REVIEW

Cultural Environmentalism and *The Wealth of Networks*

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The Wealth of Networks: How Social Production Transforms Markets and Freedom, Yochai Benkler. Yale, 2006. Pp xii, 515.

INTRODUCTION

In *The Wealth of Networks*, Harvard Law School Professor Yochai Benkler provides a thorough and intellectually rich account of our modern information environment and its interrelationship with law, technology, and, critically, networks. The book is remarkable in its breadth and depth. It is tremendously ambitious, as the title's allusion to Adam Smith's *The Wealth of Nations*[1] implies. As Dan Hunter has observed, Benkler "provides something close to a General Theory of Information Policy for the networked age that begins to explain how we should think about topics as different as spectrum policy, copyright, user-generated content, network neutrality ... well, the list pretty much encompasses all questions within internet law and policy."[2]

Benkler's primary thesis in the book is that the wealth of networks lies in the potential for widespread participation in the making, sharing, and experiencing of the information environment. The emergent networked nature of the information economy unlocks human potential and enables participation in an unprecedented manner. To support his claim that such change is in fact underway, Benkler offers

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1 Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations* (Methuen 6th ed 1950) (Edwin Cannan, ed).

2 Dan Hunter, *A General Theory of Information Policy*, Crooked Timber Blog (May 30, 2006), online at http://crookedtimber.org/2006/05/30/a-general-theory-of-information-policy (visited July 7, 2007) (ellipsis in original).

a rich descriptive account of the technology and economics of networks and an interesting set of examples that may just be the tip of the iceberg. To support his normative claim that such change ought to be allowed if not encouraged, Benkler appeals to a range of liberal political theories. And in the end, Benkler frames a "battle" over the institutional ecology of the information environment and explains how incumbents may resist change at various layers of the system.

The Wealth of Networks is a long book, densely packed with complex ideas, rich and detailed descriptions of examples, and very sophisticated analysis. It is beyond the scope of any single book review to canvass all that Benkler accomplishes or the limitations inherent in his sweeping approach.

One way to see how Benkler accomplishes so much is to situate his book within cultural environmentalism, a complementary framework for integrating the seemingly disparate areas of policy brought together in *The Wealth of Networks*. Cultural environmentalism as a theory of information policy originated with Jamie Boyle's 1996 book, *Shamans, Software, and Spleens*,[3] and his attendant scholarship.[4] Boyle issued a call to arms to protect our cultural environment and used cultural environmentalism as a metaphor to spur the organization of a political, social, and intellectual movement. Many scholars have found this call to arms appealing as a source of motivation, as a well from which new ideas, concepts, and metaphors spring—and perhaps even as a tool for (re)conceptualizing our cultural and intellectual systems.

Cultural environmentalism is potentially valuable as an analytical construct because it focuses attention on our relationships with complex systems that are significantly more nuanced and varied than those suggested by more traditional theories of information policy derived from economics or romantic notions of authorship and inventorship. With respect to the natural environment, environmentalism led to a better understanding of natural resource systems and our relationship to those systems—and consequently to an understanding that regulation is needed to preserve and protect those systems for sustainable use. Cultural environmentalism has yet to generate similar understandings: both descriptively regarding the systems and our rela-

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[3] James Boyle, *Shamans, Software, and Spleens: Law and the Construction of the Information Society* (Harvard 1996).

[4] See James Boyle, *The Second Enclosure Movement and the Construction of the Public Domain*, 66 L & Contemp Probs 33, 70–74 (2003) (elaborating on the analogy between the natural environment and the intellectual property environment); James Boyle, *A Politics of Intellectual Property: Environmentalism for the Net?*, 47 Duke L J 87, 108–16 (1997) (arguing that "a politics to protect the public domain" in intellectual property should take its cues from the environmental movement).

tionships to them and normatively regarding the consequences of how we choose to regulate the information environment.

Benkler takes significant strides in remedying these deficiencies. Situating his book within the framework of cultural environmentalism reveals its contributions to our understanding of those systems that comprise the cultural environment, how we relate to those systems, and the normative consequences of different regulatory choices we might choose. This framing helps to make *The Wealth of Networks* more accessible and, at the same time, provides a useful lens for commenting on and extending Benkler's analysis.

Part I of this Review lays the foundation for reviewing *The Wealth of Networks* and understanding the nature of some of its important contributions.[5] I begin not with Benkler but with James Boyle and his influential call for an infusion of environmentalism into the debates over intellectual property expansion—a call for *cultural environmentalism*.[6] This will be my lens. Of course, there are many other lenses through which to review Benkler's book and understand its contributions. Other scholars will undoubtedly apply different methodologies and analytic tools. Benkler draws widely from economic and liberal political theory, and his analysis is quite sophisticated; moreover, he contributes to dialogues across many disciplines. His book deserves critical attention from many different perspectives. My goal is to situate Benkler's book within cultural environmentalism; doing so allows for a greater appreciation of both where Benkler takes us and where we may go.

After briefly introducing Boyle's work and describing its considerable appeal to scholars and activists alike, I make two claims regarding its impact. First, I argue that a descriptive account of what the cultural environment is, how it works, how it evolves, and how we relate to, live within, and affect it remains underdeveloped. Second, I argue that a normative account of the range of values at stake in the context of the cultural environment, their relative importance, and their interdependence with each other and with human institutions and actions also remains underdeveloped. These claims are not meant to attack or minimize the significant work of many scholars who have developed

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5 This is a rather unconventional book review in that it begins with a discussion of cultural environmentalism and not with the book being reviewed. Those who wish to go straight to Benkler might wish to skip to Part II. Few, if any, have connected Benkler's and Boyle's work, although these authors, along with others, are writing in the same intellectual stream and building in a cumulative fashion characteristic of intellectual progress (something that both authors generally acknowledge and celebrate).

6 See Boyle, 66 L & Contemp Probs at 33 (cited in note 4); Boyle, 47 Duke L J at 87 (cited in note 4).

descriptive and normative accounts of certain aspects of the cultural environment. Rather, the claims are meant to suggest that the *potential* utility of the cultural environment metaphor has not yet been fully realized and remains (for the most part) untapped at least in part because of gaps in our descriptive and normative understandings of the various interrelated systems that comprise the cultural environment.

Part II reviews the book. I explain how Benkler fills many of these gaps and transforms a powerful metaphor into a powerful map. After a brief synopsis and stylistic note, I describe and comment on the book and its contributions, framing them, unpacking them, and exploring their significance. I begin with Benkler's descriptive account of the networked information environment and, critically, the dynamics of change within the environment. To be clear, Benkler does not situate his book within cultural environmentalism or claim that his objective is to comprehensively describe the cultural environment.[7] What Benkler explicitly seeks to describe are *the dynamics of change within the cultural environment.* Specifically, Benkler aims to describe the dynamic changes to systems of culture and information production that are driven by changes in technology, economic organization, and social practice. He observes an "increased . . . role of nonmarket and nonproprietary production" (p 2), and he seeks to explain how the emergence of such production may be understood in connection with other dynamic changes, primarily in communications and computation technologies and social practices. This is the descriptive thrust of his book. While much work remains to be done, Benkler takes significant strides forward in developing a descriptive account of the cultural environment.

Next, I explore Benkler's account of the range of normative values at stake in the context of the cultural environment. The normative thrust of the book is to argue that the emerging nonmarket and nonproprietary production systems are normatively attractive and that preserving some breathing room for their continued emergence, growth, and evolution is worthwhile. To move from description to prescription, Benkler devotes a substantial amount of effort to an exploration of normative theories that value individual participation in intellectual, cultural, and political processes. His views are strongly rooted in liberal political theory. My brief treatment highlights the range of normative commitments that Benkler weaves together and explores the relationships among some of them and the difficulty of evaluating tradeoffs among commitments. Part II ends with a brief discussion of the institutional ecology metaphor.

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[7] Benkler credits Boyle at various points and often utilizes environmental references (for example, information environment, communications environment, institutional ecology, and so on).

Part III considers three paths that Benkler has made some progress in exploring but that demand further exploration. Throughout the Review, I make suggestions for further exploration, but in this Part, I briefly discuss three distinct but interdependent areas that require further study: core common infrastructure, pooling and sharing arrangements, and cultural practices.

I. CULTURAL ENVIRONMENTALISM

A. Call to Arms

In 1996, Jamie Boyle published *Shamans, Software, and Spleens*, a book that in many ways resembles Benkler's *Wealth of Networks*.[8] Like Benkler, Boyle described a series of changes to various information-dependent systems—in the fields of culture and science—that were attributable to a series of changes in technology, economics, and social practices.

For Boyle, these changes were part of the macro-level paradigm shift from an industrial society to an information society: "The idea that we are moving toward an 'information age' or an 'information society' has now passed from iconoclasm through orthodoxy to cliché."[9] Information has become the common element of many different systems and control over information has become an essential ingredient to making things run smoothly. For markets in biotechnology, music, software, or spleens, control over information is necessary to ensure efficiency and the sustenance of robust incentives to innovate. For the information economy and, more grandiosely, the information society to realize their potential, information-dependent markets must be fixed, made less leaky, more controllable, and more manageable. At least, so went a rather simple set of arguments, which will be discussed below.

Boyle, like many other scholars,[10] fought against the simple fix: the tempting simplicity of shifting away from commons, which were doomed to tragedy,[11] and toward increased private control through stronger private property rights. His book critically analyzed the processes of information enclosure and the "ideas and ideologies" driving

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8 The books are very different in terms of style, length, depth, tone, and so on, but their basic themes overlap considerably.

9 Boyle, *Shamans, Software, and Spleens* at 1 (cited in note 3).

10 See, for example, Matthew J. Sag, *Beyond Abstraction: The Law and Economics of Copyright Scope and Doctrinal Efficiency*, 81 Tulane L Rev 187, 189 n 6 (2006) (citing various sources).

11 See Garrett Hardin, *The Tragedy of the Commons*, 162 Science 1243, 1244–45 (1968) (arguing that, since economic rationality drives people to overexploit common goods, "[f]reedom in a commons brings ruin to all").

the processes. The law vests certain entities with rights of control and those rights are exercised through social institutions by people against people—they reflect power, power distributed by law. Boyle questioned the basic reasons for choosing to concentrate control over information (and thus power) in private owners, those romanticized authors and inventors who are imagined to create independently without drawing from the information environment within which they are immersed. Through a series of very interesting examples, Boyle revealed the tragedy of too much romance in our conceptions of authors and inventors and their participation in the creative and inventive processes, the tragedy of overcommodification, overemphasis on incentives, and underappreciation of the value of the public domain. Indeed, Boyle demonstrated how this romantic vision of the author/inventor obscures economic and political analysis and leads to the persistent tailoring or optimization of our laws and social institutions in favor of information enclosure.

We encounter a very similar story in *The Wealth of Networks*. Benkler adds considerable complexity and breadth to the story, however, as he integrates networks into the picture. Networks are a core feature of the complex, information-dependent systems at the heart of our modern economy and society. For Benkler, the dynamic changes underway are part of another macro-level paradigm shift from an industrial information economy to a networked information economy (p 3). Within this more complex networked information environment, we also encounter the persistent push for enclosure of valuable resources, although it takes a more sophisticated form; it is not only a question of expanding private property rights but more broadly concerns the "institutional ecology" itself, the systems of laws and regulatory institutions that structure our relationships with the cultural environment.[12]

B. The Emergence of Cultural Environmentalism

In his work that built from *Shamans, Software, and Spleens*, Boyle continued to draw public and scholarly attention to the legal changes associated with enclosure of the information environment. More importantly, he aimed to spur a political countermovement founded on

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[12] I discuss this in more detail below. See Parts II.C–D. The basic point is that property rights are not the only institution by which enclosure occurs. Boyle was well aware of this. Propertization, privatization, and deregulation are distinguishable but often related, overlapping, and codependent. Moreover, the three processes rest on a shared set of economic premises that are contested in the networked information environment.

principles analogous to those behind the environmental movement.[13] In his essay, *A Politics of Intellectual Property: Environmentalism for the Net?*,[14] Boyle notes that we currently lack a politics of intellectual property, such as that found in the environmental or tax reform movements.[15] As a result, the largest intellectual property holders can make arguments for intellectual property regulation without being subjected to political criticism, while the public and media remain unaware of the high stakes involved.[16] "To prevent the formation and rigidification of a set of rules crafted by and for the largest intellectual property holders, we need a politics of intellectual property."[17] Boyle analogizes the current state of intellectual property politics to the American environmental movement in the 1950s or 1960s and suggests that we look to the environmental movement for the analytical tools and perception of common interest necessary to create a politics to protect the public domain.[18] In a subsequent article, *The Second Enclosure Movement and the Construction of the Public Domain*,[19] Boyle describes what he sees as the second enclosure movement, that is, "the enclosure of the intangible commons of the mind."[20] "[O]nce again things that were formerly thought of as either common property or uncommodifiable are being covered with new, or newly extended, [state-created intellectual] property rights."[21] In essence, Boyle says, the public domain is under attack.[22] To "turn the tide of enclosure," Boyle argues that the appropriate model to adopt is that of the environmental movement:

> The invention of the concept of "the environment" pulls together a string of otherwise disconnected issues, offers analytical insight

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13 See Boyle, 66 L & Contemp Probs at 73 (cited in note 4) (arguing that, like the idea of the environment, "[t]he idea of the public domain takes to a higher level of abstraction a set of individual fights [, which] allows people to overcome collective action problems in a number of different ways"); Boyle, 47 Duke L J at 113 (cited in note 4) (arguing that just as "the environmental movement *invented* the environment so that farmers, consumers, hunters, and birdwatchers could all discover themselves as environmentalists," we should "*invent* the public domain in order to call into being the coalition that might protect it") (emphasis added).

14 Boyle, 47 Duke L J 87 (cited in note 4).

15 Id at 89.

16 Id at 107 (noting that, when intellectual property issues are raised in the legislature, the media will "only call the largest property holders"). See also id at 113 ("[D]espite its astounding economic importance and its impact on everything from public education to the ownership of one's own genetic information, intellectual property has no corresponding place in popular debate or political understanding.").

17 Id at 113.

18 Id at 108.

19 Boyle, 66 L & Contemp Probs 33 (cited in note 4).

20 Id at 37.

21 Id.

22 Id at 39.

> into the blindness implicit in prior ways of thinking, and leads to perception of common interest where none was seen before. Like the environment, the public domain must be 'invented' before it is saved.[23]

The metaphor of "the environment" was a powerful cognitive and organizational device around and under which various constituencies concerned with diverse environmental resource issues could organize. "In one very real sense, the environmental movement *invented* the environment so that farmers, consumers, hunters and birdwatchers could all discover themselves as environmentalists."[24] Boyle aimed to spur a similar organizational dynamic within intellectual property discourse under the metaphor of cultural environmentalism. As with the environmental movement, different constituencies could meet at intersections and cooperate rather than operate separately within isolated silos. As Boyle explained:

> The idea of the public domain takes to a higher level of abstraction a set of individual fights—over this chunk of the genome, that aspect of computer programs, this claim about the meaning of parody, or the ownership of facts. Just as the duck hunter finds common cause with the bird-watcher and the salmon geneticist by coming to think about "the environment," so an emergent concept of the public domain could tie together the interests of groups currently engaged in individual struggles with no sense of the larger context.[25]

Many of the justifications for environmental regulation map to the cultural environment, at least at the level of basic economic analysis of market failures. Thus, in addition to being politically attractive, at the outset cultural environmentalism had some theoretical commonalities with environmentalism that were worth exploring. "In both environmental protection and intellectual property, the very structure of the decisionmaking process tends to produce a socially undesirable outcome. Decisions in a democracy are made badly when they are primarily made by and for the benefit of a few stakeholders, be they landowners or content providers."[26] Moreover, the metaphor extends beyond the decisionmaking process to the nature of the core prob-

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23 Id at 52.

24 Boyle, 47 Duke L J at 113 (cited in note 4) (emphasis added). See also Boyle, 66 L & Contemp Probs at 71–72 (cited in note 4).

25 Boyle, 66 L & Contemp Probs at 73 (cited in note 4).

26 Boyle, 47 Duke L J at 110 (cited in note 4) (noting further that "[i]n both cases, the costs of the action are spread out over many people, while the benefits redound mainly to a few easily identified and well-organized groups").

lems. That is, the environmental metaphor invokes, and is intended to invoke, complexity and path dependence in interlinked ecologies.

