

## The University as Constructed Cultural Commons

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### INTRODUCTION

This Article illustrates an agenda for investigating the mechanics of innovation contexts. The title of the symposium of which the Article is a part—“Open Source and Proprietary Models of Innovation: Beyond Ideology”—captures its premise almost perfectly: The world of intellectual property law and the conventional analyses of innovation and creativity ask the wrong set of questions. Our claim is that the world does not contain just two paradigms of innovation—proprietary and open—but that any given innovation context offers an opportunity to explore the more fine-grained ways in which law and other devices operate together to construct solutions to innovation problems.

We are interested specifically in problems of constructed cultural commons, which have received popular and scholarly attention

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\* Professor of Law and Associate Dean for Research, University of Pittsburgh School of Law. Part I of this Article is a much abbreviated version of a longer article in progress. See Michael J. Madison, Brett M. Frischmann & Katherine J. Strandburg, *Constructing Commons in the Cultural Environment*, 95 CORNELL L. REV. (forthcoming 2010), available at <http://papers.ssrn.com/abstract=1265793>. Both that paper and this one are initial steps in a broader enterprise that investigates the construction and mechanics of the cultural environment. Thanks to Professor Charles McManis and the Washington University School of Law for the invitation to write and present this paper. Copyright © 2009 Michael J. Madison, Brett M. Frischmann & Katherine J. Strandburg.

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recently in the work of Yochai Benkler<sup>1</sup> and James Boyle,<sup>2</sup> among other scholars. We believe that there are questions to be asked about these commons that may offer superior insights both into the mechanics of commons itself and into the respective roles of law and culture in innovation and creativity problems generally. Our primary focus initially is neither high-level questions—“what is law,” “what regulates,” or “when peer production can succeed”—nor very specific questions—“what is the right rule for secondary copyright liability” or “when should file sharing be permitted.” Commons is an intermediate level target. Eventually, with a more robust understanding of commons in different contexts, the analysis can be scaled up and down to innovation problems at both coarser and finer levels.

Part I of the Article briefly outlines our theoretical disposition, how our view of commons departs from the standard accounts of innovation problems and solutions. Rather than approach innovation policy as presenting the need to avoid problems of commons, we treat constructed commons as solutions to innovation problems.<sup>3</sup> Specifically, building on the pioneering work of Elinor Ostrom on common pools in the natural resources environment,<sup>4</sup> we argue that promoting innovation requires an understanding of commons in the cultural environment. We refer to “commons” rather than “the commons” in order to highlight the point, made by Ostrom, that commons is not a singular concept. Commons have multiple levels, sources, and products.<sup>5</sup> We outline a set of questions and perspectives that we believe will help in describing and understanding the

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1. See YOCHAI BENKLER, *THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM* (2006).

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

3. This approach was inspired in part by prior work on the economics of infrastructure resources, see Brett M. Frischmann, *An Economic Theory of Infrastructure and Commons Management*, 89 MINN. L. REV. 917 (2005), and on the social construction of legal objects, see Michael J. Madison, *Law as Design: Objects, Concepts, and Digital Things*, 56 CASE W. RES. L. REV. 381 (2005).

4. E.g., ELINOR OSTROM, *GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION* (Political Economy of Institutions and Decisions, James E. Alt & Douglass C. North eds., 1990).

5. Occasionally, here and below, “commons” takes on a plural character, referring to more than one “constructed commons.”

construction of cultural commons in many institutional contexts. These questions are necessarily provisional. As they are applied and explored via case studies, the type, form, and number of questions are likely to be refined.

Part II of the Article applies this framework to the example of the university, which is one of the very oldest, most durable, and most important examples of commons in the cultural environment and one that is neither wholly “open” nor wholly “proprietary” in any meaningful sense. We illustrate how the university, and institutions and practices embedded within it, rely on a variety of tools—formal intellectual property doctrines, social norms, expectations grounded in history, and the very physical structures that comprise most university facilities—to construct a variety of nested commons across a range of places and practices, from the classroom to the very notion of scholarly research and knowledge production.

Finally, the Article concludes by offering some preliminary thoughts regarding implications.

## I. THE SOURCES AND ROLES OF CONSTRUCTED COMMONS

### A. *Standard Models of Innovation Policy*

The standard description of the innovation problem is captured in the dictum attached by music and film industry executives to the economic harms inflicted by free file-sharing and file-swapping networks: “You can’t compete with free.”<sup>6</sup> That phrase captures a broader intuition: Knowledge and information are regarded as public goods in economic terms, and the social context of their provisioning and consumption is characterized metaphorically as a “tragedy of the commons.”<sup>7</sup> In abbreviated form, the theory is this: information resources, as public goods, are nonrivalrous, which means that

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6. See, e.g., Amy Harmon, *Efforts to Stop Music Swapping Draw Fire*, N.Y. TIMES, Aug. 1, 2003, at A1 (quoting general counsel of Titan Media, a content provider).

7. See, e.g., Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 TEX. L. REV. 1031, 1037–38 (2005) (describing the use of the tragedy of the commons metaphor in intellectual property contexts). The tragedy of the commons metaphor for environmental resources is generally associated with Garrett Hardin. See Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243 (1968).

consumption of a unit of information does not deplete the supply of information available for consumption by others. If we buy a book from a bookstore, that bookstore's supply of books is reduced, because books, like most tangible things, are rivalrous. But the supply of intellectual content represented in that book is not reduced; at least in principle it can be shared over and over again regardless of whether one possesses a copy of the book itself. Because of this public goods character, in the absence of some institutional regulation—if information products are free for the taking—knowledge and information will be underproduced (i.e., will be subject to the classic form of market failure). Producers of information goods will have insufficient incentives to produce knowledge and information if they are unable to capture economic returns from their output.

One standard solution to this so-called tragedy is grounded in proprietary rights, especially copyright and patent rights established and maintained by law-giving institutions, and the innovation models built on them.<sup>8</sup> Copyrights and patents construct rights of exclusion for intangible things and permit knowledge and information producers to commodify and establish private markets for their output. Through those markets, producers can try to capture private returns. Information provided by consumers' willingness to pay allows producers to determine whether production is warranted.

A second standard solution focuses on government subsidies to producers of knowledge and information through prizes, grants, privileges against enforcement of property rights held by others, tax exemptions, and so forth.<sup>9</sup> Like proprietary rights, government subsidies can dilute or eliminate the impact of the tragedy of the commons by increasing returns from innovation to the knowledge producer, reducing the producer's costs, or both.

These two approaches sometimes understate the extent to which information and knowledge production are cumulative practices. Innovators and creators draw on the work of their predecessors. To

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8. For a representative summary of the standard solutions to public goods problems, see generally Shubha Ghosh, *Pills, Patents, and Power: State Creation of Gray Markets as a Limit on Patent Rights*, 14 FLA. J. INT'L L. 217, 225–27 (2002).

9. *See id.*

maximize access for later producers, a field of knowledge production and consumption might reflect a complete absence of intellectual property rights or other formal structures designed to mitigate the effects of the tragic commons, an approach that may be characterized generally as the public domain.<sup>10</sup> In that scenario, knowledge and information might be produced and consumed according to the guidance provided by various informal normative regimes, such as social norms or private contractual arrangements, or according to no normative guidance at all. Information and knowledge might even be “free” in all possible senses of that word; subsequent producers would then, in theory, have the richest possible resource base to draw on in building new works.

As ideal starting points of analysis of any particular innovation problem, the proprietary rights and subsidy approaches come with well-known limitations. The most important of these is revealed by making explicit the implicit normative framework that guides standard solutions, that the point of institutions that promote creativity and innovation is to maximize or optimize the amounts and types of creative and innovative output. With that metric made explicit, the key limitation of the standard accounts is clear: the inability to know how to balance the central, offsetting imperatives of information governance in order to achieve that right result. In specific institutional and disciplinary settings, the interests and needs of society—accounting for both actors within that setting, and others—include both production of knowledge (suggesting an emphasis on proprietary rights and subsidies) and access to knowledge (suggesting an absence of proprietary rights or equivalent measures to assure the ability to use and re-use existing knowledge resources). In any particular context, if law or public policy misjudges how to balance those interests, then grants of proprietary rights or subsidies may impose social costs that exceed the social benefits they are designed to create.

For example, strong patent rights may limit the ability of later researchers and innovators to build on and improve earlier technical

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10. See Pamela Samuelson, *Enriching Discourse on Public Domains*, 55 DUKE L.J. 783 (2006) (describing the range of practices, theories, and doctrines captured by the phrase “public domain”).

advances, because owners of those prior patents may be unwilling to license their inventions or may be willing to license them only on terms that later innovators are unable or unwilling to accept. In a market economy, such a failure of transacting may simply represent a market-based resolution to the question of identifying socially valuable innovation, and this failure to transact is consensual and presumptively legitimate in bilateral terms.

The ultimate beneficiaries of second generation innovation are consumers and citizens, whose interests may not be represented in the would-be licensees' pricing calculus.<sup>11</sup> In social terms, the loss of subsequent innovation is real and at least potentially harmful, not only in the sense that some quantity of creativity and innovation is lost, but equally in the sense that some important number of potential innovators and creators are deprived of the opportunity to use and create based on this prior work.

