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Constructing Commons in the Cultural Environment*

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Abstract

This Essay considers the problem of understanding intellectual sharing/pooling arrangements and the construction of cultural commons arrangements. We argue that an adaptation of the approach pioneered by Elinor Ostrom and collaborators to commons arrangements in the natural environment may provide a template for the examination of constructed 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 environment(s) within which they are embedded and with which they share interdependent relationships. Such an improved understanding is critical for obtaining a more complete perspective on intellectual property doctrine and its interactions with other legal and social mechanisms of governing creativity and innovation. We propose an initial framework for evaluating and comparing the contours of different pooling arrangements with an eye toward developing an understanding of the institutional and structural differences across arrangements and industries as well as 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 cultural constructed commons should consider

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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.

I. Introduction

This Essay confronts the theoretical challenge of understanding the construction and governance of what we refer to as constructed commons in the cultural environment. "Constructed commons," as we use that term, refers to open environments for developing and distributing cultural and scientific knowledge through pooling arrangements and related institutions and structures. The Essay argues for a case-study-based theoretical framework for research exploring the construction of the cultural commons analogous to that used by Elinor Ostrom and her colleagues to understand commons approaches to natural resources.

In the past, intellectual property law scholarship has viewed innovation and creativity as stemming for the most part from the efforts either of individuals or firms – as encouraged and structured by the patent and copyright systems – or from government efforts – particularly as reflected in university research and scholarship. Consistent with this view of innovation as arising out of either individual or public efforts, the cultural landscape was viewed as divided between the private property of copyright holders and patent holders and "the public domain," or "the commons," open and available to all, comprised of those intellectual works that were never protected by intellectual property and those which had fallen out of protection. Increasingly, it is evident that this paradigm is inadequate to describe what we will refer to here, following on the work of James Boyle,[4] as the cultural environment. Cultural production comprises not just individual economic activity or government production of public goods, but 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. Thus, there is not just "the public domain" or "the commons," but a variety of differently comprised and governed "constructed commons" arising in a wide variety of cultural contexts.

[4] *See* James Boyle, *A Politics of Intellectual Property: Environmentalism for the Net*, 47 DUKE L.J. 87 (1997).

In some respects there is nothing new or surprising about this observation. Cultural works and information goods have always been socially constructed in many senses. What is changing is both the recognition that the traditional economically-inspired realm of production around which intellectual property protection is designed cannot be treated as independent of the larger cultural environment and the fact that 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. 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, but is a matter of governance of a highly social cultural environment. The question becomes how best to use legal and other tools to encourage a creative, sustainable, and equitable cultural environment.

We use the term "cultural environment" advisedly. We believe that the environmental metaphor is a natural and appropriate way to approach the problem of cultural production, and we want to argue more specifically that an approach to understanding the regulation and governance of the natural environment pioneered by Elinor Ostrom and her collaborators is likely to be fruitful in helping us to navigate the more complex reality in which we now acknowledge our intellectual property system is situated. Modern approaches to regulating the natural environment have followed a trajectory that should resonate with intellectual property scholars. The need for environmental regulation arises out of "the tragedy of the commons," famously explicated by Garrett Hardin.[5] Hardin argued that the commons is tragic because each individual seeking to extract value from a given resource (such as a grazing ground for sheep) has an incentive for over-use such that in the long run the resource is depleted. Avoiding this tragedy seems at first to require either privatization or top-down government control. One key insight of Ostrom's approach to the natural environment was recognition of the important role for institutions intermediate between private property and the state in solving problems of collective action and provision of public goods.[6] These intermediate institutions are sometimes called "common property" or "limited commons" and generally denote collective, but not necessarily governmental or even formal, means for sharing and making productive and sustainable use of

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

[6] *See* ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION (Cambridge: Cambridge University Press 1990).

resources such as fisheries, water, forests, and so forth. The research of Ostrom and other scholars demonstrates that solutions to these resource-sharing problems are various and highly contextual. Simple models, such as the Prisoner's Dilemma, and generalized theories, such as the "tragedy of the commons," 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.[7]

The analogy between the natural environment and the domain of ideas, between the public goods problems addressed by real property and those addressed by intellectual property, has been exploited fruitfully by a number of intellectual property law scholars. 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.

As technology has evolved to facilitate an increasingly extensive and various 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.[8] 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. We argue that now is the time to recognize that lessons learned by those concerned with the natural environment caution against an overly simplistic view of community cultural production. The primary lesson of the work of scholars of commons regimes such as Ostrom is that the devil is in the details – complex environments demand a more contextual empirical and

[7] *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., Cambridge, MA: MIT Press 2007); 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).

[8] *See, e.g.*, YOCHAI BENKLER, THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM (New Haven, CT: Yale University Press 2006); CLAY SHIRKY, HERE COMES EVERYBODY: THE POWER OF ORGANIZING WITHOUT ORGANIZATIONS (Penguin Press 2008).

theoretical approach.