Boyle, along with many others, successfully contributed to the development of a political movement reflecting the ideas of cultural environmentalism. For example, Boyle is involved with groups such as Public Knowledge and the Electronic Frontier Foundation, which parallel the functions of environmental groups like Greenpeace, the Environmental Defense Fund, and Environmentally Concerned Scientists.[27]

Scholars within the intellectual property community have been influenced by Boyle's work. On March 11 and 12, 2006, Stanford Law School hosted a conference, Cultural Environmentalism at 10, celebrating and exploring the development of the metaphor of cultural environmentalism. At the conference, Professor Boyle suggested that while much progress had been made in drawing public attention to the enclosure movement and the politics of cultural environmentalism, there remained much work to be done. Professors Neil Netanal and Julie Cohen specifically emphasized during their comments the need to move beyond metaphor and to develop a more rigorous understanding of our cultural environment.[28]

C. Demand for Details: Working Beyond Metaphors and Politics?

While the idea of cultural environmentalism may reverberate among scholars and activists and may serve, explicitly or implicitly, as an important organizing principle for these groups, its potential utility has not been fully realized. Removing the "ism" and leaving aside the political call to arms,[29] we are left with a metaphor that remains insufficiently worked out. Metaphors are powerful cognitive devices that have the potential to assist in our conceptualization of something, but

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27 See Boyle, 66 L & Contemp Probs at 73 n 157 (cited in note 4) ("confessing" his involvement in those organizations). Other leading scholars, notably Lawrence Lessig, have also successfully bridged the academic and public spheres in an impressive manner. See Lawrence Lessig, *Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity* 13 (Penguin 2004); Lawrence Lessig, *The Future of Ideas: The Fate of the Commons in a Connected World* 4 (Random House 2001); Lawrence Lessig, *Code and Other Laws of Cyberspace* (Basic Books 2000).

28 As Cohen notes in her essay based on her comments:

> [G]enerating a normative theory of the open network requires more than a theory of intellectual property or telecommunications, and "doing the science" of cultural environmentalism requires more than appropriation of the environmental metaphor. Cultural environmentalism is like environmentalism, but it is also different. If it is to succeed, cultural environmentalism must grapple directly with culture. In cultural environmentalism's next decade, I very much hope that we will make that our shared project.

Julie E. Cohen, *Network Stories*, L & Contemp Probs 91, 94–95 (forthcoming 2007).

29 I should note that Boyle's political call to arms and its connection to environmentalism constituted a significant accomplishment in itself.

what is the "thing" we seek to (re)conceptualize?[30] *What is the cultural environment?* The power in the metaphor is the linking of our natural and cultural environments, but to harness the power, we need to appreciate the similarities and differences between the things being linked as well as the relevance of these similarities and differences to whatever normative questions are at issue.

At a relatively abstract level, the basic similarities concern the functional and relational meanings of the common term *environment*.[31] An environment might be defined as a system of interconnected and/or interdependent resources that comprise the "surroundings," "setting," or "context" that we inherit, live within, use, interact with, change, and pass on to future generations. We inherit the natural physical environment; we live within, use, interact with, and change it; and we pass it on to future generations. Similarly, we inherit, live within, use, interact with, change, and pass on to future generations a cultural-intellectual environment, comprised of many overlapping sub-environments if one would like to distinguish culture(s), science(s) and so on. The world we live in is comprised of multiple, complex, overlapping, and interdependent resource systems with which we interact and that constitute our environments—the natural environment is one type and (socially) constructed environments, such as the cultural environment, are another. Thus, still at a relatively abstract level, we can appreciate an important difference between the natural and cultural environments: the natural resources that constitute the natural environment are not constructed by humans, while the cultural resources that constitute the cultural environment are constructed by humans.[32] That is, culture is an "artifact," something made by human beings.

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30 See, for example, Steven Winter, *A Clearing in the Forest: Law, Life, and Mind* 43 (Chicago 2003) ("Metaphor is a central modality of human thought without which we cannot even begin to understand the complex regularities of the products of the human mind."); Steven Winter, *The "Power" Thing*, 82 Va L Rev 721, 755 (1996) (arguing that metaphors about power "play a decisive role in how we analyze and reason about power"). See also generally Michael Madison, *Law as Design: Objects, Concepts, and Digital Things*, 56 Case W Res L Rev 381 (2005) (examining the nature of legal "things").

31 At a slightly less abstract level, we might examine the types or categories of resources that comprise the natural and cultural environments and then begin to compare and contrast the characteristics of these resources, how the resources interrelate as a system, and how we (human beings) interrelate with them. From an economics perspective, we might classify resources according to various criteria, such as the degrees of rivalry in consumption and possession and the extent to which resources are renewable, and then examine whether markets for categories of resources exist and if so whether such markets will predictably work well or fail. See generally Brett M. Frischmann, *An Economic Theory of Infrastructure and Commons Management*, 89 Minn L Rev 917 (2005).

32 Much of the cultural environment is inherited. See, for example, Francis Fukuyama, *Trust: Social Virtues and the Creation of Prosperity* 34 (Free Press 1995) (defining culture as "inherited ethical habit"). But see Julia A. Gold, *ADR through a Cultural Lense: How Cultural*

Boyle insightfully made the connection between the natural and cultural environment, noting that some of the normative questions are in fact the same and some of the decisionmaking processes—notably, market-based decisionmaking processes—involve similar deficiencies in appreciating normative or social consequences. For example, in both contexts markets routinely fail to account for externalities (both positive and negative), are routinely short-sighted, and are subject to path dependencies that affect social progress and opportunities.[33] Most importantly, Boyle persuasively made the case that the political and economic dynamics of enclosure, witnessed in the First Enclosure Movement with respect to land and natural resources, had resurfaced in intellectual space.[34] Drawing attention to the history and dynamics of enclosure was significant, and galvanized activists and scholars alike. Still, much work remains to be done in unpacking the metaphor and making the cultural environment a workable analytical construct.

To more fully realize the potential of the cultural environment construct, it is necessary to move beyond reasoning by metaphor and highly abstract comparisons between natural and cultural environments, although even explicit comparisons of this sort have not been fully undertaken. We need both a thorough descriptive account of the cultural environment and a thorough normative account of the values at stake in decisions we make individually and collectively through a variety of processes—market and nonmarket, political, cultural, and social. In the next two sections, I briefly discuss these two needs and return to them both in subsequent Parts.

1. Describing and understanding our cultural environment.

For the cultural environment metaphor to be analytically useful, we need to know more about what the cultural environment is, how it works, how it is constructed, how we interact with it, how we change it, how we are a part of it, and how it relates and interacts with other environments.[35] The environmental movement was not founded on

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Values Shape Our Disputing Process, 2005 J Disp Resol 289, 292 (2005) (arguing that "[c]ulture is learned, not inherited").

33 Boyle, 47 Duke L J at 110–12 (cited in note 4).

34 Boyle, 66 L & Contemp Probs at 37 (cited in note 4). The First Enclosure Movement involved the privatization of formerly common resources, especially land and labor, during the fifteenth through nineteenth centuries. See id at 33–36.

35 We might envision a meta-cultural-intellectual-environment that consists of various overlapping and interdependent systems of cultural, intellectual, and social resources that comprise the surroundings, setting, or context that we inherit, live within, use, interact with, change, and pass on to future generations. This would be analogous to envisioning the environment as a meta-natural-environment that consists of various overlapping and interdependent natural resource (eco)systems. Such broad conceptualizations may be important anchors from which further description and conceptualization may flow. Rather than attempt to distinguish between

politics alone, but rather it relied heavily on the emergence of environmental science. The scientific study of the natural environment is an ongoing process of observation, description, hypothesis, and revision in light of empirical evaluation. Of course, science itself is laden with normative judgment—an issue I do not take up here. The point is that our understanding of our natural environment and its constituent systems has improved dramatically over the past decades, and this increased understanding has informed both our decisionmaking and core normative commitments.[36]

The task of describing the cultural environment is certainly not easy. I have already defined what I mean by "environment," but what is the cultural environment? Why have I chosen "cultural environment" rather than, for example, "information environment" or "intellectual environment"?[37] One reason is to situate this Review within the movement and ideas generated by Boyle. Another reason is that "cultural" captures the contextual, contingent, and social/relational aspects of the resources that constitute the meta-environment; the resources are resources vis-à-vis their *meaning* to and among people. As Benkler suggests, "[culture] is a frame of meaning from within which we must inevitably function and speak to each other, and whose terms, constraints, and affordances we always negotiate. There is no point outside of culture from which to do otherwise" (p 282).[38] In a sense, culture itself is an environmental concept.[39]

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different subsystems within such a meta-environment, I generally refer to the meta-environment as the cultural environment.

36 See generally Richard J. Lazarus, *The Making of Environmental Law* (Chicago 2004). Of course, there is still plenty of room for improvement both in terms of our understanding of environmental systems and of our integration of environmental information and knowledge into decisionmaking. See generally Daniel C. Esty, *Environmental Protection in the Information Age*, 79 NYU L Rev 115 (2004).

37 As noted above, I use "cultural environment" broadly to encompass multiple interdependent systems of cultural, intellectual, and social resources.

38 Clifford Geertz, perhaps the leading cultural anthropologist of his generation, defined culture as "an historically transmitted pattern of meanings embodied in symbols, a system of inherited conception expressed in symbolic form by means of which [people] communicate, perpetuate, and develop their knowledge about and attitudes toward life." Clifford Geertz, *The Interpretation of Cultures* 89 (Basic Books 1973).

39 The concept of culture is exceedingly broad. Indeed, anthropologist Edward Tylor has suggested that culture is "that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society." Edward B. Tylor, *Primitive Culture* 1 (Holt 3d ed 1889). The problem with such an all-inclusive definition, however, is that with such breadth, it ceases to be analytically useful. Still, because it is so important, "[t]here is no shortage of proposed definitions—150, according to one study." Ilhyung Lee, *Culturally-Based Copyright Systems?: The U.S. and Korea in Conflict*, 79 Wash U L Q 1103, 1109 (2001). Yet a settled "definition of culture remains elusive and contested." Id. Indeed, "'[c]ulture is one of the [most] basic theoretical' sociological terms, and yet it is inherently indefinable. Both in terms of its specific meaning and broad content, the understanding of 'culture' has defied consensus among sociologists." Shubhankar Dam, *Legal Systems as Cultural Rights: A Rights'*

Culture has a normative dimension as well, and might be understood as a reflection of that which we[40] want; as John Breen puts it, culture can be understood as a society's answer to a series of "fundamental questions" about what it values.[41] This approach raises at least two very difficult questions about societal wants (or preferences or values). First, how do we know what we want? Second, how do we learn to want whatever it is that we want? Answering these questions requires considerable analysis of the dynamic interplay between how we figure out what we want, how we manifest our demands, who gets to do the valuing (or ranking of values), and how the environment within which we are situated and the opportunities it affords simultaneously enables, constrains, and shapes our wants/values. These are tremendously complicated philosophical questions that are beyond the scope of this Review. I raise them, however, because they pervade both the descriptive and normative discussion in Benkler's book and this Review.

Within the legal community, where we debate the contours of the legal systems nominally designed to promote cultural and scientific Progress,[42] we know too little about that which we seek to promote.[43]

Based Approach to Traditional Legal Systems under the Indian Constitution, 16 Ind Intl & Comp L Rev 295, 311 (2006). Despite the definitional ambiguity, which stems at least in part from the difficulties in defining meaningful boundaries and deciding what to include and exclude, rich descriptive and functional studies of components of culture can be found in various disciplines. See Julie E. Cohen, *Creativity and Culture in Copyright Theory*, 40 UC Davis L Rev 1151, 1165–67 (forthcoming 2007) (citing various sources).

40 I have used "we" throughout my discussion of culture without specifying what group or community this refers to. Part of the difficulty in defining culture stems from difficulties in defining and differentiating relevant groups and communities that play an integral part in the dynamics of culture formation and change. Tackling these difficulties is beyond the scope of this Review.

41 Working within the intellectual tradition of Catholic Social Thought, Breen further explains:

> A culture . . . constitutes the response that a given people have to these fundamental questions, a response that is constantly being revised and worked out over time. It is expressed not only through the customs and traditions of a people, but through their language, history, art, commerce and politics. Indeed, "[a]ll human activity takes place within a culture and interacts with culture." At the same time, a given culture reveals its deepest identity in the position it takes "toward the fundamental events of life, such as birth, love, work and death," as well as "the mystery of God" Thus, "[d]ifferent cultures are basically different ways of facing the question of the meaning of personal existence."
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> As such, every culture is, in essence, a normative and didactic enterprise. It indicates what is desirable and permissible within a given society. It instructs both the observer and the participant as to how they ought to act. Indeed, as Joseph Pieper reminds us, and as the etymology of the word confirms, at the heart of every "culture" is a "cult" in the sense of religious devotion. That is, a culture is a societal answer to the question of value. Every culture renders a whole series of judgments as to what is truly important in life.

John M. Breen, *Modesty and Moralism: John Paul II, the Structures of Sin and the Limits of Law—A Reply to Skeel & Stuntz* 29–30 (unpublished manuscript 2006) (quoting works of Pope John Paul II).

42 See US Const Art I, § 8, cl 8 ("Progress of Science and useful Arts").

We place too much emphasis on easily observable and measurable outputs—works and inventions—and figure the more the merrier. As Boyle noted, the romantic conception of the author/inventor is intimately connected with our narrow product-focused vision. But that is only one of many possible paths along which our culture may progress, by which our cultural environment may evolve. There are others.[44] We might, for example, imagine Progress as measured by the degree of participation in creative and inventive activities; participation in such activities yields outputs, to be sure, but participation also educates, builds human capital, skills, and ultimately may unlock human potential. My point here is not to articulate fully a new vision of Progress; that is a project for another day. Instead, my point is to emphasize that our singular notion of Progress—focused on increasing numbers of copyrightable works and patentable inventions—and the resultant view of how to socially construct legal systems to promote such Progress result (at least, in part) from an impoverished understanding of the cultural environment—what it is, how it works, how it is constructed, how we interact with it, how we change it, how we are a part of it, and how it relates and interacts with other environments.[45]

The dynamic, inherently progressive nature of culture highlights the necessity of articulating a dynamic understanding of environmentalism. For some, environmentalism conjures a static view of the world—where environmentalists are people who oppose progress (if you aren't an environmentalist) and change (if you are). In that view, cultural environmentalism would appear to come with a built-in contradiction, since culture is inherently dynamic and progressive.[46] Environmentalism, as a metaphor or political movement, may indeed be perceived as having a static view (although that perception is contested), but environmentalism as a field of study should not be perceived as such. Environmental science and economics, for example, focus on the dynamics of systems and not on the preservation of a particular state. In my view, cultural environmentalism similarly should be understood as a dynamic, emerging field of study.

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43 Julie Cohen makes this point clearly and persuasively in various articles. See, for example, Cohen, 40 UC Davis L Rev at 1151–52 (cited in note 39).

44 See, for example, Margaret Chon, *Postmodern "Progress": Reconsidering the Copyright and Patent Power*, 43 DePaul L Rev 97, 101–03 (1993) (arguing that the definition of "progress" is socially constructed and should be shaped by social values and human priorities).

45 Julie Cohen charges intellectual property scholars with overlooking "a broad array of social science methodologies that provide both descriptive tools for constructing ethnographies of creative processes and theoretical tools for modeling them." Cohen, 40 UC Davis L Rev at 1152 (cited in note 39).

46 I thank Mike Madison for bringing this point to my attention.

2. The normative values at stake and worth pursuing.

As with our impoverished understanding of the cultural environment, our understanding of the normative values at stake in individual and collective decisions that affect the cultural environment remains incomplete. What are the stakes? What paths should we take? What sort of Progress ought we promote through laws and institutions we construct? What should we do with that which we inherit, use, and build from and upon? What normative theories ought we look to in framing and answering these questions? As Julie Cohen has argued, "normative theory needs to do heavier lifting" with respect to cultural environmentalism than environmentalism because while "[c]ultural *change* may be empirically and anecdotally demonstrated . . . cultural *harm* is in the eye of the beholder."[47]

Many scholars have addressed the normative implications of expanding copyright or patent or (de)regulating communications networks from a variety of different perspectives. For example, some focus on efficiency,[48] others on participation in speech-related activities or collective governance,[49] and others on natural rights.[50] There is no shortage of normative theories from which to choose.