The key point here is that understanding the real costs and benefits of a model of innovation policy requires a sophisticated account of the interests of third parties—users, consumers, and later innovators whose interests may be poorly represented (or not represented at all) in standard tragedy of the commons accounts of knowledge problems, knowledge development and exchange, research advances, and innovation transactions. Mark Lemley and Brett Frischmann characterize these essential third-party interests as spillovers.<sup>12</sup> We argue that when the exemplary innovation transaction fails, the causes and cures for the resulting loss of innovation are obscured, rather than illuminated, by the simple model that posits forms of proprietary rights, subsidies, and the public domain as primary and perhaps exclusive alternatives for analyzing innovation policy problems. Instead, we suggest that an approach to innovation that begins with commons, and the many ways in which law and culture construct commons, offers the potential for more useful insights.

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11. See generally Brett M. Frischmann, *Evaluating the Demsetzian Trend in Copyright Law*, 3 REV. L. & ECON. 649 (2007); Brett M. Frischmann & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257 (2007); Frischmann, *supra* note 3.

12. See Frischmann & Lemley, *supra* note 11.

### *B. The Constructed Commons Alternative*

We begin this discussion of the constructed commons alternative with some very brief examples. What we describe in general terms as constructed cultural commons has its origins in the notion of intellectual property pools, or structured collective arrangements by which owners of related intellectual property entitlements (typically, patents in some technical or industrial domain) contribute those properties to a pool. Members of the pool are permitted to use the pooled patents without having to license or clear patent rights on a transaction-by-transaction basis, which means that the pool enables the simultaneous exploitation of multiple patents, all or many of which may be necessary to operate in a complex technological environment. Non-members may also use the pooled patents, usually on standardized license terms. An early, famous example of a patent pool is the Manufacturer's Aircraft Association, formed during World War I to facilitate the production of airplanes by pooling patent interests distributed among a variety of aircraft parts manufacturers.<sup>13</sup>

Neither pools nor patents exhaust the concept of constructed commons in the cultural environment. What constructed cultural commons share are member or participant contributions of information and knowledge resources to some distinguishable and bounded collectively managed enterprise, and the ability of those members to appropriate and build on those shared resources. Open source computer software projects are contemporary examples of commons that connect to copyrighted works.<sup>14</sup> Cultural commons need not depend explicitly on intellectual property rights. Newsgathering and distribution collectives, such as the Associated Press, are forms of cultural commons in an industry characterized by property rights that are, at best, fuzzy.

We tie these illustrations together with the following framework. For our foundation, we rely on a pair of metaphors. The first is

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13. See Harry T. Dykman, *Patent Licensing Within the Manufacturer's Aircraft Association* (MAA), 46 J. PAT. OFF. SOC'Y 646 (1964).

14. See Michael J. Madison, *Reconstructing the Software License*, 35 LOY. U. CHI. L.J. 275 (2003).

cultural environmentalism. The idea originates in the work of James Boyle, who pointed to the need to represent environmental values such as sustainability and stewardship in conversations about innovation policy that otherwise focus on “more” and “better” as key priorities.<sup>15</sup> We characterize the cultural environment as the set of intersecting and evolving systems of production, storage, distribution, and use of information, knowledge, and innovation—or intellectual culture, in a broad sense.<sup>16</sup>

The second and related metaphor is commons itself, which we borrow both from prior scholars of intellectual property and information policy and from scholars of the natural resource environment.<sup>17</sup> Commons serves as a metaphor for an environment defined by resources that can be contributed and appropriated by some population of creators and consumers (often, these are the same actors), operating according to some specified degree of openness. Degrees of openness distinguish commons from the balance of the cultural environment.

Neither contribution nor appropriation is defined by market processes. So long as they abide by the norms or rules of the commons enterprise (which may, of course, limit what people can add or take), people can add to and take from the commons more or less as they please, without negotiating payment for each individual transaction. (The tragedy of the commons metaphor uses the term in a related sense: A commons is a metaphoric place that is “tragic” because there are no limits on users’ ability to extract resources that are available there. Over-extraction or over-consumption is the likely result.) Importantly, commons do not simply happen. Commons are constructed by human actors and institutions, acting intentionally.<sup>18</sup>

The cultural environmentalism metaphor and the commons metaphor can be linked.<sup>19</sup> Information and innovation policy

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15. See Boyle, *supra* note 2.

16. See generally Brett M. Frischmann, *Cultural Environmentalism and The Wealth of Networks*, 74 U. CHI. L. REV. 1083 (2007).

17. See, e.g., OSTRUM, *supra* note 4, at 49–87 (describing commons case studies).

18. See Madison, *supra* note 3, at 933–38.

19. See Molly Shaffer Van Houweling, *Cultural Environmentalism and the Constructed Commons*, 70 LAW & CONTEMP. PROBS. 23 (2007) (noting the link between the cultural



problems do not exist in the abstract. They exist in the cultural environment. Questions of knowledge production, distribution, and growth exist side by side with questions of the sustainability and stewardship of cultural institutions, disciplines, and forms of knowledge. In the cultural environment, commons play a key role, and perhaps a central role (along with proprietary rights and government subsidies, among other things), in mediating competing and complementary individual and social interests in each of these processes. By studying commons, we wish to explore how the cultural environmentalism metaphor becomes concrete in practice.

In the natural resources context, this is the approach that Elinor Ostrom and her colleagues pioneered, looking at commons for resources that include fisheries, forests, and irrigation systems.<sup>20</sup> Ostrom emphasizes two central characteristics of commons, which we incorporate into our analysis and extend. One is boundaries. Commons are distinguished and distinguishable from the environment around them. Two is self-governance. Commons are managed by some population of insiders. In both senses, she recognizes that commons are not simply given. Commons are created or constructed.<sup>21</sup>

We both acknowledge our debt to Ostrom's work and make clear that one way to understand this project is as an application and extension of her work on the physical commons to this distinct area. A natural resources environment is not defined (at least not realistically defined) merely by the presence or absence of proprietary rights and government subsidies. Commons play key roles in governing natural resources. Likewise, studying problems in the cultural environment should begin with understanding the mechanics of commons in that environment and specifically understanding governance of commons, a term that explicitly (if metaphorically) embraces conservation and sustainability as well as

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environmentalism metaphor and the commons metaphor but not exploring its broader implications).

20. See OSTROM, *supra* note 4. Ostrom has taken some steps toward applying this framework to cultural institutions. See Elinor Ostrom & Charlotte Hess, *A Framework for Analyzing the Knowledge Commons*, in UNDERSTANDING KNOWLEDGE AS A COMMONS: FROM THEORY TO PRACTICE 41 (Charlotte Hess & Elinor Ostrom eds., 2007).

21. See OSTROM, *supra* note 4; Ostrom & Hess, *supra* note 20.

growth and productivity. How do information and knowledge come to be produced, stored, distributed, and consumed? What purposes do commons serve, and how do commons function?

Answering those questions requires a more complex and nuanced investigation than might first appear. To answer them in the context of particular commons, below we set out a series of sub-questions or themes that can be asked regarding a given commons, enabling understanding of the relevant mechanisms by which that commons is constructed and governed. As Ostrom does, we note that it is not possible *ex ante* to define a universal set of criteria on which this interrogation should be based. Nor is it possible *ex ante* to define all relevant commons or the scale at which commons investigation should be conducted. Instead, we expect to proceed via case studies, and we start below with a series of questions, clustered thematically, which we expect will evolve as we and others look at examples of cultural commons and identify additional sources of commonality and variation. Commons in the cultural environment, as with commons in the natural resource environment, are constructed and exist simultaneously at different scales—from the narrow and limited to the very broad and inclusive. Importantly, both commons in a single discipline or domain and the clusters of questions themselves may be characterized as “nested,” so asking questions of commons at one scale opens the possibility of asking questions of related commons at a slightly broader (or narrower) scale. The response to a preliminary question in a cluster may open the door to a series of related, additional questions in that cluster.<sup>22</sup>

We conclude this Part by laying out eight clusters of questions that we believe should be asked in investigating any particular constructed cultural commons, with the eventual goal of relating particular characteristics to the results produced by certain types of sharing arrangements. In the next Part, the clusters of questions are illustrated provisionally in the context of a longstanding complex of nested commons: the university.

First, what is the relevant history and narrative (or, what are the histories and narratives) of the commons? Commons are built from

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22. See Elinor Ostrom, *A Diagnostic Approach for Going Beyond Panaceas*, 104 PROC. NAT'L ACAD. SCI. 15181 (2007).

intentional human activity. History and narrative consist of synthesized accounts of how those processes developed over time. At one level these serve as discursive accounts of causation. Where did the commons come from? Where did commons resources come from? How are commons resources used? Why is commons a good thing in a particular context (if that is the case)? Whether or not the narrative deals explicitly in the idea of commons, it explains the purpose or purposes of a particular commons. Those may be functional, symbolic, or both. Changes in the narrative over time, or conflicts embedded within a narrative, can illustrate debates over purpose, which can illuminate the normative foundations of a commons and highlight points of conflict.<sup>23</sup> Where possible, care should be taken throughout to distinguish history from mythology, though mythology, too, may offer valuable data regarding normative aspects of commons.