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 we think the Ostrom approach may be particularly helpful for intellectual property scholarship. 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 resource commons to form a basis for a bottom-up practice-based taxonomy of successful and unsuccessful approaches to resource management.
- Second, based on the initial case studies they developed a framework for identifying the variables that are significant in determining the success or failure of a commons enterprise and what kinds of institutions are viable in particular contexts.
- Third, they recognized that learning is an iterative, cumulative process and thus viewed the research project as an evolving work-in-progress that required a growing knowledge base rooted in more case studies and a flexible framework subject to challenge and refinement.

This approach recognizes the crucial importance to the success or failure of common pool management of the interplay between the characteristics of the common pool resource itself and the social and institutional arrangements for its governance. It also walks the difficult line between overly simplistic theoretical models that paper over important complexity and an entirely fragmented list of diverse situations. The approach remains a work in progress in the natural resource domain, which is one of its strengths. We think it has proven sufficiently fruitful to make it worth adapting for our purposes.[9]

In this Essay, we explain how an Ostrom-like approach to the cultural environment might work. We identify both similarities and differences between the cultural environment and the natural environment which will be important in adapting the approach to the cultural context. We discuss the special problem of defining the

[9] *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 in this essay).

"natural" or default environment in the cultural context that arises because of the constructed nature of cultural and intellectual resources. We suggest a framework for organizing the analysis of constructed commons in the cultural environment.

As a foundation for our approach we draw an explicit connection between two approaches to intellectual property and other information policy problems that are sometimes thought to conflict. First, we draw on linguistic and metaphorical approaches to legal and sociological questions, drawing specifically on the metaphorical dimensions of the idea of the information "environment" and the knowledge "commons." Second, we align ourselves with the economic approach to common pool resource production, consumption, and distribution by adopting significant portions of the functional approach to investigating commons resources in the natural environment that was pioneered and still exemplified by Ostrom and her colleagues. 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.

II. The Environmental Metaphor and the Common Pool Framework

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. Some of this work has coalesced in the so-called Law and Literature movement.[10] 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.[11] James Boyle focuses on the rhetoric of authorship and invention metaphors in order to expose the political character of property law.[12] Carol Rose focuses on narratives of property law in order to demonstrate the essentially social character of

[10] *See* MARTHA C. NUSSBAUM, POETIC JUSTICE: THE LITERARY IMAGINATION AND PUBLIC LIFE (Boston, MA: Beacon Press 1995); JAMES BOYD WHITE, ACTS OF HOPE: CREATING AUTHORITY IN LITERATURE, LAW, AND POLITICS (Chicago, IL: University of Chicago Press 1994).

[11] *See* GEORGE LAKOFF & MARK JOHNSON, METAPHORS WE LIVE BY (Chicago, IL: University of Chicago Press 1980).

[12] *See* Boyle, *supra* note 4.

the law.[13] A number of intellectual property scholars draw on environmental and spatial metaphors in their discussions of information law and policy.[14]

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 as a system of interconnected and interdependent resources that includes both natural and built resource systems.[15] 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 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.

As to function, adopting the cultural environmentalism metaphor also offers the ability to borrow a structure for functionalist analysis from studies of the natural commons. We focus specifically on the approach of Elinor Ostrom. Via studies and reviews of numerous case studies addressed to the social, political, and physical dimensions of natural resource environments, Ostrom has shown the inadequacy of methods that investigate the commons according to a small or limited number of attributes identified *ex ante*. Such simple models fail to account for what Ostrom characterizes as the nested, multi-tier character of the natural resource commons.[16] Accordingly, they likely fail to capture the range and complexity of social, political, and economic aspects of the governance mechanisms in which the commons is

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[13] *See* CAROL M. ROSE, PROPERTY AND PERSUASION: ESSAYS ON THE HISTORY, THEORY AND RHETORIC OF PROPERTY (Boulder, Colorado: Westview Press 1994).

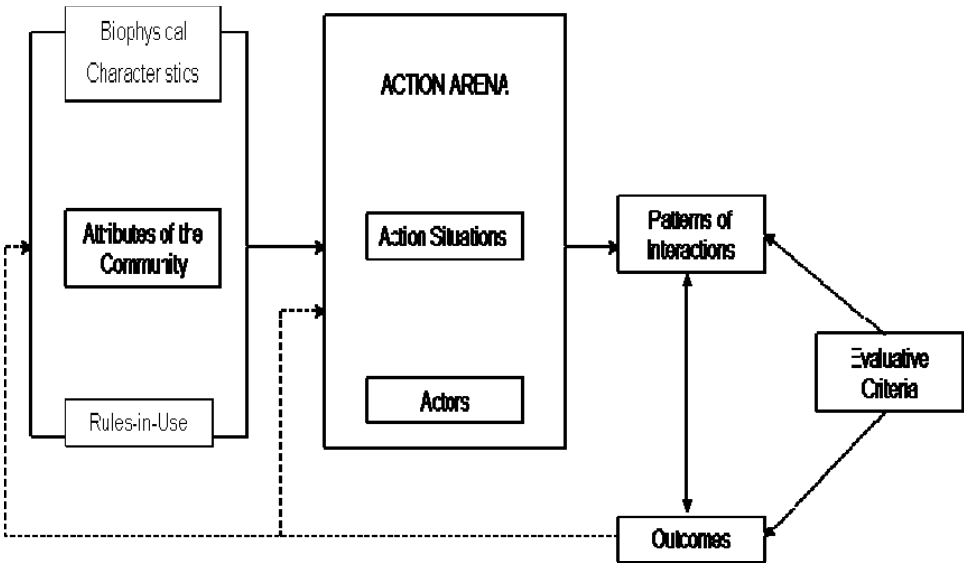
[14] *See* Brett M. Frischmann, *Cultural Environment and the Wealth of Networks*, 74 U. CHI. L. REV. 1083 (2007); Pamela Samuelson, *Enriching Discourse on Public Domains*, 55 DUKE L.J. 783 (2006); Michael J. Madison, *Legal-Ware: Contract and Copyright in the Digital Age*, 67 FORDHAM L. REV. 1025 (1998).