Yet we lack a systematic understanding of how these normative values relate to each other, when they are complementary and when they compete, and how to recognize and gauge tradeoffs between normative commitments.[51] Benkler provides an enlightening discussion of a range of liberal normative values and how these values relate to individual and collective decisions we make. He begins to connect some of the normative values within a framework that could, if developed further, lead to a more systematic understanding of normative tradeoffs pertinent to our structuring of and continuous relationships with the cultural environment. I discuss these issues below in Part II.C.

II. THE NETWORKED INFORMATION ENVIRONMENT

In *The Wealth of Networks*, Benkler provides a comprehensive and systematic account of the "networked information environment" and in doing so succeeds in taking cultural environmentalism beyond

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47 Cohen, 70 L & Contemp Probs at 91 (cited in note 28).

48 See, for example, Clarisa Long, *Patent Signals*, 69 U Chi L Rev 625, 675 (2002).

49 See, for example, Rebecca Tushnet, *Copy This Essay: How Fair Use Doctrine Harms Free Speech and How Copying Serves It*, 114 Yale L J 535, 538 (2004) (defending "copying as a method of self-expression and self-definition consistent with autonomy-based accounts of freedom of speech").

50 See generally, for example, Wendy J. Gordon, *A Property Right in Self-Expression: Equality and Individualism in the Natural Law of Intellectual Property*, 102 Yale L J 1533 (1993).

51 Economics is not especially helpful in this regard.

metaphor. Benkler synthesizes across disciplines and draws together seemingly distinct areas of human endeavor. Specifically, he brings together science, technology, arts, communications, and other social systems that rely heavily on cultural-intellectual inputs and outputs,[52] and to some degree, eliminates the silos that appear scattered across the landscape of the cultural environment.[53] He does this by focusing on the dynamics of the systems, their emerging networked nature, and their interconnectedness. While branches of science or culture are worthy of independent study and often seem to operate in splendid isolation from each other (in silos), they are worthy of cross-disciplinary study not only because of common features (such as the importance of information and networks) but also because they comprise interdependent subsystems within a more complex system, which we might call the cultural environment.[54]

In exploring the dynamic emergence of the networked information environment and its implications and opportunities, Benkler provides a detailed (yet necessarily incomplete) descriptive account of our cultural environment, explains both how we participate and the emerging potential for increased participation in the making and shaping of our cultural environment, and provides a theoretical yet practically useful account of the normative values at stake in a variety of interrelated policy debates. In this Part, I describe the book, provide a summary of its primary arguments, comment on these contributions, and suggest a few extensions.

A. Synopsis

The Wealth of Networks is organized in three Parts. The first Part focuses on describing the networked information economy, its emer-

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52 As noted earlier, Boyle observed the importance of information across these sectors and consequently the increasing demand for enclosure. See text accompanying notes 33–34.

53 This is comparable perhaps to recent developments in telecommunication. The silo view of communications law has been critiqued and may be slowly giving way to a more layered understanding of the markets and activities regulated by telecommunications law. See generally, for example, Richard S. Whitt, *A Horizontal Leap Forward: Formulating a New Communications Public Policy Framework Based on the Network Layers Model*, 56 Fed Commun L J 587 (2004). See also Douglas C. Sicker and Joshua L. Mindel, *Refinements of a Layered Model for Telecommunications Policy*, 1 J Telecom & High Tech L 69, 69–70 (2002) (proposing "a framework to serve as the basis for a unified layered policy model ... focuse[d] on the inter-connection relationship among the various players").

54 Benkler argued for such cross-disciplinary analysis in an earlier article. See Yochai Benkler, *The Commons as a Neglected Factor of Information Policy* 21 (working paper, presented at Telecommunications Policy Research Conference, Sept 1998), online at http://www.tprc.org/abstracts98/benkler.pdf (visited July 7, 2007) (noting the effects that an information policy favoring the commons can have on economic growth while also serving important democratic principles). See also Part I.C.1.

gence, and its economic features. It is comprised of three chapters, which I discuss in Part II.C. I devote particular attention to Chapter Two (pp 35–58), "Some Basic Economics of Information Production and Innovation," because it lays the foundation for much of Benkler's analysis.

The second Part of *The Wealth of Networks* focuses on describing the normative implications of the networked information economy. It "provides a detailed look at how the changes in the technological, economic, and social affordances of the networked information environment affect a series of core commitments of a wide range of liberal democracies" (p 7). It is comprised of six chapters, some of which I discuss in Part II.D. My discussion is designed to synthesize the normative implications and frame the issue of *normative tradeoffs* not addressed by Benkler.

The third Part of *The Wealth of Networks* focuses on the battle over the institutional ecology of the networked information environment. Benkler carefully sets up the conflict between different visions of the information environment—of what could be—and frames a number of challenges to the realization of these different visions. It is comprised of two chapters, which I discuss in Part II.E.

B. Stylistic Note

Reading and digesting *The Wealth of Networks* requires a significant investment of time and dedicated mental energy on the part of the reader, but the investment pays significant dividends. Some reviewers have critiqued the book on the grounds that it is not properly targeted at either an academic or lay person audience.[55] As an academic with a similar research agenda as Benkler and familiarity with Benkler's prior work and many of the literatures from which Benkler draws, I found the book accessible but not without some effort; it is not an easy read. Benkler writes in sophisticated prose and long, complex sentences, as he acknowledges. So for me, the effort required is due to navigation and digestion of Benkler's somewhat dense text.

For those less familiar with the wide range of literatures from which Benkler draws (economics, communications, liberal political theory, intellectual property, and others), the book raises a few problems. First, Benkler barely cites to the literatures from which he draws.

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55 See, for example, Dan Hunter, *A General Theory* (cited in note 2) (noting that "readers without a solid grounding in economics, liberal theory, political science and jurisprudence (and possibly network theory and internet architecture) are going to struggle through the book's five hundred-or-so pages").

The endnotes are sparse.[56] This leaves at sea the reader interested in doing some background research. Second, Benkler does not always engage or cite conflicting views. While academics familiar with a topic (or even Benkler's prior work) may recognize contestable points, those unfamiliar can only assume that most of what Benkler claims is uncontested.[57] Third, as I explore to some degree in this Review, Benkler seems at times to overstate the current impact of social production on the economy without providing empirical support for his claims.[58] While this appears to result from claim language that can be interpreted differently (for example, broadly or narrowly), the impression left on someone not familiar with the area might tend to be the broad, empirically unsupported interpretation of the claim.

While these problems are stylistic, they raise an ironic twist. By failing to cite or engage the literatures from which he draws, Benkler appears to be distancing himself from the scholarly conversation of which he is a part. In a sense, Benkler writes in classic mass media fashion, as if he was the single producer of the ideas, arguments, and stories and the reader is a mere passive consumer—not an active user who might wish to do a little background research or pursue some of the ideas as expressed by authors other than Benkler.[59] I do not mean to overemphasize these problems because they are stylistic and do not detract from the substance or importance of Benkler's work, to which I now turn.

C. Describing the Networked Information Environment

As Benkler states, the "overarching claim [of the first part of his book] is that we are seeing the emergence of a new stage in the infor-

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[56] The book has 472 pages of text and 15 pages of endnotes. By comparison, Jamie Boyle's *Shamans, Software, and Spleens*, has 185 pages of text, including 2 appendices, and 20 pages of endnotes.

[57] These first two problems are the result of the fact that significant portions of Benkler's book build directly from prior academic articles. Understandably, Benkler avoids reproducing footnotes from those underlying articles. Interested readers can find citations to the relevant literatures in his articles.

[58] Benkler writes with two voices: at times he seems to recognize that he is talking about potential outcomes and opportunities that may or may not be realized and for which we do not know the full range of benefits or costs; at other times, he writes as if the revolution has occurred and we are already witnessing a major transformation in various core sectors of the economy. The problem with the latter voice is that Benkler only offers case studies that do not provide sufficient empirical support for such a broad claim.

[59] One might infer a romantic view of Benkler as the singular creator of the many ideas, arguments, and stories presented in five hundred dense pages. Of course, he does not mean to imply such a view of his work. As noted above, the book is based on prior work, and the underlying articles provide citations to relevant literatures. Moreover, Benkler has made the book available for free online, and there is a wiki dedicated to enabling active users. See http://www.benkler.org/wealth_of_networks/index.php/Main_Page (visited July 7, 2007).

mation economy, which [he calls] the 'networked information economy'" (p 3). To support this claim, Benkler describes the evolution of the information economy from an industrial information economy to a networked information economy. He frames this discussion as follows:

> For more than 150 years, new communications technologies have tended to concentrate and commercialize the production and exchange of information, while extending the geographic and social reach of information distribution networks.
>
> . . .
>
> A particular confluence of technical and economic changes is now altering the way we produce and exchange information, knowledge, and culture in ways that could redefine basic practices, first in the most advanced economies, and eventually around the globe.... Radical decentralization of intelligence in our communications network and the centrality of information, knowledge, culture, and ideas to advanced economic activity are leading to a new stage of the information economy—the networked information economy. In this new stage, we can harness many more of the diverse paths and mechanisms for cultural transmission that were muted by the economies of scale that led to the rise of the concentrated, controlled form of mass media, whether commercial or state-run. The most important aspect of the networked information economy is the possibility it opens for reversing the control focus of the industrial information economy (pp 29–32).

In the first Part of his book, Benkler describes the dynamic changes in technology and consequently in the economics of information and cultural production. He is very careful to make clear that he is not an adherent to technological determinism and that he does not mean to rely exclusively on an economic framework, which is evident in the latter Parts of the book (pp 16–20). Still, according to Benkler, to appreciate the dynamic changes underway and the social and economic opportunities emerging, it is necessary to appreciate how economic and technological capabilities shape production possibilities and social practices and, in particular, make nonmarket production a sustainable alternative to market production.

To appreciate and understand the dynamic changes in technology and the economics of information and cultural production, some basic economics is required. Benkler provides an accessible account of the economics of information in Chapter Two. He begins by framing a puzzle:

> Why do we rely almost exclusively on markets and commercial firms to produce cars, steel, and wheat, but much less so for the most critical information our advanced societies depend on? Is this a historical contingency, or is there something about information as an object of production that makes nonmarket production attractive (p 35)?

Of course, there is something different about information—a few things, actually. The basic economic characteristics of information are very different from those of automobiles, steel, and bread, and, critically, the differences matter when evaluating and comparing the relative efficacy of different systems of production. For example, in contrast with these material goods, information is "nonrival," meaning that it can be consumed by many without it needing to be recreated for each consumer. Relatedly, information can be possessed and used by many simultaneously. Sharing information can be accomplished freely.

Benkler explains how the nonrival nature of information leads to a well-understood tradeoff between static and dynamic efficiency for markets based on patents and copyrights (pp 35–41). From a static perspective, information should be freely shared, but from a dynamic perspective, owners of exclusive rights in information may need to restrict access to information to appropriate returns and recoup investment in information production. In fact, the granting of exclusive rights is largely premised on the notion that facilitating the appropriation of returns is necessary to generate incentives to participate in information production.

The social costs of exclusionary rights, however, are not limited to deadweight losses from reduced consumption of information. A second differentiating characteristic of information is that "information is both input and output of its own production process," which is "known to economists as the 'on the shoulder of giants' effect" (p 37). The cumulative nature of information production further complicates the basic economic tradeoff between static and dynamic efficiency for markets based on patents and copyrights because the social costs of reduced access may include decreased productive use of information.[60]

After explaining the basic economics of information, Benkler concludes by emphasizing the theoretical and empirical weaknesses in the economic case for strong intellectual property rights.[61] As Boyle

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[60] See Brett M. Frischmann and Mark A. Lemley, *Spillovers*, 107 Colum L Rev 257, 281 (2007) ("Innovation is cumulative and is generally spurred by *decentralized* competition. This is particularly likely to be true of an innovation subject to productive reuse, since no one owner can capture the full value of that innovation anyway.") (emphasis added).

[61] As Benkler puts it:

argued, the Second Enclosure Movement was founded not on robust economic theory and empirical evidence, but instead, on rent-seeking politics and an unreflective adoption of a glorified view of property rights and markets.[62] Of course, the problem of baselines persists—neither Boyle nor Benkler advocates abolishing intellectual property rights; the difficulty is solving the Goldilocks problem of figuring out how to design intellectual property rights that are not too strong or too weak.[63]

Benkler then turns to the basic economics of information production with particular emphasis on the appropriation strategies employed by various information producers: How do we get information? How is information produced? How do producers make it worth their while to engage in information production? Answering these questions is an important part of the descriptive project for cultural environmentalism. According to Benkler, most information production does not come from intellectual property–based market actors; instead, most information is produced by "a mixture of (1) nonmarket sources—both state and nonstate—and (2) market actors whose business models do not depend on the regulatory framework of intellectual property" (p 39). This observation is very important from both a descriptive and a normative perspective, and it has broad implications for any normative assessment of intellectual property laws as a socially constructed system of information regulation.

Benkler first supports his observation by discussing the example of daily newspapers, the production of which, he claims, does not depend on copyright law (p 40). He then refers to surveys that have shown that in most industrial sectors of the economy, patents are not the most important means for firms to appropriate value from research and development (pp 40–42). He concludes: "[W]e find the ma-

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> When one cuts through the rent-seeking politics of intellectual property lobbies like the pharmaceutical companies or Hollywood and the recording industry; when one overcomes the honestly erroneous, but nonetheless conscience-soothing beliefs of lawyers who defend the copyright and patent-dependent industries and the judges they later become, the reality of both theory and empirics in the economics of intellectual property is that both in theory and as far as empirical evidence shows, there is remarkably little support in economics for regulating information, knowledge, and cultural production through the tools of intellectual property law (p 39).

62 See Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 Tex L Rev 1031, 1032 (2005) (arguing that the "effort[s] to permit inventors to capture the full social benefit of their invention . . . are fundamentally misguided"). Many scholars have critiqued the glorified view of property rights. See, for example, Julie E. Cohen, Lochner *in Cyberspace*, 97 Mich L Rev 462, 462 (1998) (arguing that the widely derided "economic vision embodied in *Lochner* is alive and well on the digital frontier").

63 See generally Dan L. Burk and Brett H. McDonnell, *The Goldilocks Hypothesis: Balancing Intellectual Property Rights at the Boundary of the Firm*, 2007 U Ill L Rev 575.

jority of businesses in most sectors reporting that they do not rely on intellectual property as a primary mechanism for appropriating the benefits of their research and development investments" (p 41). This remains an area in need of more empirical work, particularly in sectors of the networked information economy. Nonetheless, given the empirical evidence that we have, Benkler stands on relatively firm ground. His observations—or the surveys upon which he bases the observations—are focused on "sectors of the economy" with measurable economic output. A broader view of information production further supports his conclusion. That is, the overwhelming majority of information (without focusing on economic sectors alone) is produced and exchanged (shared) outside of intellectual property–mediated markets.[64]

Benkler further supports his argument by discussing the diversity of strategies in our current information production system. He outlines a series of strategies employed by information producers that vary in terms of their reliance on property rights to facilitate exclusion and appropriation (pp 41–48). These "ideal-type" strategies are differentiated on the basis of the producers' decisions to minimize costs and maximize benefits in their operations (p 42). It is an interesting typology of strategies that begins to provide a map of what drives participation in information production. At this point in the book, Benkler is focused on appropriation strategies because he is setting up his analysis of the effects of intellectual property. Thus, while a broader noneconomic, perhaps nonstrategic, map of why people participate would be useful descriptively, we must wait until Chapter Four (pp 91–127) for such considerations to be integrated into the discussion. I raise this point here, however, because meaningful participation in information

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[64] This was not intended to be a provocative or controversial point, but it has generated substantial concerns among some of those who graciously commented on earlier drafts of this review. Consider, for a moment, the various observations, expressions, and conversations that we experience and participate in producing and sharing every day. Most of the information involved may be economically insignificant in the sense that markets, whether mediated by intellectual property or not, would not (need not, and thus, should not) form to monetize and value the information. But that does not mean such information is not valuable—it only means that one way of observing and measuring value does not work very well; nor does it mean that we would prefer an environment within which such economically insignificant information was not produced and shared—we might prefer (what I like to call) a spillover-rich environment. Moreover, a tremendous amount of economically significant information (not captured in sector studies) is produced outside intellectual property–mediated markets—prices and stock listings being two obvious examples. I must admit, however, that I cannot offer empirical evidence to support my claim that most information in this world is produced and exchanged "outside" of intellectual property–mediated markets. As discussed below, Benkler properly takes the point I am making much further: "Social production of goods and services, both public and private, is ubiquitous, though unnoticed. It sometimes substitutes for, and sometimes complements, market and state production everywhere. It is, to be fanciful, the dark matter of our economic production universe" (p 117).

production is not always strategic. At times, Benkler's analysis of social sharing and exchange as a form of gift seems unnecessarily strategic and deliberately transactional, albeit without mediation by the price system.[65]

Benkler next draws attention to another source of inefficiency that might be attributed to "strong 'intellectual property'–type rights": induced shifts in appropriation and information production strategies (p 49). This very important point is often overlooked and deserves greater consideration. The strategies employed by information producers depend upon the relative costs and benefits of different methods of appropriation and their impact upon the costs of inputs needed to participate in information production. Changes in the law may reduce the appropriation costs by making exclusion through property rights easier and lead to increased participation in those information production activities dependent upon such means of appropriation. At the same time, the same changes in the law may increase the costs of inputs for other information producers and affect their participation rates in other information production activities. Thus, changes in the law may lead to shifts in the *types* of productive activities.[66]

Benkler seems to make his point more narrowly than necessary because of his focus on business strategies and impacts on sectors of the economy. Economic significance may be measured in a variety of ways within economics. It is not clear what metric Benkler intends to use, but implicit in his analysis of business strategies is the assumption that significance depends upon the efficient allocation of resources to activities producing economic outputs that yield appropriable value. Exclusive rights shape appropriation strategies by, among other things, lowering the costs of rights-based exclusion, and, as Benkler properly observes, this can lead to an inefficient allocation of resources—both intellectual and otherwise—to modes of production that rely more

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65 For example, consider social efforts to beautify a neighborhood through (1) planting flowers and shrubs in one's yard and (2) tending to a common garden. Both involve social production of shared benefits. Participation in (1) may not involve strategic exchange; the external shared benefits may be secondary or incidental, and participation in (2) may involve collective management of a common pool resource and thus depend upon strategic, transactional cooperation. Thus, we might classify (1) as nonmarket peer production without commons inputs, and (2) as nonmarket commons-based peer production. See Part II.B (distinguishing different forms of organizing production).