Second, what entitlement structures and resource provisions define the contents of the commons? Commons consist in the first place of some pool of resources. What are those resources? What are the relevant units of provisioning and appropriation? What background rules of law define those resources, allocate initial ownership in those resources, and govern later appropriation or consumption of those resources? Do any informal rules or practices play roles in determining the character of commons resources?

Third, what is the institutional setting that the commons inhabits, including relevant markets, firms, and other formal collective structures? What less formalized institutional structures bear on the mechanics of the commons, including social practices, disciplines, and social norms?

Fourth, are there formal legal structures addressed to the commons itself, such as subsidies, safe harbors, privileges, or exemptions from antitrust liability that have been put in place to facilitate collective action via the commons or the existence of the commons as an intermediary institution? Conversely, do formal legal structures directly or indirectly disable the commons in some way by

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23. See MARTHA C. NUSSBAUM, *POETIC JUSTICE: THE LITERARY IMAGINATION AND PUBLIC LIFE* (1995).

creating liabilities for intermediaries or proscribing certain forms of collective or concerted action?

Fifth, do any governance mechanisms guide the operation of the commons, and, if so, what are they and how do they work? Among other things, commons typically have membership criteria (specifying who may contribute to and appropriate resources from the commons); resource contribution and appropriation standards; decision-making rules; and provisions for resolving conflicts over membership and resources and sanctions for violations. Does membership impose ongoing obligations (and corresponding privileges), or are there conditions under which parties may deal with the commons on a one-time or one-shot basis? Ostrom's work on natural resource pools is especially illuminating here, as she emphasizes their self-governing character.<sup>24</sup>

Sixth, what kinds of interfaces mediate between internal governance mechanisms (the subject of the fifth cluster) and external governance mechanisms (the subjects of the second, third, and fourth clusters)? Generally, these questions identify the extent to which a commons operates and is governed more or less independently from other resource allocation mechanisms, including but not limited to market structures. These interfaces or boundaries may be informal or formal, fixed or flexible, conceptual or physical, and firm or porous.

Seventh, is the commons associated with specific solutions to innovation problems? To what extent does the commons deliver benefits that are not provided via market or subsidy-driven mechanisms or not delivered in the same quantity, at the same price, or in the same distribution? Benefits in this sense are presumptively benefits to innovation and knowledge, but indirect and unexpected benefits in other domains may be observed as well. (One obvious benefit is the transactions cost savings associated with many patent pools.) To some extent these questions overlap with the questions clustered under the first group dealing with history and narrative. Those questions are somewhat more backward-looking. Here, the questions focus on contemporary and prospective operation of the commons.

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24. See OSTROM, *supra* note 4, at 29–57.

Eighth and last (for now), what are the costs and risks associated with the commons? As with the benefits, these are presumptively costs to innovation and knowledge, but may consist of costs or risks in other areas. We stress at this point that our goal is not to engage in a simple cost-benefit assessment. Rather, we intend to catalog costs and benefits as part of an overall framing of the governance of a constructed commons.

As a conclusion to this Part and an introduction to the next, we note not only these similarities to Ostrom but also some distinctions, all of which (unfortunately) complicate the project of specifying and describing commons and their constituent elements:

First, unlike most physical, environmental resources, the nonrivalrousness of information resources complicates identification of those resources themselves, as to identifying them both outside and within a given commons.<sup>25</sup>

Second, it is important to recognize that the relevant baseline is itself constructed. Trees, fish, and water are (mostly) natural and given, and natural resources commons can be constructed from them. Works of authorship, inventions, “facts,” “ideas,” and “data” are not necessarily natural or given. When we speak of constructing commons, therefore, it is not merely commons that are constructed. All elements of cultural commons are constructed by intentional human activity, including the underlying resources themselves.

Third and finally, resources in a cultural commons move around via transactions before, during, and especially after their appropriation from that commons,<sup>26</sup> whereas at least some natural resources in a commons stay put at least and until they are appropriated. Information and knowledge resources frequently need to be combined in order to produce new knowledge. A patent or certain patent rights may be “in” a commons only in a metaphoric sense, and therefore only contingently or conditionally, whereas a

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25. Because natural resources are at least partly rivalrous, Marc Poirier argues that commons analysis from the point of view of classic environmentalism is, in some ways, more complex than commons analysis for cultural resources. Marc R. Poirier, *Natural Resources, Congestion, and the Feminist Future: Aspects of Frischmann's Theory of Infrastructure Resources*, 35 *ECOLOGY L.Q.* 179 (2008).

26. See Robert P. Merges, *Intellectual Property Rights and the New Institutional Economics*, 53 *VAND. L. REV.* 1857, 1859–67 (2000).

tree is physically in a commons until it is cut down. A patented invention must be somewhat useful in order to be patentable, but its real social utility may require combining that invention with other information, patented or not. The range of problems and solutions that define cultural commons may, accordingly, be quite broad.

These distinctions between physical resources and information or intellectual resources are fluid. An open source computer program is both a constructed object and a form of information. Commons in the natural resource environment are likewise constructed and therefore contingent. We anticipate, however, that one might intuit that natural resources commons are “different” somehow from cultural commons. In describing the governance of cultural commons, we want to build in mechanisms to accommodate and respond to that intuition.

## II. THE UNIVERSITY AS CONSTRUCTED COMMONS

We illustrate the construction and governance of constructed commons here by describing the university, rather than an institution with greater traction in intellectual property law, such as a patent pool. We use the university precisely because it exemplifies several of our central themes, without requiring mastery of legal detail: the institutional setting of commons; the intentionally constructed character of commons; the relationship between legal structures and other social and cultural forms; and the importance of commons to the production and distribution of knowledge across several levels, from the most general sense of knowledge for its own sake to the most specific sense of actions and products of individual researchers and students. The following review highlights the interplay of several institutional, legal, and practical dimensions in constructing and governing the openness that plays a key, and perhaps defining, role in the functions of the university as a knowledge producer and distributor.

Is the modern research university a constructed cultural commons? We argue that it is.<sup>27</sup> The university (and any particular

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27. Cf. David Bollier, *The Enclosure of the Academic Commons*, ACADEME, Sept.–Oct. 2002, at 19 (describing academia as a commons for managing collectively held resources, defined normatively as an alternative to the market). For a related work, see David Bollier, *Preserving the Academic Commons*, Keynote Remarks before American Association of

university) is defined by a population of faculty and students<sup>28</sup> who take as their mission the simultaneous construction and perpetuation of knowledge itself, in conceptual, physical, and practical or applied forms. There is an “in-ness” and an “out-ness” to the university community (or more precisely, communities), and members of those communities simultaneously contribute to and extract from the body of knowledge that lies at the institution’s core and serves as the foundation for further knowledge production. They do so on terms that differ markedly from the terms that govern interactions in the private market, in other institutions, and across the boundaries that distinguish the university from those institutions and the public at large. The university as commons is largely self-governed.

The modern university is an institutional anomaly. On the one hand, the university is among the very oldest and therefore most enduring of human creations. On the other hand, the university emerged amid economic and social conditions of medieval Europe that vanished long ago, and it was dramatically re-defined by social and economic conditions of the mid-twentieth century, which also have evolved significantly.<sup>29</sup> The post-World War II demographics, social attitudes, and government policies that shaped the modern American version of the university are giving way to commercial and international demands.<sup>30</sup> The university as constructed commons is both a stable, centuries-old institution and the locus of enormous dynamism.

Constructing, distributing, and perpetuating the world’s knowledge across centuries and continents is an innovation and creativity problem of the highest order, and no single model of rights,

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University Professors (June 13, 2003), available at <http://theuniversityfaculty.cornell.edu/forums/pdfs/BollierAAUP102203.pdf>.

28. And in some American settings, particularly elite private universities, by alumni, who in a sense are the durable embodiment of students.

29. See DEREK BOK, *UNIVERSITIES IN THE MARKETPLACE: THE COMMERCIALIZATION OF HIGHER EDUCATION* (2003).

30. See, e.g., David Wessell, *Yale Safeguards Its Top Spot*, WALL ST. J., Apr. 24, 2008, at A2 (describing prominence of Yale University among American universities exploring genuine internationalization).

subsidies, or openness can solve it. In a nutshell, this point captures the value of seeing the university as constructed commons. Above, we described “proprietary rights” and “government subsidies” as the foundations of the two standard accounts of solutions to tragedy of the commons problems in the cultural environment. We do not set up the university solely as an alternative to either the market or government design. Nor do we align the university unambiguously with the open or public domain alternative. The larger-scale or macro innovation problem described in the first sentence of this paragraph can be broken down into numerous small-scale, micro or subsidiary innovation problems, with multiple and overlapping constituencies, actors, and sub-institutions. There is an incentive-to-produce problem in terms of generating basic knowledge. There is a resource-coordination problem in terms of creating knowledge. There is an access-to-knowledge problem in terms of storing and managing basic knowledge (this is especially acute in trans-generational and trans-national senses, and the access problem relates not only to informational content but also to artifacts). There is a distribution problem in terms of both distributing knowledge within “basic knowledge” communities and distributing knowledge to adjacent “applied knowledge” communities (these include industrial and commercialization enterprises; governments; and students). There is a self-perpetuation problem: how does the “basic knowledge” enterprise survive in some stable form over time? Proprietary rights, subsidy, and public domain strategies are each relevant in some ways to solving these problems. The university as constructed commons involves elements of all of these approaches.

