

ANTI-INNOVATION NORMS

Stephanie Plamondon Bair and Laura G. Pedraza-Fariña

ABSTRACT—Intellectual property (IP) scholars have recently turned their attention to social norms—informal rules that emerge from and are enforced by nonhierarchically organized social forces—as a promising way to spur innovation in communities as diverse as the fashion industry and the open-source software movement. The narrative that has emerged celebrates social norms’ ability to solve IP’s free-rider problem without incurring IP’s costs.

But this account does not fully consider the dark side of social norms. In fact, certain social norms, when overenforced, can create substantial barriers to the most socially beneficial creative pursuits. Because IP scholars have left unexplored how social norms can hinder innovation in this way, the harm they cause has gone unmitigated.

This Article sheds light on the dark side of innovation norms. It coins the term “anti-innovation norms” to label these counterproductive social forces. Using the double lens of sociology and psychology, it gives a full theoretical account of three types of anti-innovation norms: research priority, methodology, and evaluation norms—all of which interfere with socially beneficial boundary-crossing innovation.

Our elucidation of anti-innovation norms has both theoretical and policy implications. On the theory side, it suggests that IP scholars to date have been too focused on addressing the free-rider problem. This has caused them to overlook other barriers to innovation, like those posed by the set of anti-innovation norms we describe here. This focus on free riding may also help explain why innovation and norms scholars have paid little attention to debates within the broader literature on law and social norms concerned with identifying situations in which social norms are welfare reducing. On the policy side, it points to innovation dilemmas that IP is not fully equipped to solve. While changes to the IP doctrines of attribution and fair use in copyright and nonobviousness in patent law can counteract anti-innovation norms at the margin, a comprehensive solution requires innovation scholars to broaden their vision beyond the IP toolkit. We take the first steps in this direction, proposing a number of interventions, including novel funding regimes and tax credits.

AUTHOR—Stephanie Plamondon Bair, Associate Professor of Law, BYU Law School. Laura G. Pedraza-Fariña, Associate Professor of Law, Northwestern Pritzker School of Law. The authors would like to thank participants in the 2017 AALS Annual Meeting, the 2017 Intellectual Property Scholars Conference, the 7th Annual IP Scholars’ Roundtable at the University of New Hampshire School of Law, the 2017 IP Colloquium at Hofstra University Law School, and PatCon 2018 for helpful comments. We have benefitted immensely from conversations with Christopher Buccafusco, Dan Burk, Robert Burns, Erin Delaney, Shari Seidman Diamond, Ezra Friedman, Andrew Gilden, Dmitry Karshedt, Andy Koppelman, Matthew Kugler, Mark Lemley, Gregory Mandel, Irina Manta, Janice Nadler, Destiny Peery, Candice Player, W. Nicholson Price III, David Schwartz, Nadav Shoked, Matthew Spitzer, James Speta, Ofer Tur-Sinai, and Eleanor Wilking. We also thank Moon-Hee Lee and Michael Ellenberger for extraordinary research assistance.

INTRODUCTION	1070
I. SOCIAL NORMS AND INNOVATION	1078
A. <i>IP Law and Social Norms</i>	1080
B. <i>Law and Social Norms</i>	1086
II. ANTI-INNOVATION NORMS	1090
A. <i>The Psychology and Sociology of Creativity and Innovation</i>	1091
B. <i>Three Types of Anti-Innovation Norms: Research Priority, Methodology, and Evaluation Norms</i>	1095
C. <i>The Psychological Underpinnings of Anti-Innovation Norms</i>	1104
D. <i>Theoretical Implications of Anti-Innovation Norms</i>	1116
III. ANTI-INNOVATION NORMS: POLICY IMPLICATIONS	1121
A. <i>What IP Can—and Cannot—Do to Address Anti-Innovation Norms</i>	1123
B. <i>Policy Prescriptions: The Potential of a More Robust Innovation Policy</i>	1131
CONCLUSION.....	1135

INTRODUCTION

Innovation drives economic growth and is key to creating prosperous societies.¹ Much of the legal scholarship on innovation focuses on the role of formal intellectual property (IP) law in promoting it.² More recently,

¹ See, e.g., Benjamin Roin, *The Case for Tailoring Patent Awards Based on Time-to-Market*, 61 UCLA L. REV. 672, 690 & n.73 (2014) (linking more innovation to greater social welfare).

² See, e.g., John M. Golden, Robert P. Merges & Pamela Samuelson, *The Path of IP Studies: Growth, Diversification, and Hope*, 92 TEX. L. REV. 1757, 1758 (2014) (“Focus on information and innovation inevitably leads to concern with intellectual property.”).

however, IP scholars have begun to examine the role that nonlegal factors, and social norms in particular, play in innovative communities.³

The bulk of the existing scholarship on social norms and innovation concerns IP's "negative space": innovative communities where creativity flourishes despite a lack of formal IP protection.⁴ The upshot of this groundbreaking literature is that social norms can, under the right conditions, promote innovation by regulating copying behavior—a task traditionally accomplished by formal IP rights. Kal Raustiala and Christopher Sprigman's study of the fashion industry, for instance, highlights how innovation in fashion design "flourishes despite a near-total lack of protection."⁵ They posit that a norm of tolerating copying behaviors leads to a fast fashion cycle that generates markets for new designs.⁶ In the world of high cuisine, Emmanuelle Fauchart and Eric von Hippel detail how a norm of shunning copiers who fail to properly credit a recipe's creator both protects novel recipes and enhances the reputations of the chefs that originated them, thus encouraging innovation without IP protection.⁷ Dotan Oliar and Christopher Sprigman's work with stand-up comedians strikingly illustrates how social norms protect individuals' jokes in the absence of IP by punishing violators

³ See *infra* Part I. By "social norms" we mean informal rules that emerge from and are enforced by nonhierarchically organized social forces. This definition of social norms emerges from the work of Robert Ellickson, which has been deeply influential in the IP studies we describe in this Article. ROBERT C. ELLICKSON, *ORDER WITHOUT LAW: HOW NEIGHBORS SETTLE DISPUTES* 127 (1991). Social norms should be understood in the context of other forms of regulation of social life, or what Lawrence Lessig calls the "four types of constraint" on behavior: law, social norms, markets, and architecture. In contrast to social norms' nonhierarchical enforcement, law constrains behavior through the "centralized enforcement of a state." Lawrence Lessig, *The New Chicago School*, 27 J. LEGAL STUD. 661, 662–64 (1998). This Article concerns primarily the interaction between social norms and law, although some of our policy prescriptions involve regulation both through the market and architecture.

⁴ For recent summaries of IP's negative-space literature, see Aaron Perzanowski & Kate Darling, *Introduction*, in *CREATIVITY WITHOUT LAW: CHALLENGING THE ASSUMPTIONS OF INTELLECTUAL PROPERTY* 1 (Kate Darling & Aaron Perzanowski eds., 2017); Kal Raustiala & Christopher Jon Sprigman, *When Are IP Rights Necessary?: Evidence from Innovation in IP's Negative Space*, in 1 *RESEARCH HANDBOOK ON THE ECONOMICS OF INTELLECTUAL PROPERTY LAW: THEORY* (Peter Menell & Ben Depoorter eds., forthcoming 2018) (on file with *Northwestern University Law Review*) [hereinafter Raustiala & Sprigman, *Rights*]; Christopher Jon Sprigman, *Conclusion: Some Positive Thoughts about IP's Negative Space*, in *CREATIVITY WITHOUT LAW: CHALLENGING THE ASSUMPTIONS OF INTELLECTUAL PROPERTY* 249 (Kate Darling & Aaron Perzanowski eds., 2017); see also the literature cited *infra* notes 26, 66, and 67. We take a capacious view of the term "IP's negative space" to include both domains for which IP protection is currently unavailable and those in which creators choose to rely on social norms, despite the availability of IP protection.

⁵ Kal Raustiala & Christopher Sprigman, *The Piracy Paradox: Innovation and Intellectual Property in Fashion Design*, 92 VA. L. REV. 1687, 1762 (2006) [hereinafter Raustiala & Sprigman, *Piracy Paradox*].

⁶ *Id.* at 1722.

⁷ Emmanuelle Fauchart & Eric von Hippel, *Norms-Based Intellectual Property Systems: The Case of French Chefs*, 19 ORG. SCI. 187, 187 (2008).

with reputational sanctions, group boycotts, and sometimes even violence.⁸ And in his study of tattoo artists' communities, Aaron Perzanowski uncovers norms that punish the copying of only some types of tattoo designs ("custom designs") but allow the copying of others ("flash designs" and other visual art from outside the tattoo community).⁹ Studies of other innovator communities have similarly shown how creativity and innovation can flourish without IP protection.¹⁰

Because granting IP rights is a socially costly endeavor,¹¹ and because social norms can be tailored to the needs of particular innovative communities more easily than IP rights, negative-space scholars tend to celebrate the ability of informal, low-cost social norms to promote innovation without incurring IP's costs.¹² While acknowledging that the social norms they describe can both over-reward and under-reward innovators, scholars writing in the negative IP space largely leave these

⁸ Dotan Oliar & Christopher Sprigman, *There's No Free Laugh (Anymore): The Emergence of Intellectual Property Norms and the Transformation of Stand-Up Comedy*, 94 VA. L. REV. 1787, 1791 (2008).