66 Benkler states the point succinctly:

> Given diverse strategies, the primary unambiguous effect of increasing the scope and force of exclusive rights is to shape the population of business strategies. Strong exclusive rights increase the attractiveness of exclusive-rights-based strategies at the expense of nonproprietary strategies, whether market-based or nonmarket-based. They also increase the value and attraction of consolidation of large inventories of existing information with new production (p 50).

heavily on exclusion and consolidation of inputs. This is an important point that Boyle alluded to in *Shamans, Software, and Spleens*,[67] but did not fully explore.

One concern that I have with Benkler's analysis, however, is that the shift or bias that exclusive rights introduce is not only toward market/proprietary appropriation strategies and away from nonmarket/nonproprietary appropriation strategies, but also more broadly toward (strategic) appropriation and away from nonappropriation. First, various sectors of information and cultural production and exchange traditionally have not and currently need not rely on appropriation strategies at all. Gift economies, for example, need not involve tit-for-tat exchanges or appropriation-related feedbacks (or paybacks), although sometimes they do.[68] Second, even where some degree of appropriation is necessary—and thus comparative analysis of appropriation strategies becomes important, an important aspect of the shift or bias that exclusive rights introduce concerns the degree of appropriation enabled and a shift toward the production of information/cultural outputs that yields observable and appropriable value. I explored this particular bias in previous work:

> The market mechanism exhibits a bias for outputs that generate observable and appropriable benefits at the expense of outputs that generate positive externalities. This is not surprising because the whole point of relying on [private] property rights and the market is to enable private appropriation and discourage externalities. The problem with relying on [private property rights and] the market is that potential positive externalities may remain unrealized if they cannot be easily valued and appropriated by those that produce them, even though society as a whole may be better off if those potential externalities were actually produced.[69]

Mark Lemley and I explore the dynamic further in *Spillovers*,[70] and explain that focusing too narrowly on appropriation, often under the guise of "internalizing externalities" (although not in Benkler's case), may introduce biases that reduce social welfare by reducing

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67 Boyle, *Shamans, Software, and Spleens* at 35–46 (cited in note 3) (discussing the need to balance the creation of incentives to produce information through strong exclusionary rules with the need to keep down the costs of producing new information).

68 See David Bollier, *Silent Theft: The Private Plunder of Our Common Wealth* 30–31 (Routledge 2002) (noting that "members of a gift economy do not come together through any cash exchange or economic transaction. What matters most is the ability to create and sustain caring, robust relationships within a group of people who share common commitments.").

69 Frischmann, 89 Minn L Rev at 988–89 (cited in note 31).

70 Frischmann and Lemley, 107 Colum L Rev 257 (cited in note 60).

participation in productive activities that yield beneficial spillovers.[71] Thus, while some degree of appropriation may be necessary to encourage participation in information and cultural production, different modes of production involve different degrees of appropriation and uncaptured spillovers; they involve different allocations of benefits and costs among producers, users, and third-parties, and as we explore in *Spillovers*, the allocation itself is economically significant because it impacts productive behavior and may have broader impacts on economic growth.[72]

To reiterate, Benkler's essential point about systematic bias is important and worth stressing. Stated more broadly, "the primary unambiguous effect of increasing the scope and force of exclusive rights is to shape" cultural and social practices—including but not limited to business strategies—within the cultural environment (p 50). Ultimately, this works to shape the cultural environment itself.[73]

Finally, Benkler moves into the digitally networked environment and makes the case that the information environment has changed drastically because of the declining cost of communication and processing. Essentially, Benkler claims that information and cultural production require three categories of inputs: "existing information and culture," "mechanical means for sensing our environment, processing it, and communicating new information goods," and "human communicative capacity—the creativity, experience, and cultural awareness necessary to take from the universe of existing information and cultural resources and turn them into new insights, symbols, or representations meaningful to others with whom we converse" (p 52). The costs of these inputs influence the mix of production and thus the range of outputs. "Given the zero cost of existing information and the declining cost of communication and processing, human capacity be-

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71 See generally id.

72 I am working on a project that seeks to connect microeconomic analysis of behavior within productive systems to the macroeconomic analysis of systems. Brett M. Frischmann and Christiaan Hogendorn, *Where Micro Meets Macro in Technology Space* (2007) (working paper). The focal point of our analysis is the role of infrastructure and institutions as intermediate forms of capital (infrastructural and institutional capital) that structure micro-level, in-system behavior, decisionmaking, and resource allocation in manners that lead to spillovers and systemic effects not easily observed (or well understood) within microeconomic analysis but perhaps more easily observed (and better understood) within macroeconomic analysis.

73 I return to this idea and its normative implications in Part II.C.1. The notion that the environment itself is shaped by intellectual property laws ties nicely to a similar argument I made in *An Economic Theory of Infrastructure and Commons Management* about how choices between managing infrastructure resources as commons or as private property structure the productive activities that infrastructure users participate in. Frischmann, 89 Minn L Rev at 941–42 (cited in note 31).

comes the primary scarce resource in the networked information economy" (p 52).[74]

The critical point is that the Internet liberates human capacity to communicate and create information and culture in a heretofore unprecedented manner because it removes a significant input cost for a wide variety of humans with untapped or underutilized creative and communicative capacity.[75] There is tremendous untapped human potential distributed across society, and the social value of tapping into that potential through widespread participation in information and culture production is difficult to fathom (p 53).

In rather bold fashion, Benkler suggests that the diverse information and culture generating activities that have been widespread and common in the human experience and not mediated by the market—the common everyday cultural exchanges and interactions that constitute our social and private lives—will be brought "smack into the middle of our economy and our productive lives" (p 53). This, according to Benkler, is the promise of the networked information economy.

But this claim may overstate both the impact of the networked environment on our daily lives and the impact of our daily lives in the networked environment on our economy. Who knows? We may see billions of people allocating some of their free time and creative capacities to "social production,"[76] or we may see only a fraction of that. Regardless of participation rates, we may see the significant creation of cultural goods that effectively compete at the core of the information economy, but we may not. Benkler may be right, but both aspects of the claim are *very optimistic*, require extensive empirical study beyond that undertaken by him, and raise significant normative implications.

It is worth noting, however, that his claim can, and probably should, be read more narrowly. While other critiques of the book have

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74 Of course, due to exclusive rights, among other things, not all existing information is free.

75 As some economists have argued, human capital is one of our most valuable economic resources. See Gary Becker, *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education* 237 (National Bureau Economic Research 2d ed 1975) (dedicating an entire book to an analysis of investment in human capital, and arguing that "human capital is going to be an important part of the thinking about development . . . for a long time to come").

76 Benkler never defines "social production" in a precise manner, other than by contradistinction with market production. This is a bit disconcerting since social production is the primary object of his analysis. One definition of social production is a mode of production where producers' decisionmaking processes concerning both the allocation of resources and the demands to which producers respond are guided by motivational factors other than expected profits. This definition is also negative, in the sense that it doesn't identify those non-profit motivations. Benkler may come close to a slightly more nuanced definition. He says that "[f]or all of us, there comes a time . . . when we choose to act in some way that is oriented toward fulfilling our social and psychological needs, not our market-exchangeable needs. It is that part of our lives and our motivational structure that social production taps" (p 98).

pointed out that it could be read to aggrandize the importance (and newness) of social production,[77] it seems fair, based on other parts of the book and Benkler's many talks about the book in various forums, to state his claim more narrowly as follows: *social production of information and culture can emerge in the core of our economy as a complementary and at times competitive system.* From this more narrow perspective, its relative importance will vary across contexts, cultural (sub)systems, and information production systems. Notably, Benkler does not tell us in which subsystems or what contexts it will emerge. Nonetheless, his core claim concerns the human potential to participate in the production, making, shaping, and experiencing of culture-information. The emergent networked nature of the information environment, he argues, has unlocked this potential.

The reason for making rather broad claims about the importance of nonmarket production may be due to a perceived need to set up a conflict between incumbents and emerging social practices that challenge existing business models. This makes sense on a few levels. First, like Boyle, Benkler is concerned with generating support for the political movement against enclosure. Second, many of the institutional challenges to the emergence of nonmarket production involve areas of law traditionally subject to intense lobbying efforts by incumbents—copyright and communications being prime examples.[78] Third, incumbents often adopt a defensive posture and perceive emerging technologies and social practices as threats to stamp out from the get-go whether or not the technologies or practices in fact represent a true

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[77] See Nicholas Carr, *Calacanis's Wallet and the Web 2.0 Dream*, Rough Type Blog (July 19, 2006), online at http://www.roughtype.com/archives/2006/07/jason_calacanis.php (visited July 7, 2007) (arguing that "we should be skeptical" of Benkler's claim that social production is going to become increasingly important because "in the past we've seen a pattern of amateur activity springing up in the wake of the invention of a new communication medium, only to be followed by increasing professionalization and commercialization"); Rebecca Tushnet, *TPRC on Peer Production: Opening Comments*, 43 (B)log (Sept 30, 2006), online at http://tushnet.blogspot.com/2006/09/tprc-on-peer-production-opening.html (visited July 7, 2007); Rebecca Tushnet *TPRC: Return of the Commentators, and Q&A*, 43 (B)log (Sept 30, 2006), online at http://tushnet.blogspot.com/2006/09/tprc-return-of-commentators-and-q.html (visited July 7, 2007) (covering comments of Gerald Faulhaber and Eli Noam at the 2006 Telecommunications Policy Research Conference).

[78] See Jessica Litman, *War and Peace: The Thirty-fourth Annual Donald C. Brace Lecture*, 53 J Copyright Socy USA 1, 4 (2005–2006) ("Like real wars, the copyright war has been very expensive. The litigation and lobbying budgets of major copyright-affected industries have gone through the roof"); Jessica Litman, *Copyright Legislation and Technological Change*, 68 Or L Rev 275, 277 (1989) (arguing that "the nature of the legislative process we have relied on for copyright revisions," in which industry members play a direct role in drafting statutory changes, "is largely to blame for these laws' deficiencies"); Jessica Litman *Copyright, Compromise, and Legislative History*, 72 Cornell L Rev 857, 862 (1987) (arguing that copyright law is the product of "a series of interrelated and dependent compromises among industries with differing interests in copyright").

challenge.[79] Fourth, incumbents also adopt an opportunistic posture and perceive emerging technologies and social practices as targets for appropriation and commercial exploitation (YouTube and MySpace being prime examples).[80] Fifth, and perhaps most important, incumbents have considerable power to shape the cultural environment. This power is manifest not only in the creation of law through interest group politics but in culture itself through the norms, expectations, behaviors, and practices that are shaped by individuals' and communities' interactions with the cultural products sold by incumbents. Thus, while Benkler's core claim may be framed somewhat more narrowly in terms of *potential* (rather than a prediction), it is important to recognize that realizing that potential entails conflict, the resolution of which entails social opportunity costs and has a range of normative implications.

In Chapters Three and Four, Benkler explores models of social production to illustrate the potential for widespread participation in culture-information production. He discusses the general model of commons-based production and the more specific example of peer production, and he describes a number of different examples to illustrate the salient characteristics of successful practices. Benkler focuses on the supply-side of the market in the sense that he seeks to describe how suppliers and producers allocate resources (money, effort, time, etc.) to the production of information and other cultural items. This ties into the broader descriptive project in the sense that it helps to explain how we make and construct our cultural-information environment. How do we build it? How do we know what to build? How many resources to devote to different productive activities? And so on.

The market system generates demand information based on price signals, and these signals indicate our relative valuation of certain cultural-information goods. The price system works rather well for some goods but is less effective for others. For some goods, the transaction costs of relying on the price system to organize production make it worthwhile to pool certain resources (such as human and intellectual capital) within hierarchical institutions (firms) that assess demand information and allocate resources based on such assessment more efficiently.[81]

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79 See Fred von Lohmann, *iPods, TiVo and Fair Use as Innovation Policy* (unpublished manuscript Mar 2005) (discussing the Sony example—although the industry initially fought against the infringing uses of the VCR, it eventually recognized the lucrative VCR market).

80 See *Site Owners Contemplate Selling*, FinancialWire (Feb 26, 2007) ("News Corp (NYSE: NWS) paid $580 million to buy MySpace, while Google (NASDAQ: GOOG) purchased video-sharing site YouTube for $1.6 billion.").

81 I should note that assessing demand and allocating resources to production are distinct but related functions. Benkler seems to focus mostly on the allocative efficiency of different systems of production on the basis of how well the systems resolve "uncertainties with regard to

According to Benkler, we are witnessing the emergence of a new mode of organizing production that does not rely on either the price system (markets) or centralized commands within the hierarchy of firms to allocate resources. Free and open source software production relies on decentralized "microlevel" decisionmaking by programmers who do not "follow[] the signals generated by market-based, firm-based, or hybrid models" (p 60). Benkler's application of transaction-cost economics to peer production is based on the considerably detailed analysis in his 2002 article, *Coase's Penguin, or, Linux and the Nature of the Firm.*[82]

Benkler defines *commons-based production* as a system of production where inputs and outputs from production processes "are shared, freely or conditionally, in an institutional form that leaves them equally available for all to use as they choose at their individual discretion" (p 62). Essentially, commons refers to a resource management regime[83] where "no single person has exclusive control over the use and disposition of any particular resource in the commons" (p 61). Benkler discusses different types of commons and concludes that the salient characteristics with regard to organizing production are (1) the absence of exclusive control by any particular entity, and (2) the nondiscriminatory or symmetric nature of any constraints placed on users (pp 61–62).

Benkler then defines *commons-based peer production* as "radically decentralized, collaborative, and nonproprietary; based on sharing resources and outputs among widely distributed, loosely connected individuals who cooperate with each other without relying on either market signals or managerial commands" (p 60). It is a subset of commons-based production because it not only focuses on how resources are managed (as commons) but also focuses on how in fact users make decisions regarding what to do. Benkler defines peer production as "production systems that depend on individual action that is self-selected and decentralized, rather than hierarchically assigned" (p 62). Participants in peer production make decisions individually, as peers in nonhierarchical relationships, and without relying on price signals as cues.

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the difference in valuation of the outcome [of some action] among different agents." Yochai Benkler, *Coase's Penguin, or, Linux and the Nature of the Firm*, 112 Yale L J 369, 409–10, 410 n 81 (2002).

82 112 Yale L J 369 (cited in note 81). See also id at 377 ("Transaction costs associated with property and contracts limit the access of people to each other, to resources, and to projects when production is organized on a market or firm model, but not when it is organized on a peer production model.").