What are the governance dimensions of the university as constructed cultural commons? To gain insight into the answer to this question, we review and apply the clusters of questions described in Part I.



*A. History and Narrative*<sup>31</sup>

The idealization of the university as an institution often points to its fundamentally open character. Relatedly, in contemporary discourse there is sometimes a rhetorical association between the university as an institution and mid-twentieth century Mertonian norms of open scientific research (disinterested researchers, communal sharing of results, and so forth).<sup>32</sup> That linkage provides a foundation for the proposition that commercialization of academic research over the last twenty-five years is a bad thing, because it represents a significant change from historic norms, and that associated legal changes, such as elements of U.S. law that promote commercialization of faculty research<sup>33</sup> and recent retrenchment on the proposition that university researchers are exempt from patent liability,<sup>34</sup> are necessarily or at least likely suboptimal.

The research function of the university is, however, a relatively recent addition to its functions, and the university's openness is a more nuanced phenomenon. The history of the university is sufficiently long and complex that any brief summary omits and essentializes important details. For present purposes, then, the central points seem to be these. The modern degree-granting university was invented in Italy in the eleventh century primarily as a locus of teaching and scholarship.<sup>35</sup> It was institutionalized by students and by

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31. Much of the following is based on JAROSLAV PELIKAN, *THE IDEA OF THE UNIVERSITY: A REEXAMINATION* (1992), which is a thorough updating of JOHN HENRY NEWMAN, *THE IDEA OF A UNIVERSITY DEFINED AND ILLUSTRATED* (I.T. Ker ed., 1976) (1852). The other modern classic analysis of the university is CLARK KERR, *THE USES OF THE UNIVERSITY* (5th ed. 2001). See also OLAF PEDERSEN, *THE FIRST UNIVERSITIES: STUDIUM GENERALE AND THE ORIGINS OF UNIVERSITY EDUCATION IN EUROPE 122–88* (Richard North trans., 1997) (describing organizational origins of first Italian, French, and English universities); Paul F. Grendler, *The Universities of the Renaissance and Reformation*, 57 *RENAISSANCE Q.* 1 (2004); Walter Rüegg, *Themes*, in *A HISTORY OF THE UNIVERSITY IN EUROPE: VOLUME I: UNIVERSITIES IN THE MIDDLE AGES 20–23* (Hilde de Ridder-Symoens ed., 1992) [hereinafter Rüegg (vol. 1)]; Walter Rüegg, *Themes*, in *A HISTORY OF THE UNIVERSITY IN EUROPE: VOLUME 3: UNIVERSITIES IN THE NINETEENTH AND EARLY TWENTIETH CENTURIES (1800–1945) 3* (Walter Rüegg ed., 2002) [hereinafter Rüegg (vol. 3)].

32. See ROBERT K. MERTON, *The Normative Structure of Science*, in *THE SOCIOLOGY OF SCIENCE: THEORETICAL AND EMPIRICAL INVESTIGATIONS* 267 (Norman W. Storer ed., 1973).

33. See 35 U.S.C. §§ 200–212 (2006).

34. See *Madey v. Duke Univ.*, 307 F.3d 1351 (Fed. Cir. 2002).

35. See PAUL F. GRENDLER, *THE UNIVERSITIES OF THE ITALIAN RENAISSANCE* 5–21

faculty to collectivize and stabilize existing practices of one-to-one instruction for pay.<sup>36</sup> Students organized to discipline a market that included defaulting teachers and cities skeptical of the students' presence; teachers organized to counter the students.

The teaching mission of the university, moreover, consisted primarily not of producing "researchers," as we understand that phrase today, but to produce graduates, especially law graduates, who could staff teaching institutions and the offices of both church and state. The curriculum was organized around the arts and the learned professions.<sup>37</sup> Research, as we recognize the practice, came later. To the extent that we can retrospectively characterize the work of scholars in medieval Italy and France, research initially consisted of close readings of text, particularly law, and at different stages of the university's evolution research was at times a feature of learned academies and, later, of clubs and professional societies<sup>38</sup> rather than a feature of universities themselves.<sup>39</sup> Modern experimental science emerged slowly, as a product of the recognition of practices of natural philosophy and natural history. Only gradually and over a long period of time was it assimilated to the university as an institutional home.<sup>40</sup> The rise of Humboldt's University of Berlin in the early nineteenth century and the implementation of Humboldt's model at Oxford and Cambridge promoted and institutionalized unfettered intellectual inquiry valued in its own right and as a pillar of the modern academy.<sup>41</sup> Research as the pursuit of knowledge itself thus came to dominate the conception of the university only during the course of the nineteenth century.

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(2002) (describing the origins of the university at Bologna).

36. *See id.*; Rüegg (vol. 1), *supra* note 31, at 20.

37. *See* Grendler, *supra* note 31, at 3–9.

38. For an enlightening description of one such "club" as a locus of "philosophical investigation," see JENNY UGLOW, *THE LUNAR MEN: FIVE FRIENDS WHOSE CURIOSITY CHANGED THE WORLD* (2002).

39. The relocation of study to learned academies was particularly true in France and, to a lesser extent, in Italy. *See* Grendler, *supra* note 31, at 23–28.

40. *See* JOHN GRIBBIN, *SCIENCE: A HISTORY 1543–2001* (2002) (omitting the university setting almost entirely from his sweeping account of the development of modern science); PELIKAN, *supra* note 31, at 110–20.

41. *See* PELIKAN, *supra* note 31, at 78–88; John Henry Schlegel, *From High in the Paper Tower, An Essay on von Humboldt's University*, 52 *BUFF. L. REV.* 865 (2004).

In the United States, during that same period, universities eventually combined the Continental university tradition (that is, Humboldt's knowledge-seeking model as constructed on a medieval foundation) with the British-based college tradition.<sup>42</sup> Other related but distinct features of the university's different historical narratives also merged in the nineteenth-century American example. The university library, long both a literal and symbolic home of the knowledge preserved by the university, had been partly a resource assembled by and for the faculty, including its ecclesiastical and state-sponsored members,<sup>43</sup> and partly a resource assembled for the benefit of students, particularly undergraduates.<sup>44</sup> In the modern university, it is frequently all of these things. The university press, for centuries a staple of the historical institution, first undertook to publish faculty scholarship during the latter part of the nineteenth century.<sup>45</sup>

Neither teaching, research, libraries for scholars, nor scholarly publishing are unique to universities, but by the end of the nineteenth century the modern university had acquired the rudiments of its contemporary identity as a shared home for each of these things. It was an open but carefully governed environment, not only for the transmission and distribution of knowledge through teaching, but also for unconstrained, disinterested inquiry by both students and faculty researchers, for the perpetuation of created knowledge via publication to scholarly audiences, and for the free exchange of knowledge between scholars and their students.

Also notable here are two other major dimensions of the university's historical narrative: the shift from institutions governed

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42. See KERR, *supra* note 31, at 7–14 (noting that the British and German traditions were married to the American universities' tradition of training for public service).

43. See Bodleian Library, History of the Bodleian Library, <http://www.ouls.ox.ac.uk/bodleian/about/history> (last visited Feb. 11, 2009) (providing a detailed history of the Bodleian Library at the University of Oxford); University Library of Heidelberg, History of the University of Heidelberg Library, <http://www.ub.uni-heidelberg.de/Englisch/allg/profil/geschichte.html> (last visited Feb. 11, 2009).

44. See Yale University, About Yale—History, <http://www.yale.edu/about/history.html> (last visited Feb. 11, 2009) (noting that Yale University is named for an early benefactor, Elihu Yale, who provided the undergraduate college with its initial collection of library books).

45. See Harvard University Press, A Brief History of HUP, <http://www.hup.harvard.edu/insidehup/history.html> (last visited Feb. 11, 2009); Oxford University Press, Oxford University Press: History, <http://www.oup.com/about/history/> (last visited Feb. 11, 2009).

by religious interests and expectations and the internationalization of the university. Both play out the same theme of a graduated but nuanced openness across the university.

Until the late eighteenth and early nineteenth centuries the university typically was aligned closely with the Christian church, not (primarily) because the university served as a home for religious scholarship, but instead because the university was a primary locus of professional training for the pulpit and for state bureaucracies that were closely aligned with the church.<sup>46</sup> An important part of the narrative of the university as constructed commons, therefore, is the secularization of the university. On the research side, Humboldt's model recognized the emergence of a secular knowledge enterprise during the eighteenth century and the rise of "science," following natural philosophy, as a disciplined mode of knowledge-seeking applicable both to the natural world and to the man-made.<sup>47</sup> On the professional training side, outside of the United States, universities that operated essentially as ecclesiastical institutions evolved into arms of the bureaucratic state.<sup>48</sup> In the United States the evolutionary path differed. University-based schools of divinity and theology continued to produce congregational leaders (and continue to do so today), but decentralized civil governance meant that universities no longer were called primarily to produce government administrators. The interface between university-as-commons and broader society is not mediated by organizational and spiritual mandates to create and perpetuate knowledge of the divine. Notably, even today, for church-sponsored universities in particular, the content and shape of the cultural commons, (such as limits on who may participate in commons and on what may be taught or learned) are at times sources of contention from the standpoint of the academic community generally.