[15] *See* Frischmann, *supra* note 14.

[16] *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).

embedded.

Instead of simple models, Ostrom offers what she characterizes as a "framework" for systematizing the investigation of commons regimes. Her Institutional Analysis and Development 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. The IAD framework is illustrated in Figure 1.[17] It divides the investigation of a commons regime into the underlying factors, including biophysical characteristics, community attributes, and what Ostrom and her collaborators denote "rules-in-use;" the action arenas, leading to patterns of interactions; and the outcome of the commons management approach.



[Figure 1]

We argue that this perspective on the complexity of commons resources and of the governance regimes that manage them can and should be applied to resources in the cultural environment. Ostrom and her colleagues themselves have taken preliminary steps to understanding how these methods might be relevant to investigating the cultural

[17] This illustration is modeled on Ostrom & Hess, *supra* note 7.

commons,[18] including digital collections of knowledge resources that fall within intellectual property regimes. We argue that the approach should be extended to encompass a broader view of cultural commons – in particular to investigate commons arrangements for the simultaneous production and sharing of intellectual goods. Unlike commons in the natural environment, cultural commons both *create* an environment within which creators, inventors and innovators may engage in a variety of productive and interactive activities, and they are also *nested* within and interact with still more complex systems of natural and socially constructed environments.[19] To see the point, consider a copyright or patent pool, through which IP rights holders agree to contribute patents or copyrights to a "pool" that those same holders may exploit on standardized terms specified as part of the construction of the pool. This 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. Pooling arrangements grounded in those laws represent contextually-driven deviations from the IP default. These constructed cultural commons may lead to innovation and improvement that would not be attainable either in the "natural" state without intellectual property protection to deter free riding or in the context of the default IP rules without the aid of the constructed commons.

The nested, multi-tiered character of sustainable cultural environments, and the diversity of attributes that contribute to successful governance regimes, are keys to understanding the commons both as a mechanism for knowledge production, collection, and distribution, and in the context of modern information and intellectual property legal regimes.

This Essay begins to explore how this nesting process can and

[18] *See id.* Ostrom and Hess take an admirable first step that certainly signals the need for and plausibility of extending the IAD framework to the cultural environment. But, as our discussion of the categories of questions below reveals, the IAD framework needs to be adapted and extended to account for the socially constructed and dynamic nature of the resources, institutions, communities, and legal contexts. This was a topic of discussion at the 12th Biennial Conference of the International Association for the Study of Commons.

[19] 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 interesting to examine the variations and causes for structural differences.

should be examined in the cultural context, and how understanding that process suggests a preliminary set of attributes that guide further examination of the cultural commons on a cross-disciplinary, case-by-case basis. While we develop certain examples by grounding the analysis in intellectual property law, it should be understood that the framework developed below 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.

III. Motivation for the Framework Approach to Constructed Cultural Commons

Scholars from many fields have examined the human phenomena of sharing and exclusion, or more broadly, cooperation and competition. In his well-known summary of cooperation problems in the natural resource environment, Hardin described the challenge of simultaneously enabling productive use of a common resource, on the one hand, and avoiding overconsumption and underproduction of that common resource, on the other hand. Hardin described this problem as the "tragedy of the commons." His argument is often coupled with an argument, associated with Harold Demsetz,[20] that such "tragic" situations give rise to solutions grounded in regimes of exclusionary property rights.

In the field of intellectual property, the sharing/exclusion and cooperation/competition dichotomies evident in the tragedy of the commons 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" (which we will 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, the resources that shape the cultural environment are by their nature naturally nonrivalrous – meaning that consumption of the resource does not deplete the supply

[20] *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).

available to other users – and nonexcludable – meaning that knowledge resources are not naturally defined by boundaries that permit exclusion of users.[21] Third, unlike resources in the natural world, resources of information and expression must be created before they can be shared. Because of the public goods character of these resources, solving the tragedy of the commons in the cultural environment is especially fraught. To be successful, a cultural commons must manage both use and production of cultural resources. Intellectual resources in the cultural environment not only *are shared in practice*, but they are *naturally shareable.* 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.