83 See Frischmann, 89 Minn L Rev at 933–38 (cited in note 31).

As a general matter, firms may engage in commons-based production (as many do) but not peer production.[84] Firms often use common resources and manage their resources as commons when doing so generates private returns that can be captured through means other than proprietary exclusion.[85] eBay, for example, manages its servers as publicly accessible commons—that is, by making the servers accessible to the public on nondiscriminatory terms—because doing so increases use of their platform and participation in auctions. For similar reasons, Google also manages many of its resources as publicly accessible commons. Content, relationships, and other outputs generated by users of these resources often are also managed as commons. This may appear to raise a potential complication regarding Benkler's classification of commons-based production as a form of social/nonmarket production. While this may seem like a mere issue of labeling, it is important to sort out because many of Benkler's claims in *The Wealth of Networks* relate to the breadth and importance of social production as an alternative system of production that is distinct from market production.

The key is to recognize that social production and commons-based production overlap but not completely. In the shared space where the categories overlap, we find commons-based peer production (and perhaps other interesting models, such as commons-based government-organized production); in the commons-based production space separate from social production, we find commons-based firm-organized production; and in the social production space separate from commons-based production, we find a variety of social practices, exchanges, and gift economies that organize productive activities without reliance on the price system or firms. The following chart delineates modes of production based on (1) the manner in which inputs and outputs from production are managed—specifically, as commons or otherwise—and (2) the motivational framework that guides producers' decisionmaking processes concerning both the allocation of resources and the demands to which producers respond—specifically, market-based or otherwise.[86]

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[84] Of course, as firms harness peer production and develop hybrid modes of production, this distinction itself becomes blurry. eBay and Amazon.com, for example, have successfully harnessed peer production of ratings and reviews. See Robert D. Hof, *The Power of Us: Mass Collaboration on the Internet Is Shaking Up Business*, BusinessWeek Online (June 20, 2005).

[85] See Joseph Farrell and Philip J. Weiser, *Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age*, 17 Harv J L & Tech 85, 96 (2003) (describing the success of open computer systems and arguing that "the modular structure seem[s] to promote innovation").

[86] Benkler divides modes of production according to different appropriation strategies pursued by producers. His delineation of "ideal-type information production strategies" (p 43)

TABLE 1: MODES OF PRODUCTION

Production	Market	Nonmarket
Commons-based Inputs and outputs managed as commons	• Firm-organized production *(Scholarly Lawyer, Know-How, Learning Networks)*	• Peer production • Government-organized production (for example, infrastructure) • Other models? *(Joe Einstein, Los Alamos, Limited Sharing Networks)*
Proprietary-based Inputs and/or outputs managed as private property (on a discriminatory basis)	• Market-organized production • Firm-organized production • Firm-organized peer production *(hybrid)* *(Romantic Maximizers, Mickey, RCA)*	• Production organized through social exchanges and gift economies • Nonprofit- or government-organized production

Benkler primarily focuses on the emergence of commons-based peer production as a mode of production that may compete with both market-organized and firm-organized proprietary-based production; that is, he focuses on the dynamic relationships along the diagonal arrow in the chart above. As I discuss in more detail below, the dynamic relationships across all four boxes are worthy of sustained attention and analysis. This is so because the dynamic changes in technology, economic organization, and social practices, and consequently to systems of culture and information production—changes that Benkler describes so well—affect the relative effectiveness and comparative roles of these different modes of cultural production. For example, in the software sector, firms actively participate in both modes of market production, competing, and at times cooperating with, participants in commons-based peer production. The dynamic interactions and evolving relationships between various producers is thus quite complex. In his earlier article, Benkler explained that market, firm, and peer production are three "ideal types" and that reality is

overlaps with this chart but not perfectly. I have included Benkler's strategies in the chart in italicized font where they seem to fit best. Although I have placed the various nonexclusion strategies within the commons-based classification, it is not clear that these strategies constitute commons-based production as Benkler has defined it. The reason is that the strategies do not always require inputs and outputs to be managed as commons. For example, a firm relying on the know-how strategy does not really manage its inputs or outputs as commons but simply does not rely on patent or copyrights to appropriate the value from research investments. Trade secrecy remains an integral part of this strategy.

filled with hybrids.[87] For now, I leave these dynamic considerations aside because, as I've noted, Benkler's focus is on the emergence of a commons-based peer production model.

The basic idea motivating this Chapter is that the networked information environment enables increased production of information within social groups that lack hierarchical forms of organization. Benkler acknowledges that this is not completely new; science relies in part on a commons-based peer production model (p 63).[88] It is the potential for this particular model as a more general alternative system for producing information, knowledge, and culture generally that motivates his analysis. Again, he makes a rather strong claim: "What we see in the networked information economy is a dramatic increase in the importance and the centrality of information produced in this way" (p 63). Is the dramatic increase in importance related to economic importance? Is the dramatic increase in centrality related to being in the core of the economy? It is difficult to say what metric of importance and centrality Benkler means to employ, although economics seems to be the framework he is operating within at this point in the book. This leaves the reader anxious for empirical evidence of (dramatic) economic impact. The case studies that follow, while very useful for demonstrating the potential for commons-based peer production, fall short of proving the claim above. The case studies arguably demonstrate (1) *viability* both as a mode of production and as a potential competitive threat to other modes of production, (2) *growth* in participation and the range of information and cultural goods subject to peer production, and (3) considerable *variability* in terms of the contextual details enabling peer production. But the case studies do not

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87 See Benkler, 112 Yale L J at 410–12 (cited in note 81) (discussing hybrids generally and Xerox's Eureka system as an example).

88 The university research context is an interesting and important case study in evolving, interdependent modes of production. While commons-based peer production has and continues to play an important role, proprietary-based modes of production do as well, as the steady increase in university patenting demonstrates. See generally Rebecca Henderson, et al, *Universities as a Source of Commercial Technology: A Detailed Analysis of University Patenting, 1965–1988*, 80 Rev Econ & Stat 119 (1998). Moreover, it is not entirely clear that university R&D is driven by nonmarket motivations alone. See generally Brett M. Frischmann, *Commercializing University Research Systems in Economic Perspective: A View from the Demand Side*, in Gary D. Libecap, ed, *University Entrepreneurship and Technology Transfer: Process, Design, and Intellectual Property* 155 (Elsevier 2005). For more on the complex, evolving relationships between universities, industry, and government in the research context, see, for example, David C. Mowery, et al, *Ivory Tower and Industrial Revolution: University-Industry Technology Transfer before and after the Bayh-Dole Act* 1 (Stanford 2004) (addressing "the role of patenting and licensing of academic inventions in supporting 'technology transfer' between universities and industry"); Derek Bok, *Universities in the Marketplace* 3–4 (Princeton 2003) (describing "the growth of commercial activity in institutions dedicated to higher learning"). See generally Lewis M. Branscomb, Fumio Kodama, and Richard Floria, *Industrializing Knowledge* (MIT 1999).

measure economic impact or growth, or otherwise gauge a dramatic increase in importance and centrality according to another metric.

To support his claim, Benkler first turns to free/open software (pp 63–68), and then broadens his discussion to the peer production of information, knowledge, and culture generally (pp 68–90). His description of free and open source software is short and not especially illuminating, but it does provide useful background information. It is the discussion that follows that illuminates. Benkler describes "a number of [peer production] enterprises, organized to demonstrate the feasibility of [peer production] throughout the information production and exchange chain" (p 68).

All of Benkler's examples provide a bit more nuance and richness in detail to our understanding of "what peer production looks like" (p 89). The value in this descriptive map is that it provides a better understanding of how and why people participate in information production in contexts that differ from the standard contexts that frame models of economic behavior or romantic authorship/inventorship; he begins to map an un(der)explored "area" of the cultural environment. The descriptive analysis of these case studies reveals the varying importance of institutional details (for example, the GNU General Public License), organization details (for example, modularization of distributed tasks), facilitative tools (for example, the Wiki authorship tool), and user-involvement in different stages of the process (that is, creation, relevance/accreditation, and distribution) (pp 68–90).[89] The varying importance of these different features is contextual, and suggests that a single model of successful peer production is neither necessary nor desirable. The pooling of resources to produce and share information-culture is common to our everyday lives and social experiences. Often, our pooling and sharing is mediated by informal norms and customs and is not really a form of *organized* production.

Critically, Benkler's analysis reveals that peer production is emerging as a form of organized production where particular sets of enabling features that vary in importance by context provide some coherence to the pattern of decentralized, unmanaged (or loosely managed) yet collaborative information-culture production. In the Appendix, I have included a chart that lists examples (from this and other chapters) and summarizes some of the key descriptive characteristics. Like a map, this chart helps us to "see" relationships in con-

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89 Benkler distills the "act of communication" into these "three distinct functions," observes that "[i]n the mass-media world, these functions were often, though by no means always, integrated," and concludes that "[w]hat the Internet is permitting is much greater disaggregation of these functions" (pp 68–69). He then organizes his examples around these three functions.

text. The reader should not mistake this chart as a substitute for Benkler's careful, detailed descriptions and functional analysis of the case studies. I mean only to organize and condense the information to illustrate how Benkler's mapping assists in our understanding the cultural environment.

Having described the features of peer production that make it feasible as a form of organized information production, Benkler turns in Chapter Four to the economics of social production and "three puzzles" raised by the "increasing salience of nonmarket production in general, and peer production in particular" (p 91). He asks:

> First, why do people participate? What is their motivation when they work for or contribute resources to a project for which they are not paid or directly rewarded? Second, why now, why here? What, if anything, is special about the digitally networked environment that would lead us to believe that peer production is here to stay as an important economic phenomenon, as opposed to a fad that will pass as the medium matures and patterns of behavior settle toward those more familiar to us from the economy of steel, coal, and temp agencies. Third, is it efficient to have all these people sharing their computers and donating their time and creative effort (p 91)?

In short, the answers are (1) people participate for different reasons, including a variety of "social-psychological rewards" (p 96) (see the "Motivation to Participate" column of the chart in the Appendix); (2)(i) "[t]he core technologically contingent fact that enables social relations to become a salient modality of production ... is that all the inputs necessary to effective productive activity are under the control of individual users" (p 99), and (ii) organizational forms have evolved to enable integration of distributed individuals' contributions (see the "Organization Details" column of the chart in the Appendix); (3) yes, at least in some cases/contexts.

Sharing is ubiquitous in society, and Benkler notes that we generally do not consider sharing to be an economic phenomenon (p 119); social and market systems of exchange generally have not competed directly with one another, at least not in the industrial economy (pp 119–20). As Benkler notes, what may be changing is that social production may be sustainable and, in some sectors at least, competitive with market production.

> Because of changes in the technology of the industrial base of the most advanced economies, social sharing and exchange is becoming a common modality of production at their very core—in the information, culture, education, computation, and communications sectors. Free software, distributed computing, ad hoc mesh

> wireless networks, and other forms of peer production offer clear examples of large-scale, measurably effective sharing practices. The highly distributed capital structure of contemporary communications and computation systems is largely responsible for this increased salience of social sharing as a modality of economic production in that environment. By lowering the capital costs required for effective individual action, these technologies have allowed various provisioning problems to be structured in forms amenable to decentralized production based on social relations, rather than through markets or hierarchies (p 121).

Again, this seems to be a strong descriptive claim about the state of the world. Critics may challenge Benkler on the ground that it is not clear what empirical data supports the claim. Some would certainly dispute whether social production is at the "very core" of the sectors he lists. It depends on one's evaluation of the examples listed—free software, distributed computing, and ad hoc mesh wireless networks. Free/open software is competing at the core of the software sector; distributed computing might be at the very core of the computation sector; ad hoc mesh wireless networking is probably not at the very core of the communications sector, although it might be in the near future. Generally, Benkler's descriptive observations about the sustainability of peer production and its relative salience in certain sectors of the economy ring true. As I have noted previously, however, the next step is to explore competitive (and cooperative) dynamics across modes of production. How might the complex productive system, of which peer production is a part along with firm-organized commons-based production and proprietary-based market production, respond and evolve as the sustainability and salience of peer production increases? This question likely yields very different answers in different sectors, as the descriptive map Benkler has drawn suggests. Of course, the dynamics depend very much on laws and institutions that structure the environment within which these modes of production compete (and cooperate).

D. Normative Values

The normative thrust of the book is that the emerging nonmarket production systems should be allowed, if not encouraged, to emerge within the core of the information economy rather than consigned to the periphery. The dynamic changes to the technological and economic conditions of the information environment enable nonmarket production to coexist and in some instances rival market production. Not surprisingly, dominant market players may resist the emergence of nonmarket production systems for a variety of reasons. Incumbents

may see emergent systems as direct substitutes or as disruptive technologies that will enable new entrants to challenge the incumbents' market positions. In addition, incumbents may see emergent systems as "free riders" that unfairly benefit from existing proprietary systems. Finally, incumbents may seek to control the development and emergence of these systems so as to ensure a "cut" of the eventual benefits. The critical prescriptive point, made most clearly and forcefully in Part III, is that society should avoid optimizing legal, technological, economic, and other socially constructed conditions—the institutional ecology—for the industrial or proprietary modes of production.

To move successfully from description to prescription, Benkler must make the case that the emerging nonmarket systems are normatively attractive—that preserving some breathing room for and even encouraging their continued emergence, growth, and evolution is worthwhile. Benkler devotes a substantial amount of effort to an exploration of normative theories that value individual participation in intellectual, cultural, and political processes that constitute our lives and construct our environment. His views are strongly rooted in liberal political theory and Chapters Five through Ten involve a sophisticated analysis of different liberal commitments. My brief treatment of the rich arguments in these chapters is only to highlight the range of normative commitments that Benkler weaves together. The resulting tapestry is a more thorough and systematic account of the liberal normative stakes in our persistent battles over institutional ecologies that bear on the social construction of the cultural environment.

The introduction to Part Two captures the basic essence of his normative vision. He begins with a paragraph that describes the relationship between freedom and the information environment (p 129–30). Basically, freedom to act as human beings depends upon our environment and how we perceive, experience, and interrelate with it and those within it.[90] This contextualized vision of liberal freedom precisely reflects the essential vision motivating cultural environmentalism.

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[90] As Benkler puts it:

> How a society produces its information environment goes to the very core of freedom. Who gets to say what, to whom? What is the state of the world? What counts as credible information? How will different forms of action affect the way the world can become? These questions go to the foundations of effective human action. . . . Freedom depends on the information environment that those individuals and societies occupy. Information underlies the very possibility of individual self-direction. Information and communication constitute the practices that enable a community to form a common range of understandings of what is at stake and what paths are open for the taking. They are constitutive components of both formal and informal mechanisms for deciding on collective action. Societies that embed the emerging networked information economy in an institutional ecology that accommodates

Benkler then stakes out his mixed descriptive-normative claims regarding the relationships between a series of liberal commitments reflecting different aspects of freedom and the emergence of the networked information economy. The normative values Benkler discusses include: autonomy (Chapter Five), democratic participation in both the political sphere (Chapter Seven) and the construction of culture (Chapter Eight), justice and human development (Chapter Nine), and community (Chapter Ten). The relationships among some of these values in the context of the networked information environment are worthy of special consideration.

1. Autonomy and participation: satisfying individuals' demands.

Autonomy and participation in both the political sphere and the construction of culture are related in the sense that both turn on choice—the range and diversity of known, available alternatives to satisfy one's preferences and the degree to which individual freedom to choose is constrained. A first order constraint on choice is the environment within which we exist.[91] Moreover, as Benkler notes, "[t]he structure of our information environment is constitutive of our autonomy, not only functionally significant to it" (p 146). In the networked information environment, individuals have more freedom to satisfy their desires: to do more for and by themselves, to choose among different types of producers and different information goods, and to choose to participate in a wide range of political, cultural, and communicative activities.

Benkler claims that the networked information economy increases individual autonomy in three ways:

> First, it increases the range and diversity of things that individuals can do for and by themselves.... Second, the networked information economy provides nonproprietary alternative sources of communications capacity and information, alongside the proprietary platforms of mediated communications.... Third, the networked information environment qualitatively increases the range and diversity of information available to individuals (pp 133–34).

He provides examples to illustrate each claim; on all three points, he appears to be on relatively strong ground. Without doubt, the Internet

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nonmarket production, both individual and cooperative, will improve the freedom of their constituents along all these dimensions (pp 129–30).