⁹ Aaron Perzanowski, *Tattoos & IP Norms*, 98 MINN. L. REV. 511, 515, 557–67 (2013). Such discrimination between custom and flash designs, Perzanowski argues, promotes innovation in the tattoo artists' community by both preserving a robust market for custom tattoos and fostering creativity by sanctioning the free borrowing of preexisting designs from outside the community. *Id.* at 577–81.

¹⁰ See literature cited *infra* note 66.

¹¹ IP rights generate deadweight loss, often require costly litigation for their enforcement, can create thickets of rights that hinder commercialization efforts, and represent a one-size-fits-all solution to what many analysts think is a problem that requires industry-specific interventions. See, e.g., Mark Lemley, *Faith-Based Intellectual Property*, 62 UCLA L. REV. 1328 (2015) (summarizing the vast literature that analyzes the efficiency of IP rights in fostering innovation).

¹² See, e.g., David Fagundes, *Talk Derby To Me: Intellectual Property Norms Governing Roller Derby Pseudonyms*, 90 TEX. L. REV. 1093, 1131, 1133 (2011) (arguing that nonlegal rules and norms "are preferable to formal law, in the context of nonmarket production by identity-constitutive communities" and emphasizing that "[p]revailing derby name norms also bring numerous efficiency advantages to their users"); William Hubbard, *Inventing Norms*, 44 CONN. L. REV. 369, 373 (2011) ("By overlooking social norms that promote invention and the effects of patents on these norms, the traditional view of patent law omits an important aspect of motivations to invent." (footnote omitted)); Gerard N. Magliocca, *Patenting the Curve Ball: Business Methods and Industry Norms*, 2009 BYU L. REV. 875, 890 ("[T]here is every reason to think that these customs (as in the curve ball example) actually encourage more sharing of knowledge and lower transaction costs in a way that makes the trade as a whole better off."); Oliar & Sprigman, *supra* note 8, at 1833 ("Comedians' social norms provide significant protection for creators' incentives—protection that provides a baseline against which any contemplated introduction of enhanced formal protections should be assessed."); Perzanowski & Darling, *supra* note 4, at 3 ("[T]he communities illustrated in this book demonstrate that creativity can thrive without legal incentives, and perhaps more strikingly, that some creative communities prefer self-regulation to law."); Raustiala & Sprigman, *Rights*, *supra* note 4, at 7 (summarizing case studies in the negative IP space as "document[ing] the powerful role social norms play in stimulating innovation and constraining appropriation"); Sprigman, *supra* note 4, at 257 (arguing that IP's negative space "turns out to be pretty positive from an economic point of view, at least in some industries" and emphasizing that, rather than stymie innovation, the lack of IP rights in the fashion industry "actually spurs [innovation]").

negative effects unexplored.¹³ Put differently, IP scholars have not paid much attention to the ways in which social norms can reduce overall social welfare by hampering innovation, and the ways in which law can mitigate these harmful effects of social norms.¹⁴

This Article fills that gap in the existing literature by exploring the dark side of social norms in innovator communities. Our work studying the sociology and psychology of innovation suggests that some social norms can mount substantial barriers to creative and innovative activities.¹⁵ We call these counterproductive social forces “anti-innovation norms.”¹⁶ Anti-innovation norms can come in many forms.¹⁷ Here, we focus on a set of norms that are particularly harmful from an innovation perspective: those that interfere with boundary-crossing innovation (i.e., “boundary-preserving” social norms).¹⁸ The sociology and psychology literatures converge on the insight that boundary-crossing work often yields some of

¹³ See *infra* notes 26, 66, 67 and accompanying text.

¹⁴ See, e.g., Lessig, *supra* note 3, at 666 (contrasting Robert Ellickson’s “Old Chicago School” analysis of law and social norms—which emphasized how social norms made law irrelevant—with the “New Chicago School” approach—which sees social norms as an “object of law’s regulation”).

¹⁵ Laura G. Pedraza-Fariña, *Constructing Interdisciplinary Collaboration: The Oncofertility Consortium as an Emerging Knowledge Commons*, in GOVERNING MEDICAL KNOWLEDGE COMMONS 259 (Katherine J. Strandburg, Brett M. Frischmann & Michael J. Madison eds., 2017) [hereinafter Pedraza-Fariña, *Constructing Interdisciplinary Collaboration*]; Laura G. Pedraza-Fariña, *Patent Law and the Sociology of Innovation*, 2013 WIS. L. REV. 813 [hereinafter, Pedraza-Fariña, *Sociology of Innovation*]; Laura G. Pedraza-Fariña, *The Social Origins of Innovation Failures*, 70 SMU L. REV. 377 (2017) [hereinafter, Pedraza-Fariña, *Social Origins*].

¹⁶ The term “anti-innovation norms” refers to instances in which social norms, on balance, retard innovation more than they foster it. The boundary-preserving social norms we examine in this Article function as anti-innovation norms when they become overenforced—what we suggest is a likely outcome absent policy interventions.

¹⁷ We suggest three broad categories of social norms with likely anti-innovation outcomes: (1) boundary-preserving norms, (2) gender norms, and (3) seniority norms. Given the importance of boundary crossing for breakthrough innovation, this Article will focus only on boundary-preserving norms and leave work on other types of norms in innovation communities for future research. For work on gender norms and innovation, see GENDER CODES: WHY WOMEN ARE LEAVING COMPUTING (Thomas Misa ed., 2010); Dan L. Burk, *Diversity Levers*, 23 DUKE J. GENDER L. & POL’Y 25 (2015); Dan L. Burk, *Do Patents Have Gender?*, 19 AM. U. J. GENDER, SOC. POL’Y & L. 881 (2011); Dan L. Burk, *Feminism and Dualism in Intellectual Property*, 15 AM. U. J. GENDER, SOC. POL’Y & L. 183 (2007); Nathan Ensmenger, “Beards, Sandals, and Other Signs of Rugged Individualism”: *Masculine Culture within the Computing Professions*, 30 OSIRIS 38, 44 (2015) (showing how “many computer programmers embraced masculinity as a powerful resource for establishing their professional identity and authority”); Shelly Wright, *A Feminist Exploration of the Legal Protection of Art*, 7 CAN. J. WOMEN & L. 59 (1994). For work on status and seniority norms, see Ronald Fischer, *Rewarding Seniority: Exploring Cultural and Organizational Predictors of Seniority Allocations*, 148 J. SOC. PSYCHOL. 167 (2008); Emmanuel Lazega et al., *Norms, Status and the Dynamics of Advice Networks: A Case Study*, 34 SOCIAL NETWORKS 323 (2012).

¹⁸ Boundary-crossing innovation refers to the migration and recombination of ideas, methodologies, and ways of framing problems across communities of innovators that do not routinely interact with each other.

the most significant and socially beneficial advances.¹⁹ Yet social norms that prevent precisely this type of work from taking place feature in practically all creative communities. Current IP and social norms scholarship, by focusing almost exclusively on how social norms affect innovator behavior *within* community boundaries, misses how in-group social norms can hamper interactions *across* innovation communities. In other words, some social norms that solve local, community-specific collective action problems can also diminish overall social welfare by delaying boundary-crossing innovation.²⁰

This Article identifies and gives a full sociological and psychological account of three anti-innovation norms. Specifically, we explain how (1) research priority, (2) methodology, and (3) evaluation norms function in innovative communities in both technology and the arts to prevent or inefficiently delay important boundary-crossing innovation.²¹ Research priority norms dictate which problems innovative communities prioritize for study, methodology norms govern the methods used to study these problems, and evaluation norms shape how innovator communities evaluate the work of their members. These norms are initially established at the group level for rational reasons: they serve as efficient coordination mechanisms that benefit the group and its members. But due to individual-level psychological biases—in particular, status quo and confirmation biases—they tend to be overenforced, leading to anti-innovation inefficiencies.²² For example, overenforcement of research priority norms that privileged a focus on light and color, methodology norms that dictated working on unstretched,

¹⁹ See *infra* Section II.A. Both research within and across innovator community boundaries is important for social welfare. In fact, the two are interrelated: ideas and techniques cannot migrate and recombine from one community to another without each community having first developed deep knowledge specialization. But the type of research that crosses boundaries is particularly likely to be underproduced by the market. First, the gap between private and social value is likely larger in boundary-crossing innovation because of the large social spillovers that accompany breakthroughs. Second, success in boundary-crossing innovation is often more uncertain, since it involves unfamiliar knowledge recombinations. Third, and the topic of this paper, because of the reputational effects of boundary-preserving social norms, problems within a specialized community, and that community's methodology for addressing them, will be preferred by group members (including marginal members) over intersectional problems or methodologies, even if both types of problems and methodologies (specialized and intersectional) have the same social value.

²⁰ Some community norms (such as norms of attribution and anti-copying norms) that are enforced through shaming and reputational sanctions also run the risk of overenforcement through competition for status or esteem. See ERIC A. POSNER, *LAW AND SOCIAL NORMS* 92–93 (2000) (describing how punishments driven by reputational competition will often escalate beyond efficient deterrence levels); RICHARD McADAMS, *The Origin, Development, and Regulation of Norms*, 96 MICH. L. REV. 338, 342 (1997) (describing how esteem competition can lead to overenforcement).

²¹ See *infra* Section II.B.