What might be called the classical approach to studying the implications of this conclusion for 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. Via private rights and private market exchange, in short, the natural shareability of knowledge and innovation is limited. 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 domain of government or public subsidy, by which the overconsumption and underinvestment problems associated with shareability 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.

Over the last decade, however, scholars have recognized

[21] *See* Brett M. Frischmann, *An Economic Theory of Infrastructure and Commons Management*, 89 MINN. L. REV. 917 (2005).

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": uses and reuses of information resources that sustain the dynamic character of the information environment.[22] Because of these spillovers, the information environment is sometimes characterized as what Henry Smith and others define as a semicommons,[23] a combination of private rights of exclusion, management by public authority, and a domain of resources that are open for reuse. 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.

The rights of exclusion that comprise the default regimes of patent and copyright law are by design not absolute. Because knowledge and other forms of culture are inherently cumulative and combinatory, 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 freely available to all. They are used in practice to construct a wide variety of semi-commons or limited commons of cultural resources that are partly open and partly closed, usable by others but not always on a purely "free" basis. Default rules of intellectual property 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.

The concept of the constructed cultural commons, more broadly conceived in metaphoric terms, that is, by analogy to the natural resource environment, includes a broad swath of industry-specific and market-specific structural innovations, collective enterprises, thickets, pools, portfolios, and legal forms that also 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

[22] *See* Brett M. Frischmann & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257 (2007).

[23] *See* Henry E. Smith, *Semicommon Property Rights and Scattering in the Open Fields*, 29 J. LEGAL STUD. 131 (2000).

choices about how to manage or delegate management of intellectual works, and how to structure relationships among resource owners and potential resource users.

Why are these constructed commons arrangements significant and worth investigating in the cultural environment? As a departure from default regimes of intellectual property rights, and as an alternative to government-supplied solutions to tragedy of the commons problems, constructed commons offer distinct means for promoting creativity, innovation, and reuse of cultural resources, particularly with respect to creating "spillovers" that benefit those who are not directly involved in the initial production and consumption of those resources. Frischmann and Lemley explain how (1) the private rights components of intellectual property laws are designed to internalize some externalities; improve supply side incentives to invest in the production, development, and dissemination of intellectual works; and thus improve markets for intellectual works; and (2) the commons components are designed to promote spillovers, or positive externalities generated by the "leakiness" built into the IP rights systems (via fair use and fair dealing in copyright, for example, and via disclosure requirements in patent law, for example) and by temporal limitations on the rights themselves.[24] Intellectual property pools, which are constructed by cross-licensing of IP rights by IP holders,[25] illustrate the relatively simple construction of a semicommons using these default regimes. Michael Madison shows how this constructed character of intellectual works, and the balance between their private and public character, can be investigated at the level of the individual object or item that embeds knowledge or culture.[26] Katherine Strandburg does likewise at the level of the institution, showing how university practices regarding transfer of research to the private sector mediate between public and private conceptions of science itself.[27] 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

[24] *See* Frischmann & Lemley, *supra* note 22.

[25] *See infra* notes 27-28 and accompanying text.

[26] *See* Michael J. Madison, *Law as Design: Objects, Concepts, and Digital Things*, 56 CASE W. RES. L. REV. 381 (2005).

[27] *See* Katherine J. Strandburg, *Curiosity-Driven Research and University Technology Transfer*, *in* 16 ADVANCES IN THE STUDY OF ENTREPRENEURSHIP, INNOVATION AND ECONOMIC GROWTH 97 (2005); Katherine J. Strandburg, *Norms and the Sharing of Research Materials and Tacit Knowledge*, *in* WORKING WITHIN THE BOUNDARIES OF INTELLECTUAL PROPERTY (Rochelle C. Dreyfuss, Harry First & Diane L. Zimmerman, eds., Oxford University Press, forthcoming 2008); Katherine J. Strandburg, *User Innovator Community Norms at the Boundary Between Academic and Industrial Research*, __ FORDHAM L. REV. __ (forthcoming 2009).

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.

In other words, we conceive of a blurry line that divides what belongs in the market, and therefore presumptively is subject to legal rights of exclusion, and what is more or less clearly outside the market, socially, culturally, and/or institutionally. We then conceive of an important and sizable set of intermediate constructions that draw on elements of exclusion claims, government management, and openness claims, that is, which blend the conventional categories. These are constructed environments for information exchange and sharing, or the constructed commons in the cultural environment. Benkler's revisiting of the theory of the firm in light of distributed and networked information resources[28] is, in our framing, an example of analysis of constructed commons. In this light, intellectual property laws are seen not merely or even primarily as sources of exclusion and production, and concomitant delineation of the public domain, but instead as social institutions constructed to govern access to and use of *some* intellectual resources. Those resources are also governed by related institutions, such as the firm and social norms. That is, intellectual property laws enclose some intellectual resources, making what would be naturally open less open or more restricted. Yet intellectual property laws also circumscribe the very rights allocated, limiting the restrictivity and preserving some degree of openness.