Outside the United States, withdrawal from church sanctioning for the university has been replaced in many countries by state support and concomitant centralized bureaucracies.<sup>49</sup> It is important,

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46. See Rüeegg (vol. 3), *supra* note 31, at 6.

47. See PELIKAN, *supra* note 31, at 78–88.

48. See Rüeegg (vol. 3), *supra* note 31, at 6.

49. See *id.*

therefore, to remember that the university as an institution is not defined solely by American norms, which build in different degrees of deference to self-governance and norms of commons than may be applicable in other countries. Partly because financial support for the university often comes principally from the state, and partly because of the continuity of state (formerly ecclesiastical) bureaucracies' involvement in managing universities, state involvement in faculty research may be far greater outside the United States than in American universities (notwithstanding the deep connections that exist between American university researchers and federal funding agencies).<sup>50</sup> In the United States, private universities are supported by endowments and student tuition that are complemented to a significant degree by state support, and state bureaucracies only recently have become more engaged with supervision of university research.<sup>51</sup> Likewise, the notion that undergraduate students participate in college commons, grounded in the classroom and reinforced by traditions and rituals associated with communal living, is distinctly Anglo-American. In the United States, we speak of sending students to "college;" in other countries, the corresponding phrase is "university." The distinction is substantive as well as rhetorical. University-related knowledge commons outside the Anglo-American college tradition are more distinctly intellectual and knowledge-based. In the United States and Great Britain, university commons are social as well.

How might this brief narrative history of the university relate back to the commons model described above? Here we focus on the proposition that commons institutions are likely to be nested in larger institutions and likewise contain smaller scale nested commons structures. "Nesting" of commons institutions within the university

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50. In Great Britain, the government-sponsored Research Assessment Exercise periodically assesses the quality and output of every government-supported researcher in the country, which is to say, just about every researcher. On the history of this institution, see Eric Hutchinson, *The Origins of the University Grants Committee*, 13 *MINERVA: REV. SCI. LEARNING & POL'Y* 583 (1975). That program is in the process of being revised as the Research Excellence Framework. See Higher Educational Funding Council for England, Research Excellence Framework, <http://www.hefce.ac.uk/research/ref> (last visited June 17, 2008).

51. The relative separation of state administration and university research formed a central part of Merton's thesis regarding the open character of scientific research. See MERTON, *supra* note 32.

followed multiple paths. Humboldt's model of the research university was bureaucratized as scholars were organized by discipline, department, and school, and as they were organized by institutional sponsorship into colleges.<sup>52</sup> Nested commons resources consisted not only of collections of people but also of collections of things. Following elite universities at Oxford and Cambridge, universities around the world built libraries, collections, and archives for the use, primarily, of community members. The result was and is qualified openness within the university commons. In part the university was open within but closed to constituencies outside the university's walls. In part each of the schools and departments of the university were open within themselves but closed to other parts of the university. The university is no longer solely a mechanism for the production of knowledge, professional training, or social mobility, as it houses a governed collection of mechanisms and resources that enable each of these things.<sup>53</sup>

For the sake of space and relative simplicity, the balance of our governance inquiry into the university focuses primarily on its American version. The question of the university's narrative and history makes clear that the American university is nested within the concept of the university as a whole and that the latter embraces a variety of international and historical instances. Likewise, within the American university there are public and private versions, secular and religious examples, universities that grant doctoral degrees but sponsor relatively modest research programs, and universities that identify research and scholarship as first among their equal missions. Moreover, nested within the institution of the university are the institutions of the college (both undergraduate and graduate), the school, the library, the archive, and the lecture hall (among many commons examples), each of which inherits degrees of constructed openness from the parent institution and each of which may be subject to independent inquiry as its own constructed commons.

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52. See Rüegg (vol. 3), *supra* note 31, at 12–15 (noting that the humanistic interest in knowledge for its own sake has survived into teaching but not into research, where the knowledge ideal tends to harden disciplinary boundaries).

53. See KERR, *supra* note 31, at 14–15.

*B. Entitlement Structures and Resource Provisions*

The knowledge resources of the university are partly conceptual: ideas, concepts, practices, and information and knowledge-based works that inhabit the minds and guide the actions of the university's faculty and students. They are partly artifactual: the articles, books, works of art, and tools and scientific instruments that reside in the university's libraries, archives, and laboratories. The latter are provisioned to members of the university community either directly, by those members as part of the university commons, or indirectly, via their acquisition by the university from external suppliers. In most parts of the world, even today, the financial, material, and knowledge resources of the university are controlled by the state. The United States is a salient exception. American universities are funded by a combination of direct state subsidies, federal subsidies (grants and related material), private financing (gifts and endowments), and tuition. Elsewhere, private tuition and funding structures are relatively modest.

The intangible resources of the university commons—the ideas, concepts, and practices that constitute the knowledge that the university houses—are provisioned by individual faculty and students (and related academic participants in the commons: fellows, postdoctorals, and the like). To the extent that these resources can be owned, both as they are contributed to the commons and as they are extracted from it, entitlement structures vary depending on the concreteness and explicitness of the knowledge in question. Historical and background knowledge of a discipline (both explicit and tacit), for example, is ordinarily considered unownable within a university setting, even though the same types of knowledge might be categorized as ownable trade secrets in a counterpart private enterprise.

In the domain of authorship and other creative practices that are ordinarily subject to copyright law, works of scholarship by faculty authors are typically owned by faculty members themselves.<sup>54</sup> In this

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54. This is based on the commonly cited but non-statutory Teacher Exception to the Works Made for Hire Doctrine in U.S. copyright law. Under the latter rule, works authored by employees as part of their employment are owned automatically by their employer. On the

area, the cycle of commons construction proceeds from (unowned) background disciplinary knowledge to (ownable) copyrightable scholarship to (owned) artifacts embodying that scholarship that are acquired by the university's libraries and re-inserted into the stream of background disciplinary knowledge for the next iteration of scholars and students.

In the domain of invention and innovation in the sciences and technological arts, the cycle is much the same, except that universities typically stake ownership claims to commercializable inventions produced by their faculty members. So long as the invention or innovation remains part of the scholarly commons, the material is either unowned or owned, if at all, by individual faculty.<sup>55</sup> If the invention sits on the line between commons and markets external to the university, the university itself typically judges whether the invention should make the move from one domain to the other and the conditions under which compensation will flow back to the faculty member. Control of technology transfer operations is a form of governance at the boundary between commons and commerce.<sup>56</sup>

Beyond technology transfer, openness of the university's commons resources is managed along several different dimensions. Inside the university, and inside any particular university, the proprietary boundaries of copyrights (which are subject to broad fair use and idea/expression limitations) and patents (which are more narrowly limited by research exemptions and by the fact that abstract ideas, natural phenomena, and scientific principles are not patentable) generally fall away, even while awareness of community members' proprietary rights lurks in the background of commons interactions.<sup>57</sup>

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survival of the exception as a matter of practice and tradition, see, for example, *Hays v. Sony Corp. of Am.*, 847 F.2d 412, 416–17 (7th Cir. 1988); *Weinstein v. Univ. of Ill.*, 811 F.2d 1091, 1094 (7th Cir. 1987).

55. We note but skip over governance of the complex constructed commons of the individual research laboratory.

56. See generally Katherine J. Strandburg, *Curiosity-Driven Research and University Technology Transfer*, in *UNIVERSITY ENTREPRENEURSHIP AND TECHNOLOGY TRANSFER: PROCESS, DESIGN, AND INTELLECTUAL PROPERTY* 93 (Advances in the Study of Entrepreneurship, Innovation and Economic Growth vol. 16, Gary D. Libecap ed., 2005).

57. See Katherine J. Strandburg, *User Innovator Community Norms at the Boundary Between Academic and Industrial Research*, 77 *FORDHAM L. REV.* 2237 (2009); Katharine J. Strandburg, *Norms and the Sharing of Research Materials and Tacit Knowledge*, in *WORKING*



Access to commons resources may be limited to faculty and student members of the university community or may be open to the public on a selective basis. With respect to artifacts, it is common for even private universities to make limited portions of their collections available to the public at large. Public and state-supported universities may do so as a matter of course. The collections in full are, however, often accessible only to scholars. Library collections are relatively easy to make fully accessible beyond the university community, though as collections shift from hard copies of books and journals to digital subscriptions licensed from publishers, providing access beyond the university becomes more challenging.<sup>58</sup>

Artifacts that serve as technology-based inputs to scientific research, or so-called research tools and materials, constitute a distinct and especially challenging group of governable things, and universities and other research institutions have developed a range of strategies to try to allocate their availability for downstream commercial (or commercializable) research, and academic basic research.<sup>59</sup> The shape of the knowledge commons created by the university changes accordingly. With respect to many other intangible and conceptual resources shared within a university that are not embodied in physical artifacts, access is almost by necessity limited to those who are faculty or student members of university commons and have by position or tuition acquired access to classroom, office, or distance learning facilities where those knowledge resources are shared.