²² See *infra* Section I.B.

unprimed canvasses, and evaluation norms that limited a judgment of “good” to works that abided by these other norms in the 1940s Abstract Expressionist community left little room for alternative approaches and arguably delayed the emergence of Minimalism, Pop art, and other visual art forms.²³ In the realm of science and technology, astronomers strongly enforced their intertwined research priority and methodology norms that privileged the visual exploration of the skies through optics technology. Community members who adhered to these norms flourished. In contrast, astronomers who became interested in using radio waves to explore the skies had difficulty publishing their research in recognized, peer-reviewed journals, securing federal and private funding, and obtaining university and industry employment. Yet, radio astronomy (many decades later) made it possible to discover the existence of cosmic microwave background radiation—providing evidence for the Big Bang theory of the universe.²⁴

Our Article makes three primary contributions to the literature. First, in contrast to the prevailing account in the innovation and norms literature, it focuses on how social norms can hamper innovation and identifies three of these anti-innovation norms.

Second, it marries insights from the sociology and psychology literatures to give a complete theoretical account of these anti-innovation norms.²⁵ Our account both engages with and expands on the broader law and social norms literature, which recognizes that social norms can be overenforced in welfare-reducing ways.²⁶ More specifically, we show how the negative effects of research priority, methodology, and evaluation norms on boundary-crossing innovation can be explained both under existing signaling²⁷ and esteem²⁸ theories of social norms. Upholding a particular innovator community’s research priorities and methodology tools—and

²³ See *infra* Section II.B.

²⁴ See *infra* Section II.B.

²⁵ See *infra* Sections III.B & III.C.

²⁶ See *infra* Section III.C.2; see also, e.g., RUSSELL HARDIN, ONE FOR ALL: THE LOGIC OF GROUP CONFLICT 72 (1997) (analyzing how certain group norms—“norms of exclusion”—can benefit group members at the expense of both other groups and society as a whole); POSNER, *supra* note 20, at 92 (exploring the “pathologies of shaming,” which include excessive sanctions arising from the disconnect between private and social gains from shaming); Jon Elster, *Social Norms and Economic Theory*, 3 J. ECON. PERSP. 99, 112–13 (1989) (analyzing how some norms “embody solutions to local collective action problems” but “may work against the interest of society as a whole”); McAdams, *supra* note 20, at 342–43 (developing an esteem theory of social norms that “identifies new situations in which norms reduce social welfare”). Robert Ellickson—the author who most directly influenced IP’s negative-space literature—while recognizing some negative features of social norms, is otherwise quite optimistic about them. See McAdams, *supra* note 20, at 409 (remarking that both Richard Ellickson and Richard Cooter “are fairly optimistic about norms”).

²⁷ McAdams, *supra* note 20, at 342.

²⁸ POSNER, *supra* note 20, at 58–61.

shaming those who do not—can serve as a signal to other community members of being a worthy, rigorous teammate. Under both signaling and esteem models, core, high-status members of an innovator community have a vested interest in enforcing norms on newcomers or marginal members to maintain their status as rigorous community members. Esteem or status competition, however, can ratchet up norm enforcement past its efficient level by making it very costly to challenge the prevailing social norm.²⁹ Thus, what may start out as a mild preference for a particular research problem and methodology can escalate to strong, inflexible preferences—leading to too many individuals focusing on one particular problem with one particular methodology and neglecting other, equally important problems from a social welfare perspective. Our psychological analysis complements these two models by positing a psychological mechanism for these behaviors. Specifically, we propose that individual-level psychological biases—the status quo bias and the conformity bias in particular—lead group members to favor the existing research priorities and methodologies of the groups to which they belong, blinding them to other possibilities and ultimately leading to entrenchment and overenforcement of these norms.

Third, this Article proffers an explanation for why the legal literature on innovation and social norms has to this point paid little attention to social norms' potential anti-innovation effects. We posit that it is because most innovation scholars are focused on IP, and IP, in turn, is focused on addressing—primarily through the regulation of copying—the market failures that arise due to the public goods³⁰ nature of innovation. Negative-space scholars have thus turned their attention to social norms as an alternative device for solving the public goods (or free-rider) problem. But there are other important barriers to innovation besides the free-rider problem.³¹ In this Article, for example, the anti-innovation norms we identify have nothing to do with the public goods nature of innovation and

²⁹ See *id.*; McAdams, *supra* note 20, at 366.

³⁰ See, e.g., JAMES BOYLE & JENNIFER JENKINS, *INTELLECTUAL PROPERTY: LAW AND THE INFORMATION SOCIETY* xi (3d ed. 2016) (“Why group [copyright, patent, and trademark law] together then? The answer we will develop depends on a core similarity—the existence of a ‘good’—an invention, a creative work, a logo—that multiple people can use at once and that it is hard to exclude others from. (Economists refer to these as ‘public goods’ though they have more technical definitions of what those are.)”); William Fisher, *Intellectual Property and Innovation: Theoretical, Empirical, and Historical Perspectives*, in 37 *INDUSTRIAL PROPERTY, INNOVATION, AND THE KNOWLEDGE-BASED ECONOMY*, BELEIDSSTUDIES TECHNOLOGIE ECONOMIE (manuscript at 1) (2001), <https://cyber.harvard.edu/people/tfisher/Innovation.pdf> [<https://perma.cc/X2UU-9DKS>] [hereinafter Fisher, *Intellectual Property and Innovation*] (“We begin with some familiar generalizations: Technological innovations belong to the category of objects and services that economists refer to as ‘public goods.’”).

³¹ See *infra* Section III.C.1

unauthorized copying of intellectual products. Instead, these three anti-innovation norms function to prevent knowledge recombination across community boundaries and therefore channel the types of innovation produced by individuals and teams in suboptimal directions.

This insight has implications for innovation scholarship that go far beyond the social norms literature. Specifically, if it is the goal of innovation scholars to maximize socially beneficial innovation, they must begin to reckon with other innovation dilemmas beyond the free-rider problem IP is designed to address. Our conclusions have much in common with the work of Brett Frischmann, Michael Madison, and Katherine Strandburg on knowledge commons.³² These authors have also called for an analysis of other social dilemmas in innovation.³³ Our research complements their work in two ways: first, by emphasizing the importance of understanding how innovator communities interact (or fail to interact) with each other—not just with the public at large—and, second, by highlighting the importance of explicitly considering that boundary-preserving and other anti-innovation norms can result in negative externalities associated with “knowledge commons.”³⁴

The Article is largely descriptive and theoretical, but its insights pave the way for productive policy prescriptions. Specifically, the recognition that anti-innovation norms operate beyond the free-rider problem suggests that

³² See, e.g., GOVERNING KNOWLEDGE COMMONS (Brett M. Frischmann, Michael J. Madison & Katherine J. Strandburg eds., 2014) (offering a research framework to study knowledge commons, the institutionalized community governance of the sharing and creation of intellectual and cultural resources); *id.* (applying the authors’ framework for studying knowledge commons to case studies involving medical professionals and information); Michael J. Madison, Brett M. Frischmann & Katherine J. Strandburg, *Constructing Commons in the Cultural Environment*, 95 CORNELL L. REV. 657, 665–66 (2011) (explaining the shortcomings of a functionalist account of IP and proposing a constructed-cultural-commons framework to complement the functionalist approach). Yochai Benkler, in his pioneering work on commons-based production, has also analyzed how cooperation can emerge without formal (legal) coordination. See, e.g., YOCHAI BENKLER, WEALTH OF NETWORKS (2006); Yochai Benkler, *Coase’s Penguin, or, Linux and The Nature of the Firm*, 112 YALE L.J. 369 (2002). In turn, these legal scholars draw inspiration from earlier work by Elinor Ostrom on natural resources commons. See, e.g., ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION (1990). But see Michael Mattioli, *Communities of Innovation*, 106 NW. U. L. REV. 103, 120 (2012) (describing how communities of innovation that share patents to facilitate innovation often require outside catalysts—such as government funding and infrastructure—to coordinate sharing).

³³ Brett M. Frischmann, Michael J. Madison & Katherine J. Strandburg, *Governing Knowledge Commons*, in GOVERNING KNOWLEDGE COMMONS 1, 9 (Brett M. Frischmann, Michael J. Madison & Katherine J. Strandburg eds., 2014) (arguing that “a myopic focus on the free-rider issue may distract researchers and policy makers from other social dilemmas that may be more important in some contexts”).

³⁴ Two questions that Frischmann, Madison, and Strandburg include in their structured interview framework are “What are the degree and nature of openness with respect to each type of community member and the general public?” and “What costs and risks are associated with the commons, including any negative externalities?” *Id.* at 20–21.

IP law, which is designed primarily to address this problem, cannot fully correct the inefficiencies created by these norms. This prompts us to broaden our vision to consider other policy interventions beyond IP.

Taking the first steps in this direction, we offer some concrete policy solutions that reach beyond the traditional IP-or-IP-substitute proposals and chart new territory, with recommendations for novel funding regimes and targeted tax credits for collaborative ventures.