Intellectual property pools are one type of constructed commons. A patent pool, specifically, is an agreement by two or more patent holders to aggregate their patents. The patents in question typically relate to complementary technology, or the exercise of patent rights by one holder "blocks" the exercise of related rights by a different holder, or both; the pool therefore facilitates exploitation all of the pooled patents that relate to a given technological domain. The pooled patents are typically available to all members of the pool, and are available on standard licensing terms to non-members.[29] A well-known example of a patent pool in the United States is the Manufacturer's Aircraft Association, which was formed in 1917 and encompassed nearly all American aircraft manufacturers, who needed access to patents held by

[28] *See* BENKLER, *supra* note 8.

[29] *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., Cambridge, MA: MIT Press 2001).

the Wright Company and the Curtiss Company.[30] To illustrate the potential breadth of the concept of the constructed cultural commons, we note that additional phenomena that may be analyzed under this rubric include examples such as medieval guilds, which provided a structured environment for sharing expert trade knowledge among members;[31] the modern research university and the departmental and disciplinary structures that lie within it and above it; and the series of Requests For Comment (RFCs) that define the technical protocols of the Internet.[32]

The next Sections seeks to flesh out the way in which we believe that the Ostrom framework might be extended to study these constructed environments and to highlight some challenges in adapting the Ostrom approach to constructed cultural commons.

IV. A Method for Investigating the Information Environment and Constructed Cultural Commons

As can be seen from Figure 1, in her studies of natural resource pools, Ostrom has begun her inquiry with the "biophysical characteristics" of the pool and its resource units, along with the attributes of the community and the "rules-in-use" (or governance). She asks questions such as:

- What sorts of boundaries define the 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?

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[30] *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).

[31] *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. 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).

[32] *See RFP-Editor Webpage*, http://www.rfc-editor.org (last visited Aug. 25, 2008).

- 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?

With respect to pools of information or knowledge resources, a closely related set of questions arises, which we begin to map out in this Essay. Each of the inquiries we propose is prompted by preliminary observations of constructed cultural commons. None of them, however, should be understood at this point as defining the entirety of the range of relevant attributes of a successful commons. Within each of these clusters of issues, additional research at finer grains of analysis will reveal specific attributes that are relevant to commons structures.

A. 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 conception of 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, 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.[33]

We discuss here two reasonable points of "natural environment" reference for the investigation of constructed cultural commons: a "natural" cultural environment without intellectual property and a

[33] *See supra* note 16 and accompanying text (noting the role of nesting in Ostrom's framework).

"default" intellectual property-based cultural environment. These two starting points correspond roughly to the public domain and to a propertized environment respectively. Which is most appropriate to use for a particular inquiry will depend upon which most closely approximates the constructed commons in a particular case. In a context such as a patent pool, 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 the sharing of jokes among stand-up comics,[34] 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 magicians,[35] 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 questions that should be pursued in analogy to Ostrom's framework.

1. *The "Natural" Cultural Environment*

Despite what appears to be the expanding scope of intellectual property law and its desirability, a significant range of activities, practices and intellectual resources remain outside the intended scope of even the most expansive intellectual property regimes. Not all cultural resources can or should be the subject of intellectual property rights. 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.[36] 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

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[34] *See* Dotan Oliar & Christopher Sprigman, *Intellectual Property Norms Among Stand-Up Comedians*, __ VA. L. REV. __ (forthcoming 2008).

[35] *See* Jacob Loshin, *Secrets Revealed: How Magicians Protect Intellectual Property Without Law*, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1005564.

[36] *Why* this environment might exist as it does is less important to us than the fact that it is the subject of lively debate. Not all cultural resources can or should be the subject of intellectual property rights. It is important to note, however, that our conception of the natural environment does not depend solely on identifying legal principles that govern exceptions from enclosure by intellectual property rights.

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 one version of the public domain, a vast pool of resources openly accessible and openly usable without seeking the permission of anyone else.[37]

Julie Cohen, on the other hand, has argued that a purely natural resources conception of the public domain, and one that relies on the distinction between permitted and lawful, unsanctioned use, 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.[38] 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.

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-propertized "natural" background. Examples of constructed cultural commons for which the

[37] On different versions of the public domain, see Samuelson, *supra* note 14.

[38] *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).

"natural" environment is the most appropriate baseline likely include the commons of research results and tools in the basic sciences,[39] the collection of jokes shared by stand-up comedians,[40] collective online creations such as Wikipedia,[41] and inventions shared by sports enthusiasts.[42] Note that the "natural" environment may be the most appropriate baseline for viewing a constructed commons even if intellectual property is available for the resources contributed to the commons and even if intellectual property law plays some role in its construction. Indeed, 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 the background structure.