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WITHIN THE BOUNDARIES OF INTELLECTUAL PROPERTY (Rochelle C. Dreyfuss, Harry First & Diane L. Zimmermann eds.) (forthcoming 2009). Sharing Research Tools and Materials: Homo Scientificus and User Innovator Community Norms (May 23, 2008) (unpublished manuscript, available at <http://ssrn.com/abstract=1136606>).

58. We note that the Book Search program developed by Google, assembling a massive, public, searchable digital database of the world's books, began with digitization of collections housed at Stanford University, Harvard University, and the University of Michigan, among other sources. See Google Book Search, <http://books.google.com/intl/en/googlebooks/history.html> (last visited Apr. 30, 2009).

59. See John P. Walsh, Ashish Arora & Wesley M. Cohen, *Working Through the Patent Problem*, 299 SCIENCE 1021 (2003); Fiona Murray, *The Oncomouse that Roared: Hybrid Exchange Strategies as a Source of Productive Tension at the Boundary of Overlapping Institutions*, 2009 AM. J. SOC. (forthcoming).

*C. Institutional Setting*

One thinks immediately here of the powerful informal norms of the academy that many suppose motivate and guide the production and distribution of knowledge in ways that are quite distinct from the rules (such as they are) of the private marketplace. University researchers are motivated by norms of curiosity and the drive for truth, rather than profit and market position.<sup>60</sup> Knowledge in the university setting is often assumed to be an inherently open thing.

To be sure, informal norms play essential roles at all levels of the university. Norms shape a presentation of a new piece of research by one scholar to a workshop of colleagues, the prioritization of new research initiatives based on inherent rather than market worth, and the subscription to the overarching premise and goal known as academic freedom—the ability of all commons members to enjoy the benefits of commons without being subject to coercion, influence, or fear of penalty based on the subject matter or perspective that informs a member's research or teaching.

Social norms in themselves do not exhaust the institutional forces shaping openness in university commons. Formal institutions that span universities and that inhabit their smallest nooks and crannies are legion. Professional associations for academic disciplines, faculty meetings, and committees in schools and departments are mostly inevitable and necessary mechanisms for assuring that university commons are governed largely by members and not by outsiders. Faculty meetings are legendary for their inefficiency, but commons are open in large part because of their self-governing character. Institutionalized norms of the university, as dysfunctional as they often are, are critical to the self-governance that defines a commons.

Distinctions among informal norms, formalized institutional structures, and market discipline—either in the sense of discipline by price or in the sense of discipline by the expectations of a field, a

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60. See Strandburg, *supra* note 56, at 95 (arguing that in the research setting curiosity serves as a better proxy for social welfare interests than market demand, so long as the primary point of knowledge production is to serve third parties).

department, a lab, and so forth—can be overstated.<sup>61</sup> In some respects, markets are part of university commons and shape their open character. As we argued above, technology transfer defines a university commons in part by offering a contrast between what innovation belongs inside the university commons and what may migrate outside the commons. Libraries and archives compete with private buyers to acquire artifacts. Scholars contract with private firms to publish scholarly monographs and journal articles. Universities themselves house publishers, including university presses and journals, that distribute their scholarly works into the market largely as private firms do, though sales and licenses to university customers may be priced differently than sales to commercial or private buyers. University scientists conduct research that may be sponsored wholly or partly by private firms and may contract to share research results with their sponsors. Universities compete for scholars, that is, for commons participants, in high-priced labor markets, against both other universities and against private firms and governments.

Government engagement with the university commons is as typical as engagement with the university by private enterprise and as important to the university's openness as commons. Through the National Science Foundation and the National Institutes of Health and other granting agencies (including, increasingly, the Department of Homeland Security), the federal government funds billions of dollars in research in American universities. By virtue of the 1980 Bayh-Dole Act, which regularized university ownership of patents on federally sponsored research, university faculty have been encouraged to patent and commercialize the fruits of government-sponsored research, giving rise to the technology transfer industry mentioned above.<sup>62</sup>

Two final noteworthy informal institutions that structure openness, and boundaries of university commons are physical premises and rituals. Unsurprisingly, given the long historical lineage

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61. See Diana Rhoten & Walter W. Powell, *The Frontiers of Intellectual Property: Expanded Protection Versus New Models of Open Science*, 3 ANN. REV. L. & SOC. SCI. 345 (2007).

62. 35 U.S.C. §§ 200–212 (2006).

of the university, both have roots in tradition. Universities are frequently defined not only by their knowledge mission but also by their physical presence, and universities that have been self-conscious about that presence have often chosen to distinguish what is commons and what is not—that is, to shape their relatively open character—via architectural means. It is no accident that Yale and Harvard announce themselves with imposing walls that distinguish their campuses and the accompanying commons courtyards from the cities of New Haven and Cambridge, respectively.<sup>63</sup> The notion of a campus is itself a commons-defining concept. Almost every university creates not only boundary conditions to distinguish itself from the adjacent town or neighborhood, but also open space inside the campus, green space as well as lecture space, which both literally and metaphorically constructs opportunities for open intellectual exchange. Universities that do not do so, such as New York University,<sup>64</sup> acquire a visibly distinct commons character compared with neighbors that do, such as Columbia University.<sup>65</sup>

Anyone who pays even a modest amount of attention to the university is struck by the rituals that surround such events as the investiture of a new university president, commencement, and even allocation of parking privileges.<sup>66</sup> At a ceremonial level, some of

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63. The idea of the university as an enduring, transcendent garden, not subject to the cycles of life and death, lurks behind the memorable essay on the Boston Red Sox by the late Yale president (and Major League Baseball Commissioner) A. Bartlett Giamatti:

These are the truly tough among us, the ones who can live without illusion, or without even the hope of illusion. I am not that grown-up or up-to-date. I am a simpler creature, tied to more primitive patterns and cycles. I need to think something lasts forever, and it might as well be that state of being that is a game; it might as well be that, in a green field, in the sun.

A. Bartlett Giamatti, *The Green Fields of the Mind*, in *A GREAT AND GLORIOUS GAME: BASEBALL WRITINGS OF A. BARTLETT GIAMATTI* 7, 13 (Kenneth S. Robson ed., 1998). Since Giamatti first published his lament, the Red Sox have twice won the World Series. Giamatti was fascinated by the connections between enclosure, gardens, and paradise or transcendence. See A. BARTLETT GIAMATTI, *THE EARTHLY PARADISE AND THE RENAISSANCE EPIC* (1969).

64. See generally New York University Webpage, <http://www.nyu.edu> (last visited Feb. 11, 2009).

65. See generally Columbia University Webpage, <http://www.columbia.edu> (last visited Feb. 11, 2009).

66. Clark Kerr noted that the university might be thought of “as a series of individual faculty entrepreneurs held together by a common grievance over parking.” KERR, *supra* note 31, at 15.

these rituals are derivative of the university's clerical history; they signify boundaries and distinctiveness. Related rituals are connected to smaller scale nested institutions. Workshop or colloquia presentations by faculty members addressing other faculty members typically have formal and informal rhythms and structures, including introductions, greetings, and the allocation of time between presentation and question periods that are unlike the rhythms and structures that govern presentations of public remarks or lectures to classrooms of students. These will vary from discipline to discipline (humanities scholars typically read their presentations, because recital is part of the field itself; economists and legal scholars rarely do) and from institution to institution. All of these rituals and patterns identify and discipline openness of a sort. For members of the university community, they meter the type and pace of openness within commons. For both insiders and outsiders, they signal solidarity and identity and serve as expressions of difference from other communities and normative structures.

#### *D. Legal Structures*

In the United States in particular, the university as constructed commons is maintained by a host of formal and informal legal subsidies and exemptions. These construct commons in the sense that they reduce the costs associated with running the institution and lessen pressure to underwrite the expense of knowledge production by recouping expenses in the private market. At the same time, in some areas the law cuts against the university as constructed commons and instead pushes the university toward a less open and more market-oriented model.

The primary source of subsidy in U.S. law exists in tax laws. Most universities are classified as tax-exempt organizations, which means that they do not pay income tax on income from their endowments or from technology transfer operations. For the same reason most donations to universities are also exempt from income taxation at the donor level. Universities can borrow money at favorable rates by

issuing tax-exempt bonds.<sup>67</sup> In many states real property owned by universities is exempt from taxation under local real estate tax laws, though in some states and communities universities have negotiated payment-in-lieu-of-taxes arrangements with local authorities.<sup>68</sup> The product of this confluence of tax policies is broad exemption from market-based pressures to develop and allocate resources; the university as such is not simply allowed to exist, but encouraged to do so. Through endowments and real estate acquisition and development, universities accumulate resources that support themselves across multiple generations.