The Article proceeds as follows. Part I synthesizes IP's negative-space literature and the conventional wisdom to which it has given rise—namely, that social norms in the innovation context are generally innovation promoting. We then place work on IP and social norms within the larger context of law and social norms scholarship. Part II challenges this conventional wisdom. Drawing from our work studying the sociology and psychology of innovation, we identify three anti-innovation norms and describe how they work to stifle creativity by hindering boundary-crossing innovation in both science and technology and the arts. This Part shows how these three anti-innovation norms—research priority, methodology, and evaluation norms—originally arise to solve coordination problems but, over time, are overenforced as a result of psychological biases. Part III examines the implications of anti-innovation norms for innovation policy and theory. We posit that innovation scholarship has focused too narrowly on solving the free-rider problem via IP or IP substitutes (like social norms). Because anti-innovation norms operate beyond the free-rider problem, unique policy solutions are required to adequately address them. Although changes to specific IP doctrines, such as attribution rights in copyright and nonobviousness in patent law, can help ameliorate the effects of anti-innovation norms, policy solutions beyond IP are needed to comprehensively tackle their anti-innovation effects. We conclude by proposing some preliminary policy interventions along these lines.

I. SOCIAL NORMS AND INNOVATION

In the past two decades, legal scholars have rediscovered the power of social norms to influence behavior.³⁵ In areas as disparate as contracts and

³⁵ Robert Ellickson's seminal work *Order without Law*, which demonstrated the prevalence of informal norms—and the irrelevance of legal rules—for achieving cooperative outcomes in close-knit communities, has served as the starting point for much of the work in this area. ELLICKSON, *supra* note 3; see also Stewart Macaulay, *Non-Contractual Relations in Business: A Preliminary Study*, 28 AM. SOC. REV. 55 (1963) (describing the emergence of informal contract norms among close-knit communities of businessmen in Wisconsin, and laying the foundation for much of the work on relational contracts).

commercial law,³⁶ criminal law,³⁷ torts,³⁸ family law,³⁹ and tax law,⁴⁰ scholars have uncovered the crucial role of social norms in regulating social behavior. Emphasizing the centrality of social norms, and the irrelevance of legal rules, these studies sparked a challenge of the prevailing “legal centralist” view of human behavior, a view that placed “governments [as] the chief sources of rules and enforcement efforts.”⁴¹

IP, however, was thought to be an exception to this pattern. While other legal fields shifted their focus to understanding the interaction between law and social norms, IP scholars remained focused on the importance of governmental intervention to foster and maintain creativity and innovation.⁴² This traditional assumption is now being challenged. IP scholars have recently identified myriad spaces where innovation proceeds apace without IP protection.⁴³ The finding that social norms can play a key role in

³⁶ See, e.g., Lisa Bernstein, *Merchant Law in a Merchant Court: Rethinking the Code’s Search for Immanent Business Norms*, 144 U. PA. L. REV. 1765 (1996) (analyzing the interplay between law and social norms in merchant communities); Robert D. Cooter, *Punitive Damages, Social Norms, and Economic Analysis*, 60 LAW & CONTEMP. PROBS. 73 (1997).

³⁷ See, e.g., Dan M. Kahan & Eric A. Posner, *Shaming White-Collar Criminals: A Proposal for Reform of the Federal Sentencing Guidelines*, 42 J.L. & ECON. 365 (1999); Dan M. Kahan, *What Do Alternative Sanctions Mean?*, 63 U. CHI. L. REV. 591 (1996).

³⁸ See, e.g., Steven Hetcher, *Creating Safe Social Norms in a Dangerous World*, 73 S. CAL. L. REV. 1 (1999).

³⁹ See, e.g., Eric A. Posner, *Family Law and Social Norms*, in THE FALL AND RISE OF FREEDOM OF CONTRACT 256 (F.H. Buckley ed., 1999); Elizabeth S. Scott & Robert E. Scott, *A Contract Theory of Marriage*, in THE FALL AND RISE OF FREEDOM OF CONTRACT, *supra* at 201.

⁴⁰ See, e.g., Eric A. Posner, *Law and Social Norms: The Case of Tax Compliance*, 86 VA. L. REV. 1781 (2000).

⁴¹ See, e.g., ELLICKSON, *supra* note 3, at 4, 138; POSNER, *supra* note 20, at 4 (criticizing normative and positive branches of law and economics for assuming that individuals “are unaffected by the attitudes of others”—that is, by neglecting to consider that individuals often conform to social norms); Janice Nadler, *Expressive Law, Social Norms, and Social Groups*, 42 LAW & SOC. INQUIRY 60, 61 (2017) (“In contrast to the instrumental view that law operates on autonomous individuals by providing a set of incentives, the social groups view holds that a person’s attitude and behavior regarding any number of demands of law . . . is a product of the interaction of law, social influence, and motivational goals that are shaped by that person’s commitments to specific in-groups.”).

⁴² See Madison, Frischmann & Strandburg, *supra* note 32, at 666 (“Intellectual property law scholarship has typically viewed invention, creative expression, innovation, and related or subsidiary activities (such as research and development) as a special set of practices for which extra encouragement is warranted.”); Peter S. Menell, *Intellectual Property: General Theories*, in 2 ENCYCLOPEDIA OF LAW AND ECONOMICS: CIVIL LAW AND ECONOMICS 131–32 (Boudewijn Bouckaert & Gerrit de Geest eds., 2000) (charting the history of economic thinking on IP that reinforced the importance of governmental intervention to generate optimal levels of innovation). Studies on the role of social norms and innovation have lagged behind studies in other legal areas by at least a decade. See, e.g., Raustiala & Sprigman, *Rights*, *supra* note 4, at 2 (noting, in 2016, that the literature on social norms and innovation is “barely more than a decade old”).

⁴³ A recent collection of essays is illustrative of the range of industries where social norms are now thought to foster innovation without IP or other governmental interventions. Perzanowski & Darling, *supra* note 4 (containing essays that describe the centrality of social norms for innovation in cuisine,

innovation processes is singularly important because it illustrates the reach of social norms in an area where predictions of the centrality of governmental intervention were thought to be most robust.⁴⁴ In this part, we briefly describe both work on IP and social norms and on the field of law and social norms more broadly—emphasizing points of departure between the IP and social norms literature and the broader literature on law and social norms.

Before we briefly summarize this literature, a note on what we mean by “social norms” is in order. We adopt the classification put forth by Robert Ellickson,⁴⁵ whose work has served as a springboard for much of the work on innovation without IP that we discuss here.⁴⁶ Social norms are rules that emerge from and are enforced by nonhierarchically organized social forces (as opposed to organizations or governments, which promulgate organizational rules and law, respectively).⁴⁷ Much like organizational rules or law, social norms influence behavior in three ways: (1) by rewarding good (prosocial) behavior, (2) by ignoring ordinary behavior, and (3) by punishing bad (antisocial) behavior.⁴⁸ Rewards and punishments are not hierarchically imposed; rather, they operate through an informal system of “vicarious self-help,” which includes gossip, shunning, reputational harms or benefits, and may include violence in cases of egregious norm-breaking behavior.⁴⁹ Thus, identifying the content of social norms that operate in particular communities requires recognizing the behaviors that such community labels as “good,” “ordinary,” or “bad,” as well as the carrots and sticks that such communities have developed to foster the good and dissuade the bad.

With these definitions in mind, we now turn to the literature on social norms and innovation.

A. IP Law and Social Norms

The traditional justification for IP rights is utilitarian. IP is necessary to incentivize the efficient production of information goods. Absent IP

medical devices and procedures, tattoo, roller derby, architecture, porn, and Nollywood (i.e., Nigerian films); see also *infra* note 154 and accompanying text.

⁴⁴ See Menell, *supra* note 42, for a summary of the theoretical underpinnings of IP—focusing on the need for governmental intervention to avert market failure.

⁴⁵ ELLICKSON, *supra* note 3.

⁴⁶ See, e.g., Fagundes, *supra* note 12, at 1133 (“Ellickson’s *Order Without Law* is the cornerstone non-legal centralist explanation for the evolution of extralegal norm systems as forms of governance.”); Fauchart & von Hippel, *supra* note 7, at 187; Raustiala & Sprigman, *Rights*, *supra* note 4, at 5 (“At a foundational level this line of scholarship draws deeply from the well of ideas associated with Robert Ellickson (1991) and his influential book, *Order Without Law*.”).

⁴⁷ ELLICKSON, *supra* note 3, at 127.

⁴⁸ *Id.* at 124.

⁴⁹ *Id.* at 131.

protection, free riding by copyists would sharply limit financial returns to creators, ultimately diminishing incentives to create information goods in the first place.⁵⁰ Despite the importance of this canonical story in shaping IP law and policy, the empirical evidence that IP law functions in the world as this traditional narrative predicts is, at best, inconclusive.⁵¹ In the past decade, a growing body of work has emerged that points to the irrelevance of IP protection for intellectual production, at least in a subset of creative fields. These studies argue that social norms can create overlooked incentives to innovate.⁵² Implicit in several of these studies—and as an explicit concern in others—is the suggestion that social norms represent a superior coordinating mechanism that provides tailored incentives to particular innovator communities without the attendant deadweight loss, holdup concerns, and high litigation costs that plague IP regimes.⁵³

Case studies have found social norms play a key role in fostering and maintaining creative output in a variety of fields including fashion, high-end cuisine, stand-up comedy, tattoo, roller derby, open-source software, flu vaccine research, and medicine, among others.⁵⁴ Some of these communities,

⁵⁰ See ROBERT P. MERGES ET AL., *INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE* 11 (3d ed. 2003) (“Information has the characteristics of what economists call a ‘public good’—it may be ‘consumed’ by many people without depletion, and it is difficult to identify those who will not pay and prevent them from using the information.”); Fisher, *Intellectual Property and Innovation*, *supra* note 30; William Fisher, *Theories of Intellectual Property*, in *NEW ESSAYS IN THE LEGAL AND POLITICAL THEORY OF PROPERTY* 168, 169 (Stephen R. Munzer ed., 2001) [hereinafter Fisher, *Theories of Intellectual Property*] (“The distinctive characteristics of most intellectual products . . . are that they are easily replicated and that enjoyment of them by one person does not prevent enjoyment of them by other persons.”); Eric E. Johnson, *Intellectual Property and the Incentive Fallacy*, 39 *FLA. ST. U. L. REV.* 623, 631–32 (2012) (explaining how ideas are public goods: they are “copyable goods” that are “nonrivalrous” and “nonexcludable”); Mark A. Lemley, *Ex Ante Versus Ex Post Justifications for Intellectual Property*, 71 *U. CHI. L. REV.* 129, 129–30 (2004) (explaining that according to the traditional theory, in the absence of IP protection people would prefer to copy others’ ideas rather than coming up with their own).