2. *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.

a. The Default Patent Law Environment

Patent grants are justified generally as departures from the norm of the "natural" environment for technological innovation on the ground that the natural shareability of technological ideas undermines incentives to produce and distribute more and better forms of innovation. This basic conception highlights the difference between constructed cultural commons and commons in the Ostrom sense. Constructed cultural commons must be concerned at the ground level not only with managing and sustaining existing resources, but 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

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[39] *See, e.g.*, sources cited *supra* note 27.

[40] *See* Oliar & Sprigman, *supra* note 34.

[41] *See Wikipedia*, http://www.wikipedia.org (last visited Aug. 25, 2008). 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).

[42] *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).

appropriate government agency. The applicant must demonstrate to the satisfaction of the patent examiner that the innovation represented by the invention is new (or "novel," in the language of patent law), in that no one has invented 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.

b. The Default Copyright Law Environment

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: 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,[43] and open access repositories for academic publishing.[44] Intriguingly, in light of its origins as "free software," the copyright environment is also probably the most appropriate analytic baseline for present-day open source software.

B. 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 the success of that construction in producing, managing, and disseminating intellectual goods. Here we suggest, as a starting point, a series of nested inquiries that we hope, over time and over a series of reviews and case studies, can 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 concerning the biophysical characteristics of a natural resource commons, we propose and discuss in this Section the following initial inquiries:

- Particular subject matter, resources pooled, types of cultural activity, 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

In the next Section we discuss some other baskets of characteristics that we believe will be important variables in understanding constructed cultural commons.

1. *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

[43] 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 (last visited Aug. 25, 2008).

[44] 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).

resources might, at least at first glance, be obvious--patents in a patent pool, recipes for French chefs,[45] jokes for the comics[46]—or it may take some consideration to identify the most salient description. What resources does an open source software community pool? Code? Coding expertise? Debugging opportunities? And so on. In many contexts, and perhaps even in patent pools, French cooking, and standup comedy, there are multiple types of resources being shared within a community. Our framework aims to be more inclusive and thus aware of the variety of resources and avoid a myopic focus on intellectual property assets.

Similarly, it may be clear who the community members are—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? Users of the code? Those who submit comments or assist with support?[47] Again, the answer will depend upon the context, and there are probably no absolute answers. 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 and governance.

In our deliberations about this project, we have struggled to some degree in delineating the types of resources and communities that reasonably fit within its scope . On one end of the spectrum, one might focus entirely on the pooling of intellectual works subject to intellectual property rights in the form of copyright 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 intellectual works, such as patented inventions, and the community is comprised of those who own those works.

As noted earlier, we envision a much broader project. There are many examples of constructed cultural commons that involve the pooling of intellectual, cultural, and related resources that are not subject to intellectual property protection or for which intellectual property is

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[45] *See* Emmanuelle Fauchart & Von Hippel, *Norms-Based Intellectual Property Systems: The Case of French Chefs*, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=881781; 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).

[46] *See* Oliar & Sprigman, *supra* note 34.

[47] For studies of open source software, see STEVEN WEBER, THE SUCCESS OF OPEN SOURCE (2004) and references therein.

tangential. 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 commons within the scope of our project.[48] We note that this example itself invites significant variation among case studies based on the resources and community targeted for study; the relevant community may be defined broadly in terms a particular university or academic discipline or more narrowly in terms such as the civil engineering department of a particular university.

At this stage, we believe the defining characteristic of a constructed cultural commons is the pooling of intellectual, cultural, and related resources within a community. While some pools may be characterized in formal or technical terms according to licensing or contractual arrangements, others are less formal and more conceptual or metaphoric in character, as they depend on intersecting institutional arrangements or social norms. While this conception may eventually turn out to be too broad, application of the framework to specific examples should assist us in more clearly defining its useful range of application. At this point in our investigation, we choose not to be too restrictive in identifying what is, and what is not, a constructed cultural commons. As Ostrom points out, restricting the inquiry too narrowly, too soon, creates the risk that salient attributes of the production of commons may be overlooked.

2. *Identifying Goals and Objectives*

In describing the goals and objectives 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 and the possibility that a common pool resource will be exhausted by uncoordinated self-interested activity. Intellectual commons address different problems, such as the production of intellectual goods to be shared, the overcoming of transaction costs leading to bargaining breakdown, the production of commonly useful

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[48] *See* Brett M. Frischmann, *Commercializing University Research Systems in Economic Perspective: A View from the Demand Side*, *in* UNIVERSITY ENTREPRENEURSHIP AND TECHNOLOGY TRANSFER: PROCESS, DESIGN, AND INTELLECTUAL PROPERTY vol. 16 (Elsevier Science/JAI Press Series: Advances in the Study of Entrepreneurship, Innovation, and Economic Growth Series 2005); Michael J. Madison, *The University as Constructed Cultural Commons*, ___ WASH. U. J.L. & POL'Y __ (forthcoming 2008).

platforms for further creativity, and so forth.