91 Consider Julie E. Cohen, *Examined Lives: Informational Privacy and the Subject as Object*, 52 Stan L Rev 1373, 1424 (2000) ("[T]o the extent that information shapes behavior, autonomy is radically contingent upon environment and circumstance.").

has enabled greater freedom along each of these dimensions. How much freedom along these dimensions? At what cost to other values? These difficult questions are not addressed fully by Benkler. Indeed, what seems to be missing is a systematic understanding of how the various normative values that we care about relate to each other, when they are complementary and when they compete, and how to recognize and gauge tradeoffs between normative commitments.

Underlying much of Benkler's analysis of the increased potential for democratic participation in the political sphere and the construction of culture is a descriptive claim about human beings that I would like to believe is true:[92] people want to be engaged; they want to be active; they want to be productive. They just need feasible opportunities, an enabling environment.[93]

To understand the participatory potential unlocked by the emergence of the networked information environment, one must appreciate the environment that preceded it. Benkler offers a detailed description of the industrial, mass media model with its high degree of concentration and focus on nurturing a consumer culture where media content is produced and delivered to passive consumers (Chapter 6). There are many critiques of the mass media model; his discussion of how the mass media responds to and shapes consumer preferences and shapes the opportunities to actively participate is rich and compelling. A particularly troubling characteristic of this model is the tendency for incumbent mass media firms to shape the cultural environment in ways that not only constrain the range of media available for consumption but also constrain and, over time, shape preferences to be active participants in the political public sphere and the construction of culture.[94]

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92 My skepticism is that while some people may want to actively participate, many do not. Not everyone needs to participate, however, for Benkler's primary arguments to retain their strength.

93 Whether one agrees with this descriptive claim, one might also consider the normative variant(s): people should (want to) be engaged; they should (want to) be active; they should (want to) be productive. We just need an enabling environment that shapes behavior (preferences). Benkler does not explicitly advance a normative agenda along these lines and instead paints a picture of a society poised to be engaged/active/productive, with the necessary latent preferences, and simply awaiting the enabling environment to unlock participatory potential. This raises a serious question about whether Benkler is too eager to leap from "is" to "ought" (or simply to conflate the two) and to assure the reader that a free and open Internet will deliver an ideal culture. I thank Frank Pasquale for emphasizing this critique.

94 Of course, the constraints prevalent with the industrial information economy were not solely the product of mass media firms; perhaps the most important constraint on individuals' capacity to actively participate in cultural production was economic and technological—the lack of cheap, networked communications capacity. It is primarily the emergence of such capacity that unlocks the potential to participate. Peer production is enabled by cheap and distributed communications and people. It is worth emphasizing that we do not need widespread participation in

One response to this and other related critiques of the mass media model is that people get what they want; the mass media simply supplies what people demand. In essence, this view challenges Benkler's basic premise and argues that people want to be passive consumers. There is some merit to the arguments that consumer preferences matter and consumers bear some responsibility for the state of the cultural environment—it reflects our values after all.[95] Still, Benkler's extensive discussion of the impact of commercialism and concentration on the mass-media markets adequately refutes the optimistic "it is simply supply meeting demand" notion of efficiency. As Benkler suggests and the emergence of sites like YouTube demonstrate, individual preferences vary considerably in terms of both the content that people would like to consume and activities in which they would like to engage (pp 204–72).

With respect to activities we'd like to engage in, we "pay to play"—whether we pay in money or time—and this is one reliable indication of what we want.[96] If Benkler is right in believing that people want to be active participants—and I think and hope he is—then increased participation will manifest demand for opportunities to participate. In other words, the rise of commons-based peer production provides important demand information to market participants, especially about platforms, facilitative tools, organizational capital, and other inputs that enable participation. While Benkler and others have focused on the competitive threat that peer production may pose for market actors, especially incumbents, it is also important to recognize that demand manifestation draws competition into some of the niches occupied by new peer production ventures. In fact, the manifestation of individual preferences in many of the spheres of social production has attracted commercial firms to exploit the potential market opportunities. Consider, for example, Google's recent acquisition of YouTube or the evolution of MySpace or Second Life. Of course, this can be a desirable outcome because it may spur competition and innovation in areas that further expand individual freedom to satisfy one's

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a particular project or activity itself—instead, if many people have many possible activities from which to choose, they can find something and collaborate through loose ties; this may lead to a wide variety of different activities, some with only moderate participation in small scale but nonetheless socially valuable projects.

95 See generally Breen, *Modesty and Moralism* (cited in note 41).

96 We manifest our demand for content and activities in many different ways. We often say what we want, yet, at times, our actions speak louder than our words. One act that manifests demand in a rather precise fashion is the act of purchasing something; our willingness to pay for something is a reliable indicator of at least our minimum valuation of the private benefits we expect to enjoy (taking into account the availability of substitutes and our disposable resources). Willingness to pay as a metric for demand does not reflect all that we want, however. There are public or environmental goods, for example, that are routinely undervalued within market settings.

desires. Or it may simply provide an opportunity for powerful firms to reassert control over those ventures that threaten "real" change to the cultural environment. It is possible that we will end up with an ongoing and perhaps accelerated process of "creative destruction," where innovators challenge incumbents.[97] Plainly, these dynamic issues require further exploration.

The one critical omission from Benkler's discussion is privacy and its relationship to autonomy in the networked information economy.[98] I began this section by noting that autonomy and participation both turn on the range and diversity of available alternatives to satisfy one's preferences and the degree to which individual freedom to choose is constrained. An important constraint on choice that constitutes a critical component of the cultural environment within which we exist is the degree to which our choices are private.[99] We may (and often do) have a wide range and diversity of available alternatives, but this does not necessarily make us free to choose among them. At least for some, exercising the freedom to choose may depend upon whether decisions are monitored. For others, it may not. Regardless of individual demand for privacy, the pervasive collection, aggregation, and trading of information about individuals' behavior online complicates the descriptive and normative analysis of the networked information

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97 See Joseph A. Schumpeter, *Capitalism, Socialism and Democracy* 81–87 (Allen and Unwin 5th ed 1976) (arguing that the most important economic changes come from the "new consumers' goods [and] the new methods of production" that "strike not at the margins of the profits and the outputs of the existing firms but at their very foundation"). See also Tim Wu, *Network Neutrality, Broadband Discrimination*, 2 J Telecomm & High Tech L 141, 142–46 (2003) (suggesting that a neutral Internet will support "meritocratic" competition among all applications (new and old), fostering "a Darwinian competition among every conceivable use of the Internet so that only the best survive").

98 I thank Julie Cohen for bringing this omission to my attention and getting me to think about it more carefully. Benkler's omission of privacy deserves more attention than I give it in this review. As Julie and others have explored, the networked information environment gives rise to many privacy concerns, but to make matters more difficult (at least, for Benkler), peer production itself destabilizes privacy in at least two ways. As a colleague remarked:

> First, the process of peer production affords little privacy. When you work as part of a group you expose your work at every stage of the process, you cannot wait to expose the final perfect product. Second, many Internet peer production sites survive by selling advertising space, advertisers use privacy threatening commercial profiling techniques. So there is this tension between privacy and peer production, which is something that proponents of peer production do not like to admit.

Email from Gaia Bernstein to Brett M. Frischmann (Dec 26, 2006).

99 "Privacy" involves considerable nuance in defining but might usefully be thought of in terms of whether behavior is monitored (or capable of being monitored). There is a rich literature on Internet privacy. For a recent effort to develop a typology of privacy interests, see Daniel J. Solove, *A Taxonomy of Privacy*, 154 U Pa L Rev 477, 485, 488 (2006) (developing a taxonomy designed "to assist the legal system in grappling with the concept of privacy," and consisting of "(1) information collection, (2) information processing, (3) information dissemination, and (4) invasion").

environment and the potential autonomy-liberating characteristics Benkler celebrates. As Julie Cohen has argued, the degree of privacy in the networked information environment dynamically affects how we learn to make autonomous choices and consequently whether and how we choose to participate.[100] To some degree, we *learn* what to want, how to act, and thus how and what to choose, and our learning is in part a function of how we perceive the privacy our choices will enjoy. This dynamic relationship between privacy and autonomy and thus participation in the political sphere and the construction of culture requires further exploration because it reflects a critical connection between our descriptive account of behavior within the cultural environment and the set of normative values under consideration.[101]

2. Participation, culture, and community: freedom to (collectively) build the cultural environment.

A second theme reflected in Benkler's normative discussion concerns the collective building and structuring of the cultural environment. In contrast to the natural environment, the cultural environment is socially constructed, and Benkler argues that broader and deeper participation in its construction is normatively attractive from the perspective of liberal political theory.[102]

The networked information environment offers a wide range of opportunities for individuals to participate productively in political, intellectual, and cultural activities. As discussed, Benkler describes many examples of peer production through the use of various Internet-enabled communications technologies, including simple email or blog software. These general purpose, content neutral, and easy-to-use technologies facilitate participation in various discussions in various communities.

The increased range of meaningful opportunities—the increased choice—is itself normatively attractive from the perspective of liberal autonomy. But putting aside individual autonomy, society also may benefit from actual participation in these activities and the products

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100 Cohen, 52 Stan L Rev at 1424–26 (cited in note 91) (arguing that "[a]utonomy in a contingent world requires a zone of relative insulation from outside scrutiny and interference—a field of operation within which to engage in the conscious construction of self").

101 For a particularly insightful discussion, see id (describing the ways in which "conditions of no-privacy . . . constrain, ex ante, the acceptable spectrum of belief and behavior").

102 While this relates to ideas discussed in the previous section, I want to take a step away from the (demand side) notion of satisfying individual preferences and instead take a step towards the (supply side) notion of collaborative construction of the cultural environment through social and cultural networks.

and/or changes to the environment that such participation yields.[103] In this section, I briefly explain how—and in doing so, aim to show how the normative commitments Benkler discusses may be woven together.

Benkler's basic claim is that greater participation may improve social communication processes, politics, and cultural production. Benkler discusses improvement in these areas by way of comparison with the state of affairs before the emergence of the networked information environment. Thus, building from his descriptive account of different modes of production, Benkler examines the dynamic competition and comparative advantages of commons-based peer production with (proprietary) market production. In Chapter Six, Benkler provides a detailed critique of the commercial mass media, and, in Chapter Seven, he provides a detailed examination of the "emergence of the networked public sphere" and its normative advantages in terms of democratic participation and a more robust and effective public discourse. Benkler supports his normative analysis with detailed examples. In particular, his discussion of the Diebold voting machines controversy is illuminating (pp 225–33). Benkler focuses not on the substance of the controversy but rather on the role of social production in improving public discourse and political action. He successfully demonstrates how "large numbers of people ... participat[ing] in [the] peer-production enterprise of news gathering, analysis, and distribution" were successful in "turn[ing] something that was not a matter of serious public discussion to a public discussion that led to public action" (pp 225–26). In Chapter Eight, Benkler discusses how the emergence of the networked information environment affects cultural production. Again, through the use of many examples, he articulates the normative advantages in terms of democratic participation in cultural production.

Several common themes emerge from this discussion. First, the networked information environment provides opportunities to participate because many different technologies and social practices lower the costs associated with being a speaker or cultural content producer on whatever topic (one chooses) to whatever audience (one

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103 I have analyzed this question in terms of the social benefits from widespread participation in spillover-generating activities. Like Benkler, I believe society benefits substantially from a spillover-rich cultural environment. See Frischmann and Lemley, 107 Colum L Rev at 289 (cited in note 60) (noting that although "measuring these spillover benefits is probably an impossible task ... [, a]s a society, on the whole, we recognize the value of active, widespread participation"); Frischmann, 89 Minn L Rev at 919 (cited in note 31) (arguing that the outputs of infrastructure resources "are often public and nonmarket goods that generate positive externalities that benefit society").

chooses, or in some case, that one happens to reach).[104] The Internet facilitates many different forms of and forums for communication that are open in terms of content and users. Email, chat rooms, blogs, and webpages are a few examples of open communications technologies that have greatly enhanced the communication capacities of individuals and groups (on a one-to-one, one-to-many, and many-to-many basis). Digital cameras, video recorders, and editing utilities (as well as Wikipedia and Second Life) are a few examples of technologies (and platforms) that significantly increase the capacities of individuals to produce digital content that can be shared and collaboratively (re)produced online.[105] Not surprisingly, a significant reduction in costs leads to a significant increase in the quantity of speakers, listeners, content producers, and thus speech and content.[106] While the quality of speech and content varies considerably, and it is reasonable to question whether some barriers to entry in communications may be socially desirable, on the whole, the societal benefits of this incredible expansion in communication capacities seem to substantially outweigh the harms.[107]

Moreover, as many have observed and discussed, these technologies as well as their complementary cousins—social software—facilitate more than communications between speakers and listeners or the sharing of content; users develop meaningful associations with others that may coalesce in groups, communities, and social networks. Users actively participate in meaningful social activities that frankly may be oversimplified when discussed solely in terms of either "speech" or "cultural production." At least in some contexts, the formation of so-

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104 Benkler examines a number of issues related to reaching an audience, including accreditation and filtering. As noted in the previous Part, he discusses various ways in which accreditation and filtering functions are being peer produced in an effective manner (pp 275–80).

105 Of course, cultural production involves the (re)use of existing cultural goods, and the increased capacity to produce and share content also has raised intellectual property concerns. For an interesting discussion, see, for example, Viktor Mayer-Schoenberger and John Crowley, *Napster's Second Life? The Regulatory Challenges of Virtual Worlds*, 100 Nw U L Rev 1775, 1825 (2006) (arguing that traditional intellectual property enforcement in virtual worlds is impossible, so governments should "encourage virtual worlds to develop forms of self-governance based on participatory lawmaking").

106 This leads some to suggest that information overload may lead to congestion (of networks, inboxes, time, etc.), and these concerns lead Benkler to emphasize a range of emerging solutions, various forms of filters, and accrediting technologies and practices (pp 169–74).

107 But see Ann Bartow, Book Review, *Some Peer-to-Peer, Democratically, and Voluntarily-Produced Thoughts*, 5 J Telecomm & High Tech L 449, 453–65 (2007) (discussing a number of harms that need more attention), reviewing Yochai Benkler, *The Wealth of Networks: How Social Production Transforms Markets and Freedom* (Yale 2006).

cial networks around speech-cultural exchange and intellectual pooling may be the more interesting and important phenomenon.[108]

Second, there is a qualitative change underway that may eclipse the quantitative change in participation. The qualitative change relates to the liberation reflected in an expansion in the choices we experience, our increased autonomy, but it is liberation in a somewhat different sense.[109] As Benkler explains:

> The qualitative change is represented in the experience of being a potential speaker, as opposed to simply a listener and voter. It relates to the self-perception of individuals in society and the culture of participation they can adopt. The easy possibility of communicating effectively into the public sphere allows individuals to reorient themselves from passive readers and listeners to potential speakers and participants in a conversation. The way we listen to what we hear changes because of this; as does, perhaps most fundamentally, the way we observe and process daily events in our lives. We no longer need to take these as merely private observations, but as potential subjects for public communication (p 213).

He goes on to explain how these changes are due to the emergence of the networked public sphere and together with the quantitative changes may portend a normatively attractive democratization of the public sphere.[110] The same changes also figure prominently in his discussion of freedom to participate in cultural production.

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[108] Benkler discusses social ties in Chapter Ten. On pooling, see Part III.B. On the idea of a distinct social-relational layer of the Internet with a focus on communications among those connected, see Susan Crawford, *Reframing Communications Law* (unpublished manuscript 2007).

[109] In his very thoughtful comments, Frank Pasquale claimed I might be too sanguine in celebrating perceived liberation. He explains:

> What some feel as liberation, others may feel as enslavement, as enforced competition. Yes, now we can all have a MySpace page, but imagine a time when we all NEED to have a MySpace page (or blog, or whatever). In South Korea, people feel pressed to decorate their online 'room' in CyWorld, and pay real money to do so. The point is just that any of these phenomena can degenerate from being liberat[ing] and expressive to being enslaving and competitive.

Email from Frank Pasquale to Brett M. Frischmann (Dec 20, 2006). See also Frank Pasquale, *Technology, Competition, and Values*, Minn J L Sci & Tech (forthcoming 2007). I understand the argument and believe there are some risks of degeneration and getting caught up in an escalating set of cultural demands; this comment ties nicely into the questions I raised at the end of the section on autonomy. Nonetheless, I remain optimistic about a potential shift toward a more participatory culture and suspect that cultural checks might protect against the sort of degeneration highlighted by Frank.