⁵¹ See, e.g., Lemley, *supra* note 11, at 1335 (“[W]e have gone out, collected the evidence, and found that it is far from clear that IP is doing the world more good than harm.”).

⁵² See, e.g., Oliar & Sprigman, *supra* note 8, at 1832 (“None of the foundational theoretical studies (as distinguished from recent studies in IP law that focus on particular creative communities) meaningfully acknowledges the possibility that social norms can provide incentives to create.”); Perzanowski & Darling, *supra* note 4, at 2 (arguing that IP law has “historically disregarded non-legal regulatory tools that enable more granular, and potentially more effective, management of creative incentives”); Raustiala & Sprigman, *Rights*, *supra* note 4, at 7 (“Many negative space studies have documented the powerful role social norms play in stimulating innovation and constraining appropriation.”).

⁵³ See *infra* notes 66–72 and accompanying text.

⁵⁴ See, e.g., KAL RAUSTIALA & CHRISTOPHER SPRIGMAN, *THE KNOCKOFF ECONOMY: HOW IMITATION SPARKS INNOVATION* (2012); ROBERT SPOO, *WITHOUT COPYRIGHTS: PIRACY, PUBLISHING, AND THE PUBLIC DOMAIN* (2013) (foreign literary works); Fagundes, *supra* note 12 (roller derby names); Fauchart & von Hippel, *supra* note 7 (French cuisine); Blake Fry, *Why Typefaces Proliferate Without Copyright Protection*, 8 *J. TELECOMM. & HIGH TECH. L.* 425, 432–37 (2010) (typefaces); Hubbard, *supra* note 12; Jacob Loshin, *Secrets Revealed: Protecting Magicians’ Intellectual Property Without Law*, in

such as the fashion industry and high-end cuisine, operate in an environment where IP protection is unavailable.⁵⁵ In other industries, such as stand-up comedy, tattoo, and roller derby, IP protection is available but seldom used.⁵⁶ In yet other industries, such as open-source software, flu vaccine research, and medicine, participants actively discourage resort to IP law—despite it being readily available—often through contractual devices.⁵⁷

We identify two key takeaways from this literature. The first is that creativity can and does routinely take place not through IP law but through social norms. For example, in their study of stand-up comedians, Oliar and Sprigman conceive of social norms as averting the risk of market failures in the absence of IP rights.⁵⁸ Similarly, Fauchart and von Hippel characterize norm-based IP systems as “enabl[ing] innovators to establish and enforce rights to some types of IP to their economic advantage.”⁵⁹ And Perzanowski and Darling characterize current research on innovation without IP as revealing “the role that social norms, marketplace strategy, and architectural changes can play in shaping an environment *hospitable* to creativity.”⁶⁰ In high-IP contexts, the social norms of openness and collaboration are also innovation inducing. For example, Katherine Strandburg describes several mechanisms by which the social norm of sharing in science-based industries

LAW AND MAGIC: A COLLECTION OF ESSAYS 123 (Christine A. Corcos ed., 2010) (magic tricks); Fiona Murray et al., *Of Mice and Academics: Examining the Effect of Openness on Innovation*, 8 AM. ECON. J.: ECON. POL. 212 (2016) (academic science); Oliar & Sprigman, *supra* note 8; Perzanowski, *supra* note 9; Raustiala & Sprigman, *Rights*, *supra* note 4; Mark F. Schultz, *Fear and Norms and Rock & Roll: What Jambands Can Teach Us About Persuading People to Obey Copyright Law*, 21 BERKELEY TECH. L.J. 651, 653, 676–77 (2006) (jambands); Cathay Y. N. Smith, *Street Art: An Analysis Under U.S. Intellectual Property Law and Intellectual Property’s Negative Space Theory*, 24 DEPAUL J. ART, TECH. & INTELL. PROP. L. 259 (2014) (graffiti); Robert Spoo, *Courtesy Paratexts: Informal Publishing Norms and the Copyright Vacuum in Nineteenth-Century America*, 69 STAN. L. REV. 637 (2017) (foreign literary works); Katherine J. Strandburg, *Legal but Unacceptable: Pallin v. Singer and Physician Patenting Norms, in INTELLECTUAL PROPERTY AT THE EDGE: THE CONTESTED CONTOURS OF IP* (Rochelle Cooper Dreyfuss & Jane C. Ginsburg eds., 2014). In her analysis of the flu vaccine network, Amy Kapczynski moves the debate beyond the IP or social norms dichotomy, to emphasize that innovation can flourish without IP but *with* other forms of governmental intervention. See Amy Kapczynski, *Order Without Intellectual Property Law: Open Science in Influenza* 102 CORNELL L. REV. 1539 (2017). Her emphasis on other government-based interventions to promote innovation is in alignment with many of the policy proposals we advance in Part III.

⁵⁵ See, e.g., Fauchart & von Hippel, *supra* note 7, at 187; Raustiala & Sprigman, *Piracy Paradox*, *supra* note 5.

⁵⁶ See, e.g., Fagundes, *supra* note 12; Oliar & Sprigman, *supra* note 8; Perzanowski, *supra* note 9.

⁵⁷ See, e.g., Kapczynski, *supra* note 54; Josh Lerner & Jean Tirole, *Some Simple Economics of Open Source*, 50 J. INDUS. ECON. 197 (2002); Strandburg, *supra* note 54.

⁵⁸ Oliar & Sprigman, *supra* note 8, at 1860 (“Our study suggests that even in instances where, at least initially, market failure seems likely, non-legal protections against unauthorized appropriation may later develop and avert the risk of market failure.”).

⁵⁹ Fauchart & von Hippel, *supra* note 7, at 196–97.

⁶⁰ Perzanowski & Darling, *supra* note 4, at 5 (emphasis added).

fosters innovation, including by “boost[ing] a user innovator’s reputation within the community and sometimes even among the broader public.”⁶¹ Similarly, openness and collaboration, tied to “recognition” rewards, are postulated to enhance innovation in open-source software communities by incentivizing individual programmers to devote their time to open-source projects.⁶²

A second important lesson from the literature on social norms and innovation is that IP law does not function in a vacuum; rather, it functions against background social norms.⁶³ The fact that formal law and informal norms coexist raises important questions about the impact of their interaction on innovation. Formal law could work synergistically with social norms, have no impact on the content of social norms, or undermine them.⁶⁴ IP law and norms scholars have been cautious about predicting the direction of this interaction, although many have warned that IP law could diminish the innovation-enhancing effects of social norms—for example, by displacing cost-efficient, reputation-based norms with costly IP-rights regimes.⁶⁵

Two advantages of social norms systems over IP law feature prominently in most writings. First, social norms—unlike one-size-fits-all IP regimes—can be tailored to the needs of particular innovator communities.⁶⁶

⁶¹ Katherine J. Strandburg, *Derogatory to Professional Character?: The Evolution of Physician Anti-Patenting Norms*, in *CREATIVITY WITHOUT LAW: CHALLENGING THE ASSUMPTIONS OF INTELLECTUAL PROPERTY* 63, 64 (Kate Darling & Aaron Perzanowski eds., 2017). Strandburg describes two additional reasons why a “sharing norm” is innovation enhancing. First, “user innovators benefit from a sharing norm because they can use the inventions shared by other community members. Second, by sharing their inventions with the community, user innovators obtain feedback and suggestions for improvement.” *Id.* at 63–64.

⁶² See, e.g., Lerner & Tirole, *supra* note 57, at 206.

⁶³ Oliar & Sprigman, *supra* note 8, at 1866 (“The case for intellectual property law . . . must explain why non-legal regulation is inadequate, and why market failure is therefore likely in the absence of formal legal regulation.”).

⁶⁴ See, e.g., *id.* at 1832 (“If a non-IP incentive is present either generally or in a particular market or creative practice, the marginal benefit of legal protection would thus be only the added creativity that formal law induces above and beyond that preexisting baseline of incentives.”).