It may be useful to distinguish among different types of cultural commons or pools based on their core purposes. Some of these arrangements arise as solutions to collective 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. The General Public License and related licenses for open source computer software are likely examples of this type. Standard-setting enterprises also likely fit into this category, as do joint ventures for research and development. 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 arises as a solution to collective action, coordination, or transaction cost problems that exist only because of the intellectual property rights themselves.[49] Examples of such arrangements might include constructed commons for basic biological building blocks such as the SNP consortium or the publicly available databases of the Human Genome Project.[50] In some such cases, the commons is constructed as a defense against potential privatization of commonly useful resources which becomes possible only with the expansion of the domain of intellectual property rights.

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 patents) to the private market, are examples of this type.[51] The cultural environment inside the university is typically characterized by information sharing not governed by intellectual property rights (even if IP rights are present as

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

[50] For discussions of "open source" approaches to biology *see, e.g.*, Arti Rai, O*pen 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).

[51] *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).

matters of form).[52] The environment outside the university is governed largely by IP rights. Technology transfer institutions may constitute an institutional pool or commons that mediates these two regimes.[53] Similarly, open source projects have developed "boundary organizations" to mediate their relations with commercial firms.[54]

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 that do not arise from the character of intellectual property interests themselves, and some that do.

We are obviously aware that pooling arrangements may exist for less socially salutary reasons. Most obvious is the case of members colluding to restrict competition. By requiring that an intellectual commons operate via sharing of intellectual resources themselves, we distinguish this project from similar investigations of cartels, which operate via sharing price and output information and which therefore pose significant risks of anticompetitive behavior without offsetting welfare benefits. 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 pools.

3. *Degrees of Openness and the Character of Control*

As part of describing the subject matter of a constructed cultural commons, including the activities involved in producing, managing, and

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[52] See sources cited *supra* note 27; John P. Walsh, Wesley M. Cohen & Charlene Cho, *Where Excludability Matters: Material versus Intellectual Property in Academic Biomedical Research*, 36 RES. POL. 1184 (2007).

[53] *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., Cambridge: Cambridge University Press 2003).

[54] *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).

extracting information works and the actors who undertake those activities, it is important to describe the degree of openness associated with a particular constructed cultural commons. Again, this characteristic is less crucial to natural resource commons arrangements. Natural resources are finite, rivalrous and often congested and subject to tragic overconsumption. Consequently, it is often necessary to limit access to a common pool resource to a defined community. The boundaries of the community sharing a resource tend to be coextensive with the boundaries of commons self-governance. Intellectual resources, by contrast, are not subject to the same natural constraints and are naturally shareable It is entirely possible and desirable for a community to produce and/or manage a cluster of cultural goods that is accessible to others. Indeed, one of the measures of success of a constructed cultural commons may be the degree to which it disseminates the intellectual goods it produces to a wider audience. It is thus important to inquire into the degree of openness of a particular constructed commons.

Commons regimes, and all structured intellectual property regimes and other resource management regimes, are guided by both 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.* These features should be assessed both with respect to the commons itself and with respect to the intellectual resources that constitute the commons. As noted above, the natural shareability of those resources makes the design of openness and control especially pertinent to constructing cultural commons.

a. 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 a particular attribute of a resource.

When we say that some*thing* is *open*, we are generally referring to a *thing*, a *resource* that can be described, possessed, and used. Openness describes our capacity to relate to a resource by accessing and using it. Thus, openness describes the extent to which there are barriers to possession or use. At one extreme, there are no barriers at all to possession or use, and at the other extreme, there is an insurmountable barrier to access and/or use. In between the extremes, openness (restrictiveness) varies according to the barrier costs (in terms of money, conditions, or other restrictions). As Joel West observes, openness in this sense may encompass joint or shared access to and use of the

resource.[55]

Barriers to possession or use of a resource may be natural or constructed. A resource may be open naturally because its characteristics prevent it from being possessed, owned or controlled by anyone. 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.

b. 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

[55] *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.

constructed attributes that define membership in the community and partly in terms of power and other bases for relations between participants.[56] 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. 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. 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 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.

[56] 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.

In information and knowledge environments, however, those resources are "naturally" given only in part. As described above, the cumulative and aggregative character of knowledge is fundamental to human culture. Producers of knowledge and culture resources are therefore simultaneously users and consumers. In analyzing openness, 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.[57] 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. 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.

C. Other Important Variables for Describing Constructed Cultural Commons

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 other characteristics of the constructed commons. Here we identify several additional clusters or "buckets" of variables that will be important to explore.[58]

- History and narrative
- Entitlement structures and resource provisions
- Institutional setting (including markets and related firm and collective structures, and social structures, and boundary organizations or mechanisms mediating internal governance with external markets, public domain, and so forth)
- Legal structures (including intellectual property rules, subsidies, contract and licensing law, antitrust provisions)
- Governance mechanisms of the commons (membership rules, resource contribution or extraction standards and requirements, conflict resolution mechanisms, sanctions for rule violation)

[57] *See* Frischmann, *supra* note 21.