Secondary subsidies based in intellectual property law show the sometimes fragile line between university commons and the university as market participant. Two examples make the point. First, by explicitly encouraging university faculty to patent the products of their research, the Bayh-Dole Act, mentioned above in connection with technology transfer, indirectly undermines the distinctively scholarly character of university-based research.<sup>69</sup> University-based research remains presumptively open for other researchers and scholars but perhaps less so than in earlier eras to the extent that it is colored by proprietary claims.<sup>70</sup> Second, until recently, university

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67. Private universities are typically themselves tax-exempt as nonprofits; public universities are typically exempt as state institutions, though their endowments may be managed by private, tax-exempt nonprofits. The boundaries of the exemption are controlled via the “private benefit doctrine,” under which a nonprofit’s tax-exempt status may be revoked if net earnings inure to the benefit of outsiders. For reviews of tax policy and universities, see Sarah E. Waldeck, *The Coming Showdown over University Endowments: Enlisting the Donors*, 77 *FORDHAM L. REV.* 1795, 1797–98 (2009) (describing the tax provisions noted in the text, among others); Peter D. Blumberg, Comment, *From “Publish or Perish” to “Profit or Perish”:* *Revenues from University Technology Transfer and the § 501(c)(3) Tax Exemption*, 145 *U. PA. L. REV.* 89 (1996) (criticizing application of income tax exemption to revenues from technology transfer revenues); Mark J. Cowan, *Taxing and Regulating College and University Endowment Income: The Literature’s Perspective*, 34 *J.C. & U.L.* 507, 511–22 (2008) (summarizing the current tax status of university endowments). Since we have no tax law expertise and are not economists, we use the phrase “subsidy” in this context in a colloquial sense, rather than a technical one.

68. See Blumberg, *supra* note 67, at 141 n.249.

69. 35 U.S.C. §§ 200–212 (2006).

70. As patent law intrudes into the university, researchers are inevitably affected by patentability requirements. In addition to tensions over research tools and experimental use noted above, the printed publication bar to patentability, which confines patentability to inventions not published before a critical date in advance of filing the patent application, limits academic presentations. If American researchers are interested in patenting their work abroad,

scientists conducted research with patented technology relying on an assumption that they would not be sued for infringement so long as they were acting in good faith as researchers. In *Madey v. Duke University*, the Federal Circuit limited the scope of the judicial “experimental use” exemption in cases involving university researchers, and threw that assumption into doubt.<sup>71</sup> The court noted that Duke University, the defendant and accused infringer in that case, was ineligible for the “experimental use” defense precisely because university research fulfilled the university’s “legitimate business objectives” of “educating and enlightening students and faculty participating in these projects” and served to “increase the status of the institution and lure lucrative research grants.”<sup>72</sup> Perhaps because of their increasing commercial entanglements, universities were no longer seen by the court as inhabiting a distinctive, non-commercial realm.<sup>73</sup>

Finally, university commons may be constructed through research collaboratives, joint research projects, and other inter-institution initiatives that are largely exempt from antitrust scrutiny of the sort that private sector research collaborations routinely attract. The proposition that university commons are not typically subject to the norms of commerce and competitive markets was brought home in 1991 when the U.S. Department of Justice sued several elite universities for price fixing in connection with their decades-old practices of sharing information regarding student income in making

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the publication bar in a first-to-file patent system outside the United States—which usually forbids any publication prior to filing—restricts academic presentations still further. For a recent discussion of these issues, see Sean B. Seymore, *The “Printed Publication” Bar After Klopfenstein: Has the Federal Circuit Changed the Way Professors Should Talk About Science?*, 40 AKRON L. REV. 493 (2007).

71. *Madey v. Duke Univ.*, 307 F.3d 1351 (Fed. Cir. 2002). A related assumption in the copyright context, based on the statutory fair use doctrine, once permitted university faculty to avoid clearing rights to copyrighted work assigned as part of photocopied coursepacks. Publisher litigation put an end to this practice. See *Princeton Univ. Press v. Mich. Document Servs., Inc.*, 99 F.3d 1381 (6th Cir. 1996); *Basic Books, Inc. v. Kinko’s Graphic Corp.*, 758 F. Supp. 1522 (S.D.N.Y. 1991). Publishers now are trying to establish rights to licensing income from digital versions of coursepacks.

72. *Madey*, 307 F.3d at 1363.

73. Pairing these two developments, it is noteworthy that the cause of Duke’s undoing in the *Madey* litigation was technology transfer practices induced largely by the Bayh-Dole Act. See 35 U.S.C. §§ 200–212 (2006).

financial aid awards.<sup>74</sup> The cases were settled, and Congress enacted a statute that facilitated a work-around for universities.<sup>75</sup> But the point was made. University discretion in constructing the membership of the commons was and is not unlimited.

#### *E. Governance Mechanisms*

A university typically has an abundance of governance mechanisms. Who is a part of the university's constructed commons? Faculty appointments and admission to the student body shape membership in university commons. Note that the former is (in almost all cases) a matter of self-governance; faculty members control admission to their own ranks. Faculty status is an entrée to a lifetime of repeat encounters with various facets of university commons. For students, different methods of governance reveal the different status of students in the commons enterprise. Undergraduate students, and, often, students in masters degree programs and professional schools, are typically admitted to the university via an administrative process. Doctoral student admission typically is informed heavily by faculty input. Undergraduates and most masters and professional students are essentially transient. Their engagement with the commons is repetitive, but only for a short period. Doctoral students are being apprenticed to full faculty careers. Because the self-governing character of doctoral student status is more explicit, they are usually expected to contribute to university commons (and are eligible to appropriate commons resources) to a greater degree than undergraduate students. In recent years, full faculty status has become a more scarce commodity, as universities are increasingly populated by postdoctorals, fellows, and adjunct faculty members who are not full-fledged members of university commons partly because they lack access to job security and other employment

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74. *United States v. Brown Univ.*, 5 F.3d 658 (3d Cir. 1993) (finding that universities were not exempt from substantive antitrust scrutiny in financial aid context).

75. A temporary exemption from antitrust liability for institutions of higher education that admitted students without regard to financial need was passed by Congress in 1992, Higher Education Amendments of 1992, Pub. L. No. 102-325, § 1544, 106 Stat. 448, 837, extended in 1994, Improving America's Schools Act of 1994, Pub. L. No. 103-382, § 568, 108 Stat. 3518, 4060-61, and again in 2001, Act of Nov. 20, 2001, Pub. L. No. 107-72, § 2, 115 Stat. 648, 648.



benefits and partly because they are not eligible to participate in governance activities.

For full-time faculty appointees, the standard and classic commons governance mechanisms are tenure, which in theory fully enables open and independent research and scholarship without fear of employer retribution, and the related obligation to conduct research and to publish scholarship. The latter is the primary resource contribution mechanism in university commons. It serves as a formal antecedent of tenure and promotion policies, since virtually every university discipline makes tenure and promotion dependent on scholarly distinction. The sanction for lack of publication before tenure is typically loss of appointment and loss of access to the university commons. (There is ordinarily no corresponding concept of excessive appropriation of resources from the university.) The obligation to publish also serves as an informal, norm-based sorting mechanism, which both directly and indirectly structures governance institutions. More prolific and more influential publication is positively associated with higher status in the discipline and in university commons: chairs, deanships and other senior administrative appointments, and related positions that command additional resources and authority within the university. Publication is also a critical determinant of access to resources for ongoing research. The existence of a commons does not assume an egalitarian governance structure. Universities and academic institutions make clear, as Orwell once wrote, that “some animals are more equal than others.”<sup>76</sup>

Once membership in a university commons is established, as noted above self-governance mechanisms are legion (faculty assemblies and senates, school, college, and departmental committees, and so forth), but they are limited in almost all cases to procedural matters, rather than monitoring contributions to the commons (tenure and promotion mechanisms being the notable exception). While the purposes and details of self-governance vary widely, they typically share a foundation that is sometimes implicit, and often explicit: assuring the conditions of academic freedom.

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76. GEORGE ORWELL, *ANIMAL FARM* 88 (Alfred A. Knopf 1993).

*F. Interfaces Between Internal Governance Mechanisms and  
External Governance Mechanisms*

Given long-standing traditions of university self-governance in matters of appointment and evaluation for tenure and promotion purposes, interfaces between those traditions and external norms applicable to hiring and promotion become significant. In fact, in recent years courts increasingly have been willing to subject university employment and promotion decisions to external scrutiny, but courts concurrently draw a line between self-governance that stems from commons management, that is, based on questions of academic freedom and the integrity of the commons, and self-governance that stems from other considerations.<sup>77</sup> Questions that fall in the first category are the province of the university, and courts typically defer to university decision-making. Questions in the second category, such as allegations of discrimination based on race, gender, and age, are usually subject to the same anti-discrimination rules that govern firms in the private sector (or in the public sector, for public universities).