⁶⁵ See, e.g., Fagundes, *supra* note 12, at 1146 (“[T]here is something concerning about the increasing likelihood that the foundation of our blackletter IP law is premised on an empirical fact about motivation that does not match the way much (even if not all) modern creative production actually happens.”); Oliar & Sprigman, *supra* note 8, at 1836 (“If enforcement of property rights among stand-up comedians shifted toward the use of formal law (perhaps following changes in the copyright laws intended to encourage the use of formal law by comedians), the costs of monitoring and enforcement might be much greater, and could even displace the cost-effective informal enforcement customs that have developed over decades.”); Raustiala & Sprigman, *Piracy Paradox*, *supra* note 5, at 1744–45 (“[I]t is also likely true that a move to a nominal high-IP regime in the United States is more likely to result in significant litigation compared to the same move in Europe.”); Strandburg, *supra* note 61, at 64 (“Patents may be both costly and dangerous to the viability of a user innovator community with a reputation-based sharing norm.”).

⁶⁶ See, e.g., Horace E. Anderson, Jr., *No Bitin’ Allowed: A Hip-Hop Copying Paradigm for All of Us*, 20 *TEX. INTELL. PROP. L.J.* 115, 117 (2011) (arguing that informal norms in the hip-hop community are

Social norms carry with them the promise of adaptive flexibility while law imposes significant uniformity costs.⁶⁷ Indeed, the social norms that emerge from studies in IP's negative space are strikingly heterogeneous. In some cases, such as the fashion industry, social norms treat copying as "ordinary behavior" that is neither punished nor encouraged;⁶⁸ in other cases, such as high-end cuisine, social norms punish only *exact* copying and misattribution.⁶⁹ And yet in other cases, such as stand-up comedy, social norms mimic and even expand prohibitions against copying present in existing IP regimes.⁷⁰ Finally, in open-sharing regimes, such as open-source software and flu vaccine research, social norms actively encourage information exchange.⁷¹ Second, enforcement costs in social norms regimes are often significantly lower than in legal regimes. Litigation costs and lengthy times to reaching a final verdict make legal enforcement in fact inaccessible to many innovators.⁷²

Although scholars recognize that the social norms at work in those communities could have harmful effects on society at large, they leave these negative effects largely unexplored. For example, Oliar and Sprigman briefly consider the possibility that comedians' social norms may have a "net

preferable to formal IP protection because community-tailored copying can distinguish "copying that promotes 'progress' from copying that inhibits it"); Fagundes, *supra* note 12, at 1136 ("[T]he informal manner in which derby girls enforce their name regulation rules creates a variety of flexible outcomes, in contrast with the binary approach of formal law, which tends to require all-or-nothing, winner-loser outcomes."); Magliocca, *supra* note 12, at 877 ("[T]here should be a presumption against considering a process patentable subject matter . . . when a norm can be found in the relevant industry against patenting the class of innovation at issue."); Oliar & Sprigman, *supra* note 8, at 1794 ("We emphasize that one attractive feature of social norms is that they offer a way to order creative practices that do not fit well within copyright law's one-size-fits-all regime."); Perzanowski & Darling, *supra* note 4, at 2 ("IP law displays a troubling insensitivity to the specific needs of particular creative communities, and it has historically disregarded non-legal regulatory tools that enable more granular, and potentially more effective, management of creative incentives."); Elizabeth L. Rosenblatt, *A Theory of IP's Negative Space*, 34 COLUM. J.L. & ARTS 317, 346 (2011) [hereinafter Rosenblatt, *IP's Negative Space*] (arguing that in certain fields, "internal norms that differ from traditional IP" are "better suited to serving the priorities of creators"); Elizabeth L. Rosenblatt, *Fear and Loathing: Shame, Shaming, and Intellectual Property*, 63 DEPAUL L. REV. 1, 41 (2013) [hereinafter Rosenblatt, *Fear and Loathing*] ("In negative-space communities, a lack of formal protection seems to benefit creation and innovation, at least partly because participants in these communities are governed by customized rule sets enforced by conscience and shame.").

⁶⁷ See, e.g., Oliar & Sprigman, *supra* note 8, at 1839 ("[N]orms-based IP systems may be desirable as a way of tailoring otherwise uniform IP rules.").

⁶⁸ Raustiala & Sprigman, *Rights*, *supra* note 4.

⁶⁹ Fauchart & von Hippel, *supra* note 7.

⁷⁰ Oliar & Sprigman, *supra* note 8.

⁷¹ Lerner & Tirole, *supra* note 57; Kapczynski, *supra* note 54.

⁷² See, e.g., Fauchart & von Hippel, *supra* note 7, at 197.

negative social welfare effect.⁷³ Perzanowski and Darling also note that social norms may not produce an optimal balance of incentives and costs.⁷⁴ And Elizabeth Rosenblatt recognizes that shaming and reputational sanctions can be deeply damaging because they can “occur[] without regard for due process or proportionality.”⁷⁵ Theirs and other writings in the IP and social norms scholarship largely sidestep this issue, however, often emphasizing that because it is uncertain whether current levels of copyright or patent protection are efficient, it is equally difficult to ascertain social norms’ levels of efficiency.⁷⁶ But in the realm of IP law, determining the optimal length and scope of IP entitlements is an area of active empirical and theoretical investigation.⁷⁷ Theoretically, as Amy Kapczynski has pointed

⁷³ Oliar & Sprigman, *supra* note 8, at 1863; *id.* at 1836 (noting that “like formal IP law, norms-based regulation of jokes may err either by underprotecting or overprotecting creators”).

⁷⁴ Perzanowski & Darling, *supra* note 4, at 7 (“We cannot prove, nor do we claim, that communities that rely on social norms or market-based responses to address information appropriation produce an optimal balance of incentives and costs.”).

⁷⁵ Rosenblatt, *Fear and Loathing*, *supra* note 66, at 39; *see also* Rosenblatt, *IP’s Negative Space*, *supra* note 66, at 340 (noting that the very existence of social norms does not necessarily mean reliance primarily on social norms would be the best way to promote innovation in a given field).

⁷⁶ *See, e.g.*, Hubbard, *supra* note 12, at 404 (recognizing the important conflicts between the traditional market-allocation justification for IP rights and reputation-based norm enforcement but concluding that “[a]ddressing these conflicts is challenging because of the difficulty of measuring the comparative costs and benefits related to inventing norms vis-à-vis those related to exclusive rights”); Oliar & Sprigman, *supra* note 8, at 1839 (“We lack the baseline to make a reliable determination because we do not know whether formal copyright law is itself under- or over-protective with respect to any particular creative product at issue here.”); Perzanowski & Darling, *supra* note 4, at 7 (“[I]n part, the answer eludes us because IP policy has paid insufficient attention to isolating and measuring the incentives at the core of the justification for the IP system.”). There are some important exceptions to this lack of focus on the potential negative impact of social norms. Rochelle Cooper Dreyfuss has questioned the ability of social norms to promote optimal levels of creativity, emphasizing the fragility of norm-based systems and their dependence on homogeneous, tight-knit communities. Rochelle Cooper Dreyfuss, *Does IP Need IP? Accommodating Intellectual Production Outside the Intellectual Property Paradigm*, 31 CARDOZO L. REV. 1437, 1458–62 (2010). Jennifer Rothman has more broadly questioned efforts to interpret IP doctrines by reference to local customs, arguing that industry-developed customary norms are likely to be suboptimal when compared with formal IP law. Jennifer E. Rothman, *The Questionable Use of Custom in Intellectual Property*, 93 VA. L. REV. 1899, 1906–07 (2007). And Amy Kapczynski has criticized IP and social norms scholarship for generally neglecting to consider whether individual communities’ social norms are efficient from a societal perspective. Kapczynski, *supra* note 54, at 1546.

⁷⁷ Articles and books analyzing how to design an efficient patent and copyright systems are too many to comprehensively list. For some examples of this literature, see SUZANNE SCOTCHMER, *INNOVATION AND INCENTIVES* (2004); Nancy T. Gallini, *The Economics of Patents: Lessons from Recent U.S. Patent Reform*, 16 J. ECON. PERSP. 131 (2002); Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 SCI. 698 (1998); Adam B. Jaffe, *The U.S. Patent System in Transition: Policy Innovation and the Innovation Process*, 29 RES. POL’Y. 531 (2000); Joshua Lerner, *The Importance of Patent Scope: An Empirical Analysis*, 25 RAND J. ECON. 319 (1994); Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839 (1990); Suzanne Scotchmer, *Standing on the Shoulders of Giants: Cumulative Research and the Patent Law*, 5 J. ECON. PERSP. 29 (1991).

out in a related critique,⁷⁸ IP law is often deemed efficient because it relies on market signals to channel investments.⁷⁹ This reliance on market signals also provides a test for when IP law is likely to work poorly (for example, when ability to pay is an inadequate signal of social need, or when there is a wide disparity between private and social returns, or when distributive concerns are normatively important).⁸⁰ The efficiency of social norms, which are often maintained by nonpecuniary rewards, cannot be tethered to the same market signal rationale. This lack of emphasis on the potential anti-innovation effects of social norms is an important point of departure from the broader law and social norms literature, in which scholars have focused more extensively on identifying when social norms are likely to be inefficient from a societal perspective, and to which we turn in the next Section.⁸¹

B. Law and Social Norms

The broader literature on law and social norms is not quite as optimistic as the IP literature about the power of norms to efficiently regulate social behavior. Robert Ellickson and Robert Cooter recognized that norms that increase the welfare of group members could harm outsiders and thus be potentially detrimental to society at large.⁸² In Ellickson's theory, social norms emerge and are maintained because they are welfare maximizing for the members of the group: whether to promote, ignore, or punish a particular behavior is the result of a "subtle calculus of cost minimization" through which community members "engage in more enforcement activity to encourage cooperative behavior only if they expected that the marginal gains from the additional cooperation would exceed the marginal costs of the additional enforcement."⁸³ Notice also that we speak here of "communities"

⁷⁸ Kapczynski, *supra* note 54, at 1546–47 (arguing that "[t]he norms literature has largely ignored the question" of whether the types and quantity of innovation generated by social norms regimes is efficient from a societal perspective).