[58] 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 7.

Finally, as when analyzing natural resource commons, there should be an inquiry into outcomes, including:

- Solutions to the underlying collective action problem and benefits delivered by the commons
- Innovations, creative output, produced, shared, and disseminated to a broader audience
- Costs and risks associated with the commons (any negative externalities)

This list is preliminary and thus unavoidably vague. The proposal is to use empirical studies to flesh out these categories, identify clusters of questions and issues that each category embraces, and perhaps uncover others. In the next few sections we attempt to give more content to some of these inquiries.

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 likewise 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.[59] Michael Madison[60] and Jessica Silbey[61] 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

[59] *See* ROSE, *supra* note 13.

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

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

to largely static output concerns. A commons is a rhetorically open place. A "pool" emphasizes the resources themselves, and how those resources are bounded. Explicitly giving attention to creation narratives also encourages attention to evolutionary processes. Changes in the narrative over time, or conflicts embedded within a narrative, can illustrate debates over purpose, which can illuminate the normative foundations of commons and highlights points of conflict. How does the pool 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?

2. *Entitlement Structures and Resource Provisions*

In any resource pool, the resources that are part of the commons have to come from somewhere. The "natural" information environment contains an abundance of raw information resources, including inherited and experienced knowledge, but those things only 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, or 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.

As with some natural resource pools that (when suitably managed) supply their own resources, in the cultural context the commons itself may be a source of the resources as well as a mechanism for managing them. The follow-on invention is but one example. In addition, resources that are excluded from the commons because social choices limit the scope of intellectual property entitlements – as with "facts" or "ideas" in copyright law, for example, which are excluded from legal protection – may be the sources of resources that are protected by law and later contributed to the commons. An essential attribute of a cultural commons, therefore, is the degree to which it is a dynamic construct, rather than a static one.

Boundaries in an information environment are likewise more obviously culturally constructed than their counterparts in the field of natural resources. Oceans, lakes, and rivers have beds and shores; forests yield to fields. Boundary maintenance is an important part of commons management in natural resources, but the maintenance question often has a reference point in naturally occurring boundaries. In the information environment, all boundaries ultimately depend on cultural constructs.[62]

3. *Institutional Setting*

Pools and commons in the cultural environment are functional entities; they 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.[63] 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.

4. *Legal Structures That Affect the Pool Itself*

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[62] 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*, ADMIN. SCI. Q. (forthcoming 2008).

[63] *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).

While industry and market structures are essential reference points for a 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 from antitrust enforcement for parties engaged in a form of concerted activity, or intended to engage in concerted activity, may be adopted. 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*,[64] 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 research agreement."[65] 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 Litman[66] 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

[64] 464 U.S. 417 (1984).
[65] 35 U.S.C. § 103(c) (2006).
[66] *See* Jessica Litman, *War Stories*, 20 CARDOZO ARTS & ENT. L.J. 337 (2002).

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*

As a constructed commons is an alternative to proprietary exclusion and to direct government intervention as a means of addressing a tragedy of the commons, yet relies in part on both of those things, understanding the commons as a form of governance, rather than government, is at the heart of the analysis. In Ostrom's work, the degree of *self*-governance is an important characteristic of a resource pool. 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. 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 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.[67] Conflict-resolution mechanisms within a pool depend on monitoring mechanisms. Before the emergence of the Internet, research on self-governing communities emphasized size and distance as key variables in a monitoring system. As Benkler[68] and Cohen[69] 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.

6. *Outcomes*

Not only should a constructed commons be assessed in light of its ostensible purposes, but it should also be viewed in light of its consequences.

a. Solutions and Benefits

Above, 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 problems that do arise from those entitlements, as solutions to boundary spanning dilemmas, and as reactions to an "infrastructure"-type problem that is the inverse of the standard tragedy of the commons diagnosis. In all cases, we argue that commons can enable what Frischmann and Lemley label "spillovers," the dynamic benefits that an information environment should 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.

For any specific cultural commons, therefore, the questions

[67] *See, e.g.*, Jacobsen v. Katzer, ___ F.3d ___ (Fed Cir. August 13, 2008).
[68] *See* BENKLER, *supra* note 8.
[69] *See* Julie E. Cohen, *Pervasively Distributed Copyright Enforcement*, 95 GEO. L.J. 1 (2006).

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 precisely because the desired spillovers benefit populations other than those in direct producer/consumer relationships. 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 pools may supply). Enabling collaboration and cooperation among firms in terms of sharing access to pooled information resources facilitates cooperation along lines that are generally regarded as 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.

V. Conclusion

The theoretical discussion of intellectual property policy is myopically focused on extremes (exclusion/open access), ignoring a wide range of constructed commons that persist between the extremes, and is 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.

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

Borrowing from Ostrom, we argue that understanding the origins and operation of beneficial 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 pools are structured by default rules of exclusion, and the ways in 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 pool and determine the extent to which "openness" is, as we hypothesize, associated with pools that are welfare-enhancing.