[110] Chapters Six and Seven offer a very detailed discussion of how the Internet democratizes the public sphere.

The key to this qualitative change is that *people* may change for the better with their experiences in the networked information environment. They may become more aware, conscious of their (potential) roles as listeners, voters, and speakers, but also as consumers and producers, as political, cultural, and social beings, as members of communities.[111] They may learn to be productive—or learn to want to be productive, if such desire is not simply latent. This very awareness that one can play different roles and that the environment is not fixed or fully determined by others is encouraging. It encourages participation and the development of facilitative social practices, and perhaps over time, the adoption of a participatory culture. From a normative perspective, or at least, from one rooted in liberal political theory, such qualitative changes in people are welcome improvements—both from an individualist perspective and from a collective perspective.

To take one example that Benkler discusses, consider Barbie (pp 285–89). The cultural significance of Barbie has changed over time and has depended upon who says (authoritatively) what Barbie "means." Before the emergence of the networked information environment, Mattel (more or less) had effective control over the mass communication of messages regarding Barbie, largely through commercial advertising and distribution. Mattel had no control over what people said privately or even in most small group settings, but any such communications had little significance in shaping the cultural meaning.[112] With the emergence of the networked information environment, Mattel has lost some degree of control and individuals have gained some capacity to shape the cultural meaning of Barbie, a meaning that certainly appears to be contested if one simply searches Google for Barbie (p 286).[113] The changes were both quantitative and qualitative.

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111 The increased awareness is due in part to increased transparency in cultural production. Given the difficulties in evaluating culture, cultural production, or cultural progress, Benkler emphasizes transparency as a value worth pursuing (p 293). See also Cohen, 70 L & Contemp Probs at 91 (cited in note 28) ("[C]ultural *harm* is in the eye of the beholder."). On the various roles of participants in Internet speech and also on the emergence of a democratic culture, see Jack Balkin, *Digital Speech and Democratic Culture: A Theory of Freedom of Expression for the Information Society*, 79 NYU L Rev 1, 34 (2004) (noting that in the context of "Internet speech . . . [t]he roles of reader and writer, producer and consumer of information are blurred and often effectively merge").

112 On "widespread practices of secondary creativity" and fan fiction, see Rebecca Tushnet, *Legal Fictions: Copyright, Fan Fiction, and a New Common Law*, 17 Loyola LA Enter L J 651, 654 (1997) (arguing that "secondary creativity expressed in fan fiction . . . should fall under the fair use exception to copyright restrictions"). See also Rebecca Tushnet, 114 Yale L J at 538 (cited in note 49) (arguing that "[t]he current version of copyright, in which . . . ordinary unauthorized copying is prohibited, is incompatible with the First Amendment").

113 Benkler chooses examples that support his normative outlook. Reducing Mattel's control over the meaning of Barbie and increasing the public's voice seems appealing, but are there counterexamples? Is a loss of control always good? Putting aside whether loss of control is good

There are many more culturally significant meanings;[114] more people have the capacity to participate in public conversations about Barbie, and more people exercise that capacity. Perhaps more importantly, people *learn* that Barbie's meaning is contestable, that the meaning advertised and sold is but one of many possibilities and that meaningful participation in the contest (of meaning-making) is possible.[115]

I would extend Benkler's point slightly to emphasize that active participation in political, intellectual, and cultural conversations/activities develops human and social capital. That is, besides making us aware of our potential roles—of our options—participation itself may develop skills, educate us, and improve our effectiveness as participants. To the extent that this is true, it may constitute an important feedback effect into the development of a democratic participatory culture.

The quantitative and qualitative changes in both how and the degree to which people participate in cultural production of political, cultural, and social goods are not inevitable and depend significantly on context, on the environment within which we exist. As noted above and as Benkler explains, these quantitative and qualitative changes are tied to changes in technology, economic organization, and social practice that make increased participation possible. And yet realizing actual and sustainable participation still hinges on an additional factor, namely the institutional ecology—the laws and other institutions that regulate behavior within the environment.[116]

3. Normative tradeoffs.

Benkler devotes a substantial portion of his book to articulating the normative arguments that support preserving some space[117] for

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or bad, should we necessarily have faith in openness and the public's ability to sift through the noise? These questions lead to further complications related to searching, filtering, accreditation, and other processes related to making, experiencing, and changing culture.

114 The meanings may be contested but still shared among groups (or subcultures).

115 For an interesting discussion of critical re-appropriation of Barbie images, see Rebecca Tushnet, *My Fair Ladies: Sex, Gender, and Fair Use in Copyright*, 15 Am U J Gender, Soc Policy, & L 273, 278–81 (2007). Tushnet notes that critical re-appropriation of Barbie images may be transformative fair use, but that "is not the same as liberating." Id at 281.

116 Technology, economic organization, and social practice depend upon each other as well as the institutional ecology; these are dynamic interdependent systems. Participatory behavior within the cultural environment depends on all four systems. See Lessig, *Code and Other Laws of Cyberspace* at 86–90 (cited in note 27) (describing these systems as various layers or sources of constraints that can be placed on an actor). See also Lawrence Lessig, *Code: Version 2.0* (Basic Books 2006).

117 It may be that "territory" better describes the concept I invoke here. Territory may be understood as the areas between places, the unowned areas available for use and perhaps even appropriation, what Jonathan Yovel refers to as the "non-place." See Jonathan Yovel, *Imagining Territories: Space, Place, and the Anticity* 2 (University of Haifa Faculty of Law Legal Studies

nonmarket production within the networked information environment (cultural environment). Benkler claims that the emerging practices of individuals and groups "offer defined improvement in autonomy, democratic discourse, cultural creation, and justice" (p 379). The range of normative commitments discussed by Benkler provides *some* support for preserving *some* space for nonmarket production in the construction of the cultural environment.[118] But how much support? How much space? Are there any costs involved in pursuing these commitments? If so, how does one evaluate tradeoffs between various normative commitments?

We cannot fully answer these questions because the normative values involved are incommensurable and thus cannot be effectively weighed and compared.[119] Yet making choices regarding how we collectively decide to construct the cultural environment is unavoidable. The cultural environment is necessarily a collective production system and a collective product in the sense that culture reflects a society's answer to fundamental questions about what it values and in the sense that culture reflects a society's common reference frame regarding meaning and meaning-making processes. We should be asking and saying—as individuals, in groups, and as a society—what sort of culture we want, and, given the difficulties in answering that question, we

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Research Paper Series, Nov 2006), online at http://ssrn.com/abstract=950895 (visited July 7, 2007) (describing territory as "the void between [the] places ... [n]ot a place, but the absence of place"). See also generally Michael Madison, *Legal-Ware: Contract and Copyright in the Digital Age*, 67 Fordham L Rev 1025 (1998) (using "open space" to describe this phenomenon).

118 It would be worth incorporating normative perspectives other than those derived from liberal political theory. In particular, the cultural environment lens supports an effort to integrate normative principles, such as the precautionary principle, intergenerational equity, and sustainable development. These commitments have gained traction in the environmental area and may prove helpful in framing issues in the networked information environment. See Frischmann, 89 Minn L Rev at 980–81 (cited in note 31) (arguing that "the truly important borrowing" from the environmental movement "is not from descriptive metaphors, but from normative principles").

119 See Margaret Jane Radin, *Contested Commodities* 9 (Harvard 1996) (arguing that although "there aren't any knock-down logical arguments that compel people to recognize incommensurability ... many of us do have implicit unrecognized commitments to incommensurability"); Cass R. Sunstein, *Incommensurability and Kinds of Valuation: Some Applications in Law*, 92 Mich L Rev 779, 796 (1994) ("Incommensurability occurs when the relevant goods cannot be aligned along a single metric without doing violence to our considered judgments about how these goods are best characterized."); Margaret Jane Radin, *Market-Inalienability*, 100 Harv L Rev 1849, 1851 (1987) (arguing that we should evaluate inalienabilities in connection with our best current understanding of the concept of human flourishing"). But see Kenneth Arrow, *Invaluable Goods*, 35 J Econ Lit 757, 757–65 (1997) (critiquing Radin's analysis of incommensurability). See also Jason Scott Johnston, *Million-Dollar Mountains: Prices, Sanctions, and the Legal Regulation of Collective Social and Environmental Goods*, 146 U Pa L Rev 1327, 1327 (1998) ("It is not that our diverse values are incommensurable. It is, instead, that we do not think that money is the appropriate medium in which to express these values."), 1328 ("[D]eveloping a functional, economic account of how money-price allocation of certain kinds of relationships is likely to result in the eventual destruction of the value inherent in those relationships.").

should at least be asking ourselves about how the cultural environment is constructed, what systems of production are supported, who gets to participate, in what ways and to what degree, and so on. The "normative and didactic enterprise"[120] of continuously living within and shaping the cultural environment is unavoidable.[121] Given this fact, we ought to be conscious of our roles and seek to understand the enterprise we are engaged in as best we can. Benkler helps in this regard.

Benkler begins to develop a more systematic understanding of how these normative values relate to each other, and how these values relate to individual and collective decisions we make regarding our structuring of and continuous relationships with the cultural environment. This is an important step forward for a few reasons. First, as I have just noted, his analysis is systematic and nuanced. He integrates a number of complementary normative theories in a manner that provides a framework for understanding how the underlying values might relate to each other and be promoted. I have explored two dimensions along which these commitments relate, and may be complementary, to each other. Further exploration of when these values are complementary or conflicting would be helpful. Second, he integrates descriptive and normative perspectives through the use of many detailed examples to support his analysis. The Diebold story and his discussion of Barbie are two among many different factual narratives that Benkler uses to ground his theoretical discussion in reality; there are many more "reality" stories to be told.[122]

It is important to recognize that Benkler's normative analysis proceeds on a relatively strong argument that the commons-based peer production is economically viable as a production system. In other words, his arguments for preserving and encouraging this system of production based on a series of normative arguments is not necessarily in conflict with economic welfare considerations and is not (necessarily) dependent upon direct government support through subsidization (except with respect to infrastructure, perhaps, see Part III.A). As discussed in Part II.E, however, it depends very much on the existence of an institutional ecology that permits its emergence and growth, despite efforts of incumbents to squelch the emerging system

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120 Breen, *Modesty and Moralism* at 30 (cited in note 41).

121 We participate whether we like it or not, but our participation in making and shaping the cultural environment is neither fixed nor uniform; we contribute in different ways and to different degrees. To varying degrees, we may actively participate in political, intellectual, and cultural activities that shape the environment; we also participate as consumers, in the sense that our consumptive demands affect the production and flow of cultural content.

122 As I explain below, descriptive accounts of cultural practices remain underdeveloped, at least within legal scholarship. See Part III.C.

through optimization of the institutional ecology to favor existing systems.

E. Institutional Ecology and Conflict

In the final Part of his book, Benkler frames a "battle" over the institutional ecology of the information environment and explains how incumbents may resist change at various layers of the system. This Part covers more familiar, well-trodden terrain, and my discussion will be quite brief.

This Part most directly connects with Boyle's call for a political movement against enclosure. While Boyle was primarily focused on enclosure of the intellectual commons through expansion of intellectual property rights, Benkler takes a broader, more comprehensive approach. He views the "new enclosure movement" in terms of attempts to shape and control systems of laws and institutions that structure our relationships with the cultural environment and affect behavior within the environment. Thus, while intellectual property laws remain an integral front in the battle, telecommunication law and regulation, domain name governance, trespass to chattels, and other laws and institutions are also subject to conflict. Organizing his analysis around the physical, logical, and content "layers" of the Internet, Benkler provides a good overview of battles fought over the past two decades.

The institutional ecology metaphor has roots in the cultural environmentalism metaphor. Institutions are socially constructed to mediate relationships between us and the environment; at the same time, they form part of the environment and are reflective of our cultural commitments. Benkler's systematic approach to law and institutions provides a better connection between the descriptive and normative accounts of the cultural environment, and it reveals a more complex view of the various policy debates that directly affect the cultural environment. Critically, the institutional ecology itself can be understood as a system of institutions that interacts and co-evolves with the other important behavior-affecting (regulating) systems, including technology, social practices, and markets.[123]

Consider, for example, the current debate over network neutrality. The debate is complex and has generated substantial commentary from a wide variety of perspectives, but the basic underlying question concerns how (*not whether*) to structure the networked information

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123 See generally Lessig, *Code and Other Laws of Cyberspace* (cited in note 27). See also Joel R. Reidenberg, *Lex Informatica: The Formulation of Information Policy Rules through Technology*, 76 Tex L Rev 553, 554–55 (1998) (describing the legal, social, and technological systems that shape the production and use of information).

environment. That is, our choice of regulatory regime, including a choice not to regulate at all, will strongly affect the institutional ecology for the networked information environment and, consequently, our relationships with and behavior within the environment. Should network owners be free to discriminate among users and uses when delivering data packets? Should government regulations forbid such discrimination? These are the questions being debated, often in the language of competition policy. But it might make sense to reframe the debate in terms of a more fundamental, normative question: what type of networked information environment do we want—an open, spillover-rich environment or a controlled, spillover-dry environment?[124]

III. BEYOND BOYLE AND BENKLER

In this final Part, I explore three paths that Benkler has made some progress in exploring but that demand further exploration. My focus here is on three relatively specific examples of research paths in need of sustained attention. There are others, some of which I have already discussed.

A. Core Common Infrastructure

Benkler's vision of the networked information environment relies on the existence of a core common infrastructure. As he states in the conclusion:

> To flourish, a networked information economy rich in social production practices requires a core common infrastructure, a set of resources necessary for information production and exchange that are open for all to use. This requires physical, logical, and content resources from which to make new statements, encode them for communication, and then render and receive them (p 470).

However, Benkler does not fully examine what constitutes core common infrastructure or the challenges to ensuring sustainable public access to common infrastructure. In earlier work, he has written about the core common infrastructure.[125] Among other things, Benkler has

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[124] For more on network neutrality and this fundamental question, see generally Brett M. Frischmann and Barbara van Schewick, *Network Neutrality and the Economics of an Information Superhighway*, Jurimetrics (forthcoming 2007); Frischmann and Lemley, 107 Colum L Rev 257 (cited in note 60); Frischmann, 89 Minn L Rev 917 (cited in note 31).

[125] See Yochai Benkler, *Property, Commons, and the First Amendment: Towards a Core Common Infrastructure* 26 (White Paper for the First Amendment Program, Brennan Center for Justice at NYU Law School, 2001), online at http://www.benkler.org/WhitePaper.pdf (visited July 7, 2007) (arguing that "[b]uilding a core common infrastructure serves the central values that animate the First Amendment").

argued for open wireless networks (or spectrum commons) and public provisioning of communications infrastructure.[126]

Core common infrastructure refers to those foundational infrastructural resources that should be available to all on a nondiscriminatory basis. Not all infrastructures are "core" infrastructure; not all infrastructures should be managed as commons. The first difficulty is in identifying which resources are truly foundational and explaining why this critical subset of infrastructure resources should be managed on a nondiscriminatory basis.[127] Once that obstacle is surmounted, more difficulties remain. For example, by what institutional means should commons management be achieved? There are many options. If infrastructure resources are privately supplied and owned, a variety of institutions may sustain commons—for example, regulatory rules (common carriage and network neutrality), intellectual property rules (idea-expression and fair use doctrines), antitrust rules (essential facilities doctrine), or other nondiscrimination rules.[128] We need to better understand these various institutions and how they relate to each other, and we need to recognize their shared function.[129] Yet, we also need to engage in a comparative analysis of these various institutions to better appreciate their relative costs and benefits in the context of core common infrastructure.[130]

Infrastructure need not be privately supplied and owned, however. Public provision remains a viable alternative. This raises a number of options, ranging from public-owned-and-managed infrastructure, public-owned-and-contractor-managed infrastructure, and a vari-

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126 Id (arguing that First Amendment principles are best served by "providing an open platform for individual expressive freedom"). See also generally Yochai Benkler, *Some Economics of Wireless Communications*, 16 Harv J L & Tech 25 (2002); Yochai Benkler, *Siren Songs and Amish Children: Autonomy, Information, and Law*, 76 NYU L Rev 23 (2001); Yochai Benkler, *Overcoming Agoraphobia: Building the Commons of the Digitally Networked Environment*, 11 Harv J L & Tech 287 (1998).

127 In recent work, I have developed a theory of infrastructure and commons management that focuses on demand-side considerations and the case for managing different infrastructural resources as commons. See generally Frischmann, 89 Minn L Rev 917 (cited in note 31).