⁷⁹ See, e.g., Harold Demsetz, *Information and Efficiency: Another Viewpoint*, 12 J.L. & ECON. 1, 19–20 (1969); see also Kapczynski, *supra* note 54, at 1557–58.

⁸⁰ See, e.g., Kapczynski, *supra* note 54, at 1557–60 (analyzing the contexts in which the market allocation theory of patent law fails to produce efficient results).

⁸¹ See *supra* note 76. These other critiques, however, do not explore anti-innovation norms in depth, nor do they analyze the sociological and psychological mechanisms that maintain their anti-innovation effects.

⁸² See ELLICKSON, *supra* note 3, at 169 ("[N]orms that add to the welfare of the members of a certain group commonly impoverish, to a greater extent, outsiders to that group."); Robert D. Cooter, *Decentralized Law for a Complex Economy: The Structural Approach to Adjudicating the New Law Merchant*, 144 U. PA. L. REV. 1643, 1690–94 (1996); Robert Cooter, *Law and Unified Social Theory*, 22 J.L. & SOC'Y. 50, 65–66 (1995); Robert D. Cooter, *Structural Adjudication and the New Law Merchant: A Model of Decentralized Law*, 14 INT'L REV. L. & ECON. 215, 224 (1994).

⁸³ ELLICKSON, *supra* note 3, at 173.

as the locus where social norms emerge. The vast majority of social norms are bounded: they are the product of particular communities linked together by geography, cultural identity, or other defining factors.⁸⁴ They also generally apply only to community members.⁸⁵ In fact, Ellickson limited his theory of social norms to “close-knit” communities⁸⁶: those in which “informal power is broadly distributed among group members and the information pertinent to informal control circulates easily among them.”⁸⁷

Other theorists, however, have paid closer attention to social norms’ negative consequences for social welfare, including the social welfare of group members themselves. For example, Richard McAdams has argued that norms arise from and are maintained by individuals’ desire for the “esteem of others”—i.e., their good opinion or respect.⁸⁸ In this theory, social norms can reduce social welfare in two situations. First, social norms are inefficient when they do not arise to solve collective action problems.⁸⁹ Second, social norms can produce excessive (and thus inefficient) levels of conformity.⁹⁰ In this second situation, what McAdams terms “esteem competition” results in norms that originally arise to solve a collective action problem being overenforced, so that people carry out inefficiently high levels of a particular activity.⁹¹ In McAdams’s model, norm overenforcement can take place because esteem is a relative good (i.e., we seek esteem in *comparison* to others), and because imposing esteem sanctions is relatively costless.⁹² Competition to be “well thought of” compared to others raises the cost of noncompliance—i.e., the status loss from deviance—while simultaneously decreasing the gains from compliance.⁹³ Norm competition thus incentivizes individuals to seek “high – or ‘hero’ – status by leading the way to new and

⁸⁴ Of course, organizational rules and law are also bounded in that they apply to members of a particular institution, or—depending on the type of law— a particular state or country.

⁸⁵ *But see* ELLICKSON, *supra* note 3, at 141 n.15 (“[N]orms (or perhaps self-enforced personal ethics) can influence the interactions of parties who are not members of a close-knit group”).

⁸⁶ ELLICKSON, *supra* note 3, at 177 (“The hypothesis predicts that welfare-maximizing norms emerge in close-knit settings but is agnostic about whether such norms can emerge in other social settings.”).

⁸⁷ *Id.* at 177–78.

⁸⁸ McAdams, *supra* note 20, at 342.

⁸⁹ *Id.* at 412.

⁹⁰ *Id.* at 419.

⁹¹ *Id.* at 371 n.123. When law and social norms scholars analyze whether a norm is “efficient” they refer to either Pareto-efficiency or to the Kaldor-Hicks criteria for efficiency. Under the former, a norm is efficient because it makes some or all members of the group better off and nobody worse off. Under the latter, a social norm is efficient if those who benefit from the norm could—through their gains from the new social norm—fully compensate those who do not (although no actual compensation need take place). *See id.* at 409 n.235 (describing these two criteria as applied to law and social norms scholarship). When we characterize a norm as “overenforced,” we use the Kaldor-Hicks efficiency criteria.

⁹² *Id.* at 355–57.

⁹³ *Id.* at 365–66.

higher levels of norm compliance.”⁹⁴ There is no necessary relationship, however, between the optimal level of compliance with the norm (from a societal perspective) and the norm equilibrium achieved through esteem competition.⁹⁵

Eric Posner develops a game-theoretic signaling theory of social norms in which social norms function as costly signals to others that one is a desirable cooperative partner, or a “good type.”⁹⁶ Because *any* costly action can be a signal (including behaviors that could be welfare reducing for society at large), the private good obtained from sending a costly signal (enhancement of reputation) is unrelated to whatever public good (or bad) that might be produced as a consequence of the behavior used as a signal (i.e., the resulting social norm).⁹⁷ Social norms often impose a choice on good types with “idiosyncratic tastes and values” who will either suppress these tastes—to signal their good type—or satisfy them and be shunned.⁹⁸

Russell Hardin takes a more pessimistic approach to social norms in relationship with overall social welfare.⁹⁹ Focusing on the role of social norms on ethnic conflict, Hardin identifies two types of social norms: norms of “exclusion” and “universalistic” norms.¹⁰⁰ The former are norms that “reinforce individual identification with the group and enhance the separation of the group from the larger society or from another specific group in the society.”¹⁰¹ The latter apply uniformly (or “universalistically”) to all members of a society.¹⁰² Hardin argues that norms of exclusion are beneficial to most individual group members and are driven by self-interest, but can be very socially harmful.¹⁰³ Norms of exclusion “work by changing the interests of marginal [or fringe] group members to get them to act in conformity with

⁹⁴ *Id.* at 366. “The result is that one individual’s decision to refrain from engaging in *X* has the externality of raising the price that others must then pay for engaging in that behavior.” *Id.* at 367.

⁹⁵ *Id.* at 420 n.273.

⁹⁶ POSNER, *supra* note 20.

⁹⁷ *Id.* at 24–25. While in McAdams’s model, sanctions (withholding esteem) are considered relatively costless, in Posner’s model, signals are always costly. In addition to costly actions, signals can include shunning others with idiosyncratic tastes or behaviors. Shunning is costly because it “cuts off opportunities for cooperative gains and risks retaliation.” *Id.* at 25.

⁹⁸ *Id.* at 27–28, 214.

⁹⁹ HARDIN, *supra* note 26. *Cf.* Elster, *supra* note 26, at 100 (identifying situations in which a norm may benefit the group but harm society as a whole, *as well as situations in which a social norm does not benefit anyone*).

¹⁰⁰ HARDIN, *supra* note 26, at 72 (Hardin defines these two types of norms as “those that redound to the benefit of members of a more or less well-defined subgroup within a larger society, and those that seem to apply universalistically to more or less all members of a society.”).

¹⁰¹ *Id.*

¹⁰² *Id.*

¹⁰³ *Id.* at 72–73.

the interests of the core of the group.¹⁰⁴ Why would fringe individuals adopt the “core” norms or values of the group? Hardin gives us two reasons. First, assuming that there is often a conflict of interest over limited resources between groups, norms of exclusion allow coordination for access to limited resources (such as state subsidies) for group members only.¹⁰⁵ Second, norms of exclusion serve an “epistemological” purpose: they preserve the “benefits of comfort, familiarity, and easy communication in one’s group.”¹⁰⁶ Here, group preservation is a consumption good itself.¹⁰⁷ Importantly, as in Posner’s model, Hardin’s social norms are ultimately maintained because they function as a signal (in Hardin’s model, to signal group identity).¹⁰⁸ The negative impact of norms of exclusion arises from their effect on both fringe members and those ultimately excluded. Thus, maintaining the comforts of familiarity “typically require[s] exclusion of those who make for discomfort—often hateful exclusion.”¹⁰⁹ And the economic benefit of access to jobs and position requires exclusion of others on the basis of nonmembership.¹¹⁰

Applying these theories to previous case studies on IP’s negative space allows us to identify situations in which social norms are likely welfare reducing and which merit closer study. For example, stand-up comedians’ norms that punish copying of even the very general premise for a joke and that do not allow for independent invention could plausibly be the result of inefficient norm overenforcement through esteem competition.¹¹¹ When one can obtain the esteem of peers by claiming to be an “honest” and “original” comedian who never steals, esteem competition can make behavior that is considered dishonest more and more extreme over time.¹¹² And the behavior of tattoo artists, whose norms sanction the free copying of art made by

¹⁰⁴ *Id.* at 72.

¹⁰⁵ *Id.* at 76–77 (“In a conflict in what is roughly a constant-sum game, at least for the short run, some subgroup or coalition can benefit its members most quickly by excluding others from access to the limited resources.”).