A second key area of interface is the process of technology transfer, to which we referred above in connection with entitlement structures, institutional settings, and legal regimes that are relevant to governance of university commons. Perhaps the most important role of technology transfer processes is shaping the interface between university commons and outside market processes. Before the enactment of the Bayh-Dole Act in 1980,<sup>78</sup> “universities wishing to retain title to patents resulting from federally funded research utilized Institutional Patent Arrangements (IPA) that were negotiated with individual funding agencies or petitioned these agencies for title on a case-by-case basis,”<sup>79</sup> and patenting was uncommon in many disciplines. Academic research generally remained in commons, where it was open to scholars (and typically fully publishable) and to

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77. See, e.g., John D. Copeland & John W. Murry, Jr., *Getting Tossed from the Ivory Tower: The Legal Implications of Evaluating Faculty Performance*, 61 MO. L. REV. 233 (1996).

78. 35 U.S.C. §§ 200–212 (2006).

79. Bhaven Sampat, David C. Mowery & Arvids A. Ziedonis, *Changes in University Patent Quality After the Bayh-Dole Act: A Re-Examination*, 21 INT’L J. INDUST. ORG. 1371, 1372 (2003).

commerce. If faculty members or graduate students left a university, little stood in the way of their appropriating and commercializing their knowledge.

Whether this state of affairs was suboptimal can be debated. For every example of a technology that might have been exploited earlier and more profitably had universities been permitted to patent it, one can cite a grand counterexample: the Internet, the basic technologies of which were developed mostly in university settings with federal research support. It is impossible to know what the trajectory of the Internet would have been had a Bayh-Dole statute been in place before 1980, when much of the basic architecture of the Internet was being standardized, but there is reason to worry that open, common standards would have been more difficult to establish in the shadow of patenting, and that the explosion of Internet-related innovation and creativity in the years since 1990 in particular might not have benefited so many individuals and firms worldwide.<sup>80</sup>

What is clear is that the federal government made a conscious decision to move the line with Bayh-Dole, in an attempt to pull patentable technology out of the university.<sup>81</sup>

The line between universities and the private sector can be moved in other directions, and commons interfaces made more or less porous, both by universities themselves and by governments and other firms. For years, university and faculty practice in most disciplines has been to assign individual faculty copyrights in publishable scholarship to academic journals, which are often published by commercial firms that charge high prices for access—including high prices to faculty authors and their universities. The recent rise of the open access publishing movement, which relies on the existence of widely available, cheap, online storage and connectivity to justify calls for scholarly research to be openly

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80. See, e.g., M. MITCHELL WALDROP, *THE DREAM MACHINE: J.C.R. LICKLIDER AND THE REVOLUTION THAT MADE COMPUTING PERSONAL* (2001) (one fairly representative account of the early origins of what became the Internet). Today, there is a counterpart worry about a possible anticommons—a fragmentation of property interests that stifles follow-on innovation—in biomedical research. See, e.g., Fiona Murray & Scott Stern, *Do Formal Intellectual Property Rights Hinder the Free Flow of Scientific Knowledge? An Empirical Test of the Anti-Commons Hypothesis*, 63 J. ECON. BEHAV. & ORG. 648 (2007).

81. See Brett M. Frischmann, *The Pull of Patents*, 77 *FORDHAM L. REV.* 2143 (2009).

available on the Internet, has introduced some new dynamics. The Harvard University Faculty of Arts and Sciences adopted a resolution granting the university licenses in their scholarly work in order to promote its distribution on open access terms.<sup>82</sup> In a related move that also impacts universities, in late 2007, Congress mandated that scientific research produced with funding through the National Institutes of Health be made publicly available through the National Library of Medicine's PubMed Central no later than twelve months after official publication.<sup>83</sup> Rather than using the prospect of patents to pull information and knowledge out of university commons, open access arguments are using the prospect of even greater openness to accomplish a related goal.<sup>84</sup>

### *G. Solutions and Benefits; Costs and Risks*

Given the coordination and transactions problems described in the introduction to this Part, the university works highly imperfectly as commons, but it does function as a commons, as a series of commons nested within it, and as an institution nested within a larger commons of institutions and practices, such as firm-based private research enterprises, that focus on basic knowledge. Its success as commons is demonstrated by its very persistence over nearly one thousand years. An institution dedicated to the production and transmission of knowledge does not last that long unless it is largely fulfilling that mission. As the scale and pace of knowledge development has

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82. See Robert Mitchell, *Harvard to Collect, Disseminate Scholarly Articles for Faculty*, HARVARD UNIVERSITY GAZETTE ONLINE, Feb. 13, 2008, <http://www.news.harvard.edu/gazette/2008/02.14/99-fasvot.html>.

83. See NATIONAL INSTITUTES OF HEALTH, NOTICE NO. NOT-OD-08-033, REVISED POLICY ON ENHANCING PUBLIC ACCESS TO ARCHIVED PUBLICATIONS RESULTING FROM NIH-FUNDED RESEARCH (2008), <http://grants.nih.gov/grants/guide/notice-files/NOT-OD-08-033.html>.

84. New forms of openness are not limited to research. MIT, for example, has made the commons/commerce boundary more porous with respect to teaching. Via the OpenCourseWare project, MIT and its faculty make teaching materials for virtually all courses available for free on the Internet, though with some license restrictions designed to preserve their commons character. See MIT OpenCourseWare, <http://ocw.mit.edu/index.html> (last visited Feb. 11, 2009); Florence Olsen, *MIT's Open Window: Putting Course Materials Online*, *The University Faces High Expectations*, CHRON. HIGHER EDUC., Dec. 6, 2002, at A31; Charles M. Vest, *Why MIT Decided to Give Away All Its Course Materials via the Internet*, CHRON. HIGHER EDUC., Jan. 30, 2004, at B20.

increased and demands for coordination and large scale investments in research facilities and archives have grown, the size and breadth of universities have grown accordingly. It is common today for elite public and private research universities to run annual budgets of \$1 billion or more. That scale enables both scholarship and teaching to occur in settings where human and material resources can be aggregated across a variety of dimensions. The results include extraordinary opportunities for collaboration and sharing of knowledge and facilities within the university, massive economies of scale, and an institutional framework that translates more or less intact across time and culture from East to West and North to South.

Yet increased size and scale have brought complication to the university commons. Even accounting for the university's complex institutional history, its presumptively open character is now explicitly engaged in many places with government subsidies and proprietary rights. In addition, especially to the extent that a central mission of university commons is to facilitate spillover or third-party benefits from knowledge production, storage, and distribution, it is clear that at all levels of the university, the university's performance could be improved. Internally, as described above, the university flatters itself with its success. Externally or from a broader social welfare perspective, measured purely in money, universities are also notoriously expensive to administer and inefficient and wasteful. Most universities occupy elite positions in international, national, and local societies, with corresponding benefits in terms of status but corresponding costs in terms of access to students and to the public at large. The cost of education is in a relentless upward spiral. Technology transfer addresses some of this gap between university commons and public benefit, but that interface is often clogged.<sup>85</sup> Finally, as with many elite resources, university resources are concentrated in the developed West. Only recently have universities in Asia, for example, begun to acquire resources that may eventually

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85. See Amy Kapczynski et al., *Addressing Global Health Inequities: An Open Licensing Approach for University Innovations*, 20 BERKELEY TECH. L.J. 1031 (2005) (describing an open access framework to encourage the broader and fairer distribution of university-based research to under-served markets and communities).

enable them to serve as commons in the various ways described above.

This summary suggests strongly that both law and other social institutions have been highly influential in creating and maintaining the university as commons. The chief risk, therefore, is not that the university will somehow lose its commons character, but that specific micro-level elements of the university will be shaped by law and society in ways that change the types of knowledge that is produced and distributed, where and how it is distributed, and the pace of knowledge-sustaining activities. Of course, universities are not without resources themselves in these processes. Going forward, it is important to bear in mind that commons can be durable, but they are also delicate and the subject and object of evolutionary processes.

#### CONCLUSION

We have argued that the concept of the constructed commons in the cultural environment is a useful starting point for considering solutions to classic problems of developing institutions and practices to manage producing, storing, and distributing knowledge and information goods. We borrow the concept of the constructed commons from the work of Elinor Ostrom, who has explored commons and governance of commons in the natural resource environment,<sup>86</sup> and we draw an analogy between the natural resource environment and the cultural environment. Using Ostrom's work as a conceptual template, we offer several clusters of related questions that can be used to investigate a given commons context, including commons in "nested" forms or in macro and micro versions.

We then apply this framework to a specific example of commons, the university. We argue that a close reading of the history and contemporary functioning of the university reveals that it functions as commons across many dimensions of teaching, research, and knowledge archiving, but that this mission is deeply affected by legal rules grounded in proprietary rights, modified by government intervention and subsidy, and subject to challenge and evolution, particularly in international contexts. This reading of the university

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86. *E.g.*, OSTROM, *supra* note 4.

might be supplemented in some details, but the basic point is clear. The university and its constituent institutions and practices constitute constructed commons, and treating them as constructed commons offers a more nuanced basis for diagnosing their strengths and weaknesses in the cultural environment than models based primarily on theories of proprietary rights, government subsidies, or the public domain.

We have not emphasized normative questions, but offering commons as an object of analysis presumes that normative questions are at least implicit. What are commons good for? The chief implication of this work is that normative choices regarding models of innovation and creativity are not either/or, but vary in their details based on the constructed characteristics of specific contexts. The issue is not whether to use law and policy to promote creativity and innovation, but precisely how to do so.