128 See generally Frischmann and van Schewick, Jurimetrics (cited in note 122) (network neutrality); Frischmann and Lemley, 107 Colum L Rev 257 (cited in note 60) (intellectual property); Spencer W. Waller and Brett Frischmann, *The Essential Nature of Infrastructure or the Infrastructural Nature of Essential Facilities* (unpublished manuscript 2007), online at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=961609 (visited July 7, 2007) (antitrust).

129 See generally Frischmann, 89 Minn L Rev 917 (cited in note 31) (analyzing these institutions in terms of their shared function).

130 I am not claiming that these institutions are the same in all respects. Rather, I suggest only that the institutions operate to sustain common access to resources within different domains. The differences between the institutions are precisely what drives demand for comparative analysis of the institutions. It matters that some institutions are regulatory, others are common law; some apply ex ante, others apply ex post; some focus, at least to some degree, on the conduct of parties, others focus exclusively on the resource at issue.

ety of other public-private partnerships. It is worth noting that governments have played and continue to play a significant and widely-accepted role in ensuring the provision of many infrastructure resources.[131] As with the institutions noted above, we need to engage in a comparative analysis of these various provisional options to better appreciate their relative costs and benefits in the context of core common infrastructure. There has been a substantial amount of work done on this topic, but not (sufficiently) with respect to the infrastructure most relevant to our cultural environment.

B. Pooling and Sharing Arrangements

Benkler reveals the importance of social production of information and culture through structured (but nonhierarchical) pooling arrangements. Individuals pool a variety of resources when participating in peer production. Specifically, in Chapters Three and Four, Benkler considers a number of case studies and discusses the institutional and organizational details that allowed the particular pooling arrangements to work. His qualitative descriptive and functional analysis is an important first step toward the development of a comprehensive understanding of pooling arrangements in intellectual and cultural space. Much work remains to be done.

Elinor Ostrom has studied extensively the problem of collectively managing shared environmental resources. While the standard "tragedy of the commons" story foretells tragedy unless private property rights or government regulation are used to manage the resource in question, Ostrom's work on institutional arrangements for managing common pool resources suggests a third option.[132] Benkler's vision of the networked information environment and the social activities it enables has a close connection with the work of Ostrom. The peer production activities in the intellectual-cultural environment mirror the collective management activities in the natural environment.

Mike Madison, Joe Miller, Katherine Strandburg, and I have undertaken a study of intellectual sharing/pooling arrangements and the construction of open intellectual-cultural environments.[133] Our study

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131 While private parties and markets play an increasingly important role in providing many types of infrastructure (due to a wave of privatization as well as cooperative ventures between industry and government), the government's position as provider, coordinator, or regulator of infrastructure provision remains intact in most communities throughout the world.

132 See, for example, Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* 25 (Cambridge 1990) (contributing "to the development of an empirically supported theory of self-organizing and self-governing forms of collective action").

133 Brett M. Frischmann, et al, *IP, Pooling Arrangements, and Constructed Environments* (unpublished manuscript 2007).

builds from the work of both Ostrom and Benkler. Our project (in progress) entails the comprehensive examination of the institutional features of pooling arrangements through a wide range of case studies from a wide range of intellectual disciplines. Through our study of pooling arrangements, we would like to develop a better understanding of how participants in pooling arrangements structure their environment in relation to the environment(s) within which they are embedded and with which they share interdependent relationships. In future work, we will evaluate the contours of different pooling arrangements with an eye on developing an understanding of the structural differences across arrangements and industries as well as the underlying contextual reasons for such differences. Among other things, we will consider rules pertaining to membership criteria, contribution to and use of pooled resources, internal licensing conditions, management of external relationships (licensing conditions—for example, package or menu; whether independent licensing is permitted), and institutional form. In addition, we would like to study the degree of collaboration among members, sharing of human capital, degrees of integration among participants, and whether there is a specified purpose to the arrangement.

C. Cultural Participants and Practices

Benkler successfully describes a wide range of practices within the cultural environment and provides a detailed and nuanced, descriptive account of behavior in the networked information environment. Other scholars within legal academia and from other disciplines have much to offer in further describing cultural participants and practices.[134] There are more reality stories to be told. We need rich descriptive accounts of the wide variety of activities within the cultural environment to better evaluate the range of normative questions at

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134 See Cohen, 40 UC Davis L Rev at 1190–92 (cited in note 39) (describing the dynamic interplay between creativity and the cultural environment); Sonia Katyal, *Performance, Property, and the Slashing of Gender in Fan Fiction*, 2006 Am J Gender, Soc Policy, & L 461, 469 (arguing that slash fan fiction illustrates that open access to information "can yield richer and more complicated textual narratives than the content industries offer"); Julie E. Cohen, *The Place of the User in Copyright Law*, 74 Fordham L Rev 347, 349 (2005) (arguing that "the success of a system of copyright depends on both the extent to which its rules permit individuals to engage in creative play and the extent to which they enable contextual play . . . within the system of culture more generally"); Tushnet, 114 Yale L J at 538 (2004) (cited in note 49) (defending "copying as a method of self-expression and self-definition consistent with autonomy-based accounts of freedom of speech"); Tushnet, 17 Loyola LA Enter L J at 654 (1997) (cited in note 112) (arguing that "secondary creativity expressed in fan fiction . . . should fall under the fair use exception to copyright restrictions"). See generally Margaret Chon, *New Wine Bursting from Old Bottles: Collaborative Internet Art, Joint Works, and Entrepreneurship*, 75 Or L Rev 257 (1996).

stake in individual and collective decisions about how we live within, use, and change the cultural environment.

Julie Cohen has begun to develop a theory of decentered creativity that emphasizes the thorough description of the creative practice of individuals, as users "situated" within a "cultural landscape" (or environment).[135] Her promising approach draws on cultural studies and science and technology studies literatures that pay closer attention to actual practices of real individuals and groups.[136] Other legal scholars, such as Rebecca Tushnet and Sonia Katyal, have illuminated aspects of the creative enterprise by focusing on the creative practices of fans; in doing so, they both tell considerably interesting stories that make "user participation" real and contextual. To better appreciate how culture may be the ultimate example of peer production,[137] and thus to justify sustainable, open space for a wide range of participatory practices, we need many more stories.

CONCLUSION

My purpose has been to situate Benkler's significant contributions in the intellectual stream of cultural environmentalism. Benkler has filled major gaps in our descriptive and normative understandings of the cultural environment. Understanding Benkler's work in this manner enables a deeper appreciation of the progress Benkler has made and provides some suggestions for further development.

As Boyle showed us, despite its significant flaws, the theory underlying the enclosure movement is appealing in part because it is intuitively simple and in part because it leads us to focus on observable measures of social welfare. According to the theory, enclosure through private property rights makes sense because property rights internalize externalities, generate optimal incentives, and facilitate transactions and the efficient allocation of resources—ends that seem worth pursuing. The problem is that the theory is seriously flawed; property rights do not always serve these ends.[138] Besides being based on a simple but flawed theory, the benefits of enclosure are observable and measurable—in terms of the number of patents or copyrighted

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135 Cohen, 40 UC Davis L Rev at 1178–83 (cited in note 39). See also Michael J. Madison, *A Pattern-Oriented Approach to Fair Use*, 45 Wm & Mary L Rev 1525, 1687 (2004) (arguing for such an approach).

136 Cohen, 40 UC Davis L Rev at 1178–83 (cited in note 39).

137 As Breen notes, "culture is a vast, decentralized phenomenon that is expressed only over time through the accretion of numerous individual decisions involving a multiplicity of activities." Breen, *Modesty and Moralism* at 33 (cited in note 41).

138 See generally Brett M. Frischmann, *Evaluating the Demsetzian Trend in Copyright Law*, Rev L & Econ (forthcoming 2007); Frischmann and Lemley, 107 Colum L Rev 257 (cited in note 60).

works or growth in sectors that rely heavily on intellectual property rights—while the opportunity costs are not. Boyle's call to arms was political, and his invocation of environmentalism was metaphorical. He thought cultural environmentalism might challenge the simple ideas behind enclosure of the cultural environment.

But cultural environmentalism is not simple. It is complex and highly contextual. While many find it an appealing metaphor, the struggle to move beyond the metaphor entails work. As this Review has highlighted, Benkler has not shied away from the complexities of the networked information environment; he has described, explored, and evaluated many of them in considerable depth and, consequently, has made significant strides in *The Wealth of Networks*.

APPENDIX: EXAMPLES OF PEER PRODUCTION

Example of Social Production	Individually Produced Good: Inputs→	Socially Produced Good: Outputs	Social Contribution/ Activity Engaged In	What Is Invested, and by Whom	Organizational Details	Motivation to Participate
Free/Open Source Software (p 63)	• Small, incremental, individual contributions of code	• Software programs, many of which are used widely by commercial entities	• Collective effort to create sharable software programs	• Programmers invest time and knowledge • Others invest in creating and supporting infrastructure like Source-Forge to allow production to flow smoothly	• GNU General Public License (GPL) to prevent downstream appropriation • Production model "based on voluntary contributions and ubiquitous, recursive sharing; on small incremental improvements to a project by widely dispersed people" (p 66) • Source-Forge—a hosting-meeting place for such projects (p 67)	• Politics/philosophy (belief that software should be free) • Practicality—programmer wants to modify software for his own use • Reputation • Fun
NASA Clickworkers (p 69)	• A few minutes of routine science analysis (for example, marking and classifying craters); discrete easily performed tasks	• Complex, large-scale scientific analysis of Mars's terrain	• Contribution to progress of science	• Workers invest small increments of time • NASA invests computer resources • Pilot study with limited funding and time of a few professional scientists • Coordination of volunteer effort	• High modularization of tasks: large, complex task broken into small, independent modules • "Built in redundancy and automated averaging out of both errors and purposeful erroneous markings" (p 69)	• Fun ("[T]he raw human capital needed would be contributed for the fun of it" (p 69))

Example of Social Production	Individually Produced Good: Inputs→	Socially Produced Good: Outputs	Social Contribution/ Activity Engaged In	What Is Invested, and by Whom	Organizational Details	Motivation to Participate
Wikipedia (p 70)	• Writing tasks, small or large; editing entries	• Free, online encyclopedia	• Contributing to a large store of knowledge available to all free of charge	• Writers invest time and knowledge • Hosters provide computing power and wiki platform	• Wiki platform—a collaborative authorship tool (p 70) • An "open, peer-production model" (p 71) • All content released under GNU Free Documentation License • Self-conscious use of open discourse • "The project relies on social norms to secure the dedication of project participants to objective writing" (p 72) • "As the project has grown, it has developed more elaborate spaces for discussing governance and for conflict resolution" (p 73)	• "[P]articipants . . . are plainly people who like to write" (p 73) • People who wish to present a particular point of view on an issue • People who want to help build the encyclopedia or share their knowledge • Contributing to a common enterprise
Second Life (p 74)	• Individual construction of objects in the game environment, particular story lines, or substantive framework for interaction	• An online world with "thousands of characters, hundreds of thousands of objects, multiple areas, villages, and 'story lines'" (p 75)	• Creating and playing in an online environment	• Players invest time and subscription fees • Linden Labs invests money to provide computing power and software to allow Second Life to exist	• Linden Labs offers a software platform and tools to build objects in the environment • Users do everything else	• Fun—it's a game • Reputation

Example of Social Production	Individually Produced Good: Inputs→	Socially Produced Good: Outputs	Social Contribution/ Activity Engaged In	What Is Invested, and by Whom	Organizational Details	Motivation to Participate
Slashdot (p 76)	• Individual submissions of or comments on news items; ratings on the comments as a mediator	• Relevance and accreditation for technology news	• Providing relevance and accreditation for technology news items	• Users invest time • Slashdot invests computing power and software to allow for ratings of comments and mediators	• Complex, meritocratic system for rating and filtering user submissions and comments (long discussion of the system at pp 77–78) • OSTG has some paid employees to do very coarse initial filtering	• Reputation (from being a moderator) • Interest in technology news
Open Directory Project (p 76)	• Individuals select websites for inclusion in the directory	• A comprehensive, human-reviewed directory of the web	• People working together to make the Internet easier to navigate for others	• Volunteers spend time to review websites for inclusion in the directory • Netscape "pays for server space and a small number of employees to administer the site and set up the initial guidelines" (p 76)	• The site is hosted and administered by Netscape • Licensing is free • The site relies on 60,000 volunteers • "Quality relies on a peer-review process based substantially on seniority as a volunteer and level of engagement with the site" (p 76)	• Volunteers probably want to help make the Internet easier to use for others • It "presumably adds value partly to America Online's (AOL's) and Netscape's commercial search engine/portal and partly through goodwill" (p 76)

Example of Social Production	Individually Produced Good: Inputs→	Socially Produced Good: Outputs	Social Contribution/ Activity Engaged In	What Is Invested, and by Whom	Organizational Details	Motivation to Participate
Project Gutenberg (p 80)	• Individual scanning of a book; proofreading text	• Online library of "e-texts" available for free	• Building an online library	• Volunteers invest time • Michael Hart, the founder, invests time for copyright research • The Project also provides computing power/servers to store the texts	• Hart runs a copyright check on proposed books • Volunteers choose the books • An exchange from initial scanner to subsequent proofreaders is done through Listserv mailing and bulletin board • Distributed Proofreading breaks proofreading down into small individual tasks	• Desire to contribute to the common effort of building a free online library
SETI@Home (p 81)	• Discrete calculations performed on an individual's idle PC	• Super computer	• Scientific research; Benkler names a few other examples: Fightaids@home, Folding@home, Genome@home, and other sites dedicated to cryptography and mathematics (p 82)	• Participants provide the use of their personal computers • SETI invests time to create the software • Other sites offer to share prize money	• SETI "has developed software and a collaboration platform that have enabled millions of participants to pool their computation resources into a single powerful computer" (p 82)	• These are projects "engage in pursuits understood as scientific, for the general good, seeking to harness contributions of individuals who wish to contribute to such larger-than-themselves goals" (p 82) • "Other sites . . . combine 'altruistic' with hobby as their basic motivational appeal" (p 82) • Other sites offer a share of prize money • "[T]he pursuit of meaning in contributing to a common goal" (p 83)

Example of Social Production	Individually Produced Good: Inputs→	Socially Produced Good: Outputs	Social Contribution/ Activity Engaged In	What Is Invested, and by Whom	Organizational Details	Motivation to Participate
Peer-to-Peer Software (p 84)	• A single computer storing information that is available to anyone using the software	• Massive online data storage with retrieval capabilities	• Making files (like music and movies) available to anyone in the world with a computer within seconds	• "What is truly unique about peer-to-peer networks as a signal of what is to come is the fact that with ridiculously low financial investment, a few teenagers and twenty-something-year-olds were able to write software and protocols that allowed tens of millions of computer users around the world to cooperate in producing the most efficient and robust file storage and retrieval system in the world" (p 85)	• No central server/host like with some of the other examples • Just software and protocols that link millions of computers	• "The want music; they can get it from these networks for free; so they participate" (p 85)
Free High School Science Texts (FHSST) (pp 101, 326–27)	• Individual contribution to a physics, chemistry, or mathematics text	• Free high school science text books	• Collective effort to create complete science text books available free of charge anywhere in the world	• Time of contributors • Time of graduate student administrators	• "The whole FHSST project involves a substantially more managed approach than is common in peer-production efforts, with a core group of dedicated graduate student administrators recruiting contributors, assigning tasks, and integrating the contributions" (p 101)	• Altruism

Example of Social Production	Individually Produced Good: Inputs→	Socially Produced Good: Outputs	Social Contribution/ Activity Engaged In	What Is Invested, and by Whom	Organizational Details	Motivation to Participate
The Blogosphere (Chapter 7)	• Individual posts and comments on blogs	• Detailed discourse on innumerable topics	• Social conversations, often on politically relevant topics and potentially leading to political action	• Time to read, write, and comment • Personal computing power or fee to host a blog	• There is a hierarchy of blogs • Bloggers can allow comments to their blog • Many interlinking blogs pointing to one another	• Interest in a topic • Reputation • Political motivations
Nonproprietary Scientific Publications (pp 323–28)	• Individual scientific publication or contributions	• Library of scientific publications or texts available free of charge	• Publishing useful scientific information; contributing to scientific progress	• Scientists invest time to publish a paper • The journals invest in their particular business model	• The different examples have different models, but the end result is freely available scientific publications	• Reputation in the scientific community • Contributing to scientific progress • Ensuring free access to advancements as they are made