighted American music was incorporated into the copyright statute initially in order to prevent holders of those copyrights from monopolizing an adjacent market for performances. 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.

(5) 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.¹¹⁴ Members have rights not only to contribute to and extract from the pool, but 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 decisionmaking 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, non-legal institutions or social structures?

For example, in the context of the General Public License for open source computer programs, membership in the commons defined by the license is

¹¹² 35 U.S.C. § 103(c) (2006).

¹¹³ See Jessica Litman, *War Stories*, 20 CARDOZO ARTS & ENT. L.J. 337 (2002).

¹¹⁴ See OSTROM, *supra* note 45..

defined by use of the program itself, which according to the terms of the license that accompanies the programs, constitutes assent to its terms. 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. 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 free-standing non-profit organization dedicated to advocacy on behalf of "free" software, and accompanying open source license terms, in its own right.

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 the 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.¹¹⁵ 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 Benkler¹¹⁶ and Cohen¹¹⁷ each argue, networking technology offers not only the potential for community development and resource aggregation, but also 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, there should be an inquiry into patterns of interactions and outcomes, including:

- Solutions to the underlying collective action problem and benefits delivered by the commons, including both innovations, creative output,

¹¹⁵ See, e.g., *Jacobsen v. Katzer*, 535 F.3d 1373 (Fed Cir. 2008). In that case, the open source collective was represented by one of its members, Jacobsen, as assignee of copyright interests in the open source program at issue.

¹¹⁶ See BENKLER, *supra* note 34.

¹¹⁷ See Julie E. Cohen, *Pervasively Distributed Copyright Enforcement*, 95 GEO. L.J. 1 (2006).

produced, shared, and disseminated to a broader audience, and the dynamics of the social practices that emerge from the interaction of commons resources and commons participants

- Costs and risks associated with the commons, including for example, any negative externalities

A constructed commons be assessed not only in light of its ostensible purposes, but it should also be viewed in light of its consequences. This aspect of the case study approach should both identify what those consequences are 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 themselves, a constructed 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 Associated Press enables the production of newspapers.

In the case of most constructed 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.¹¹⁸ 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 networks, distributed broadly in space and time.¹¹⁹ The Associated Press and other wire services have cultivated and retained identities as distinct and productive enterprises in their own right despite the fact that they publish relatively little of their very own.¹²⁰ The news is published by member or subscriber firms. The jamband community is a recognized community that defines itself partly via its practices of archiving and sharing jamband performances.

a. Solutions and Benefits

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

¹¹⁹ See BENKLER, *supra* note 34.

¹²⁰ An adjunct Associated Press product, the Associated Press Stylebook, is published by the Associated Press itself and is something of a bible for newspaper editors across the industry.

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, therefore, 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 what Frischmann and Lemley label “spillovers,”¹²¹ 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, or via some pool or other constructed environment. The beneficiaries of the MAA patent pool included the American government, which purchased aircraft during World War I. 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. As noted above, under some circumstances, the very persistence of an institution may be evidence of the success of a commons regime.

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 costs and risks associated with the 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 in terms of sharing access to pooled information resources facilitates cooperation along lines that may be anticompetitive and therefore socially harmful: agreements to raise and fix costs, and agreements to reduce output. Pools, like any 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.

¹²¹ See Frischmann & Lemley, *supra* note 22.

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,¹²² transactions cost economics,¹²³ and even history and anthropology,¹²⁴ which may be profitably aggregated and recast as examples of cultural commons. One step in that direction is a forthcoming application of the framework to analyze universities as cultural commons.¹²⁵ Collecting and reconstructing this literature, using the baskets 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 model that underlies the constructed 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.

IV. Conclusion

The theoretical discussion of intellectual property policy has been myopically focused on extremes of exclusion and open access, ignoring a wide range of constructed commons that persist between the extremes, and 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 to consider a limited number of descriptive variables. This 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.

¹²² See Schultz, *supra* note 15.

¹²³ See Merges, *supra* note 6.

¹²⁴ See KELTY, *supra* note 7.

¹²⁵ Madison, Frischmann, & Strandburg, *supra* note 16.

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 Elinor Ostrom, we argue that understanding the origins and operation of beneficial constructed 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 collective and production 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 commons helps to elevate collective, intermediate solutions to their possible place of significance in accounts of property regimes and should diminish the skepticism 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 constructed commons across a wide range of collected case studies should lead us to doubt panacea prescriptions drawn from overly simplistic models.