¹⁰⁶ *Id.* at 77 (emphasis removed). When norms of exclusion serve an epistemological purpose, their enforcement is often costless. As Hardin explains, “[t]hey are not sanctioning per se; rather, they are merely acting in the interests of their comfort in familiarity or whatever and excluding those who are unfamiliar.” *Id.* at 90.

¹⁰⁷ *Id.* at 77.

¹⁰⁸ *Id.* at 82 (“Once the convention is in place, I can most readily show my identity by following it. The norm of using it becomes functional to identification with the group.”).

¹⁰⁹ *Id.* at 217.

¹¹⁰ *Id.*

¹¹¹ Oliar & Sprigman, *supra* note 8, at 1823 (“Along these same lines, we heard from many of our interviewees that appropriation of even very general comedic premises—anything that, even if at a high level of generality, was not ‘stock’ or ‘commonplace’—was objectionable.”).

¹¹² *Id.* (“Perhaps less so than any other creative form we can think of, comedians have little esteem for even the most expert reworkings of others’ ideas.”).

“outsiders” but not of original tattoos, while potentially a signal to differentiate good from bad types within the tattoo community, may be a behavior that diminishes overall social welfare once we take into account its effect on those outsider artists whose work tattoo artists freely copy.¹¹³

Our goal in this Article is to widen current conceptualizations of social norms in innovation to include both pro- and anti-innovation features of these norms. The three types of norms we describe in the next Part of this Article—research priority, methodology, and evaluation norms—while serving an important coordinating and focusing function, also maintain boundaries of particular innovator communities and prevent the productive recombination of knowledge across them. Because knowledge recombination across communities of innovators is crucial for breakthrough innovation, these norms can result in important social costs. Anti-innovation norms are reinforced by psychological processes that favor the status quo and in-group conformity. We describe these processes in Part II, providing the first scholarly synthesis in IP law of how psychological biases serve to create and maintain sociological norms. Describing anti-innovation norms opens the door for potential policy interventions to lessen their anti-innovation effects. These interventions can include, but are not limited to, changes in IP law itself.

II. ANTI-INNOVATION NORMS

In this Part, we describe three types of social norms that are at work in innovator communities: (1) research priority, (2) methodology, and (3) evaluation norms. An important function of these three types of norms is to erect and maintain boundaries between different innovator communities. In turn, these boundaries prevent or inefficiently delay important boundary-crossing innovation.

Because an important role of these three norms is to establish difference between communities of innovators, they could be characterized as norms of “exclusion” in Hardin’s terminology. Nevertheless, as we explain in more detail below, the effect of these norms on innovation is more complex. First, by erecting boundaries between communities these norms serve at least one positive social function: they increase specialized knowledge, allowing for coordinated research on specific topics and faster accumulation of and access to specialized knowledge. This welfare-enhancing effect differs from Hardin’s norms of exclusion whose sole function is to increase benefits to insiders by establishing difference and limiting opportunities to outsiders.

¹¹³ Perzanowski, *supra* note 9, at 564–67.

But these types of norms have two crucial anti-innovation features. First, sometimes they simply function to establish difference without attendant social benefits. For example, they can give rise to specialized terms that substitute for standard terminology for the sole purpose of differentiating its users from those who do not use the special terminology.¹¹⁴ Second, these norms run the constant risk of being excessively enforced. Excessive enforcement of community boundaries leads to excessive specialization and insufficient communication across boundaries. We show how excessive enforcement takes place through subtle psychological biases (the status quo bias and the conformity bias) that reinforce the boundary-preserving function of these norms.

In our analysis below, we begin with a short synopsis of how psychological and sociological accounts of innovation converge to show the importance of boundary-crossing recombination for creativity. We then describe in detail how research priority, methodology, and evaluation norms function as anti-innovation norms by preventing such productive knowledge recombination in a variety of creative industries. Our narrative combines sociological and psychological insights. These two lenses provide both macro and micro accounts of how social norms shape individual behavior. In so doing, we expand upon the current theories of social norms in the legal literature. Our account outlines a psychological mechanism through which inefficient norms become internalized—and thus become unexamined, implicit routines in innovator communities.

We conclude by offering some remarks on the theoretical implications of anti-innovation norms. We link our discussion to broader debates in the law and social norms literature—something the existing IP and social norms literature has not sufficiently done—showing how our analysis of the psychological bases of anti-innovation norms complements prevailing models of norm development.

A. The Psychology and Sociology of Creativity and Innovation

Both psychology and sociology have long been interested in how individuals and organizations access and recombine existing knowledge to create new knowledge. We and others have written about this literature in

¹¹⁴ See HARDIN, *supra* note 26, at 79–80 (Hardin made this point about the development of slang in some ethnic communities, noting that “some community-specific slang may . . . do no more than substitute for standard terminology. Its effective function is, rather, to distinguish its users as users, to signal their difference from those who do not use the special terminology.”); see also Dan L. Burk & Jessica Reyman, *Patents as Genre: A Prospectus*, 26 LAW & LITERATURE 163, 164 (2014) (using genre theory methodology to argue that the patent document itself—including its use of jargon—can be in part understood as serving the social role of shaping and preserving the boundaries of the “patent community”).

previous work, and we provide only a short synopsis here.¹¹⁵ This rich and varied scholarship converges on a singular insight: creativity (or innovativeness) is enhanced through the recombination of knowledge from distant domains.¹¹⁶ By distant domains, we mean simply knowledge from specialized fields that are not routinely brought together.

Studies from network and organizational sociology have shown that firms that are located in a “structural hole” in a knowledge network produce more “innovative” products and have better ideas than their competitors.¹¹⁷ Structural holes are discontinuities in social relationships.¹¹⁸ If we imagine communities of innovators as nodes in a knowledge network, information developed within communities whose members interact routinely with each other will flow quite readily among those community members (who are connected by strong social ties) but will have a tendency to remain trapped inside community boundaries. Therefore, firms that occupy structural holes—or “brokers”—are in an enviable position: they have unique access to knowledge from two (or more) communities that do not routinely interact with each other.¹¹⁹ More recent sociological studies have further refined the concept of a knowledge broker. Shifting the focus from a single organization (or individual) to that of a team, recent network studies show that innovations that are considered most creative by peers arise from teams with overlapping memberships in distant knowledge domains.¹²⁰ In other words, team creativity requires *both* trust (from people who have previously worked together, hence the need for overlap) and knowledge distance.¹²¹ Trust is thought to be essential for distant communities to overcome the tensions that arise when separate bodies of knowledge and different ways of

¹¹⁵ See, e.g., Stephanie Plamondon Bair, *Innovation Inc.*, 32 BERKELEY TECH. L.J. 713 (2017); Stephanie Plamondon Bair, *The Psychology of Patent Protection*, 48 CONN. L. REV. 297 (2015) [hereinafter Bair, *Psychology*]; Jeanne C. Fromer, *A Psychology of Intellectual Property*, 104 NW. U. L. REV. 1441 (2010); Gregory N. Mandel, *To Promote the Creative Process: Intellectual Property Law and the Psychology of Creativity*, 86 NOTRE DAME L. REV. 1999 (2011); Pedraza-Fariña, *Constructing Interdisciplinary Collaboration*, *supra* note 15; Pedraza-Fariña, *Social Origins*, *supra* note 15; Pedraza-Fariña, *Sociology of Innovation*, *supra* note 15.

¹¹⁶ By creativity or innovativeness, we mean a particular type of innovation that has a high social value (and that people do in fact value).

¹¹⁷ See, e.g., Ronald S. Burt, *Structural Holes and Good Ideas*, 110 AM. J. SOC. 349, 349–50, 353 (2004).

¹¹⁸ *Id.* at 353.

¹¹⁹ *Id.* at 353–55.

¹²⁰ See, e.g., DAVID STARK, *THE SENSE OF DISSONANCE: ACCOUNTS OF WORTH IN ECONOMIC LIFE* (2009); Mathijs de Vaan, David Stark & Balázs Vedres, *Game Changer: The Topology of Creativity*, 120 AM. J. SOC. 1144 (2015); Balázs Vedres & David Stark, *Structural Folds: Generative Disruption in Overlapping Groups*, 115 AM. J. SOC. 1150 (2010).

¹²¹ de Vaan, Stark & Vedres, *supra* note 120, at 1154–55.

understanding the world come into contact.¹²² Trust enables ongoing communication between distant communities across structural holes. Richard Lester and Michael Piore have called this process of ongoing communication across structural holes an “interpretation” process.¹²³ In contrast to analytical problem-solving, which is goal driven and bounded by a particular problem to be solved, interpretation requires the “capacity to integrate across organizational, intellectual, and cultural boundaries”¹²⁴ and the capacity to “move forward in the face of uncertainty.”¹²⁵ In most new technologies and new art forms, analytical problem-solving comes *after* a period of open-ended discussion and “play” with the possibilities arising from potential combinations across existing community boundaries.¹²⁶

Many of the most innovative contributions to society have been fueled by this interpretive process across community boundaries. From the discovery of the structure of DNA¹²⁷ to the discovery of Big Bang radiation¹²⁸ in the basic sciences; from the rise of designer jeans¹²⁹ to new music and art forms such as jazz, tango, and Pop art in the arts;¹³⁰ and from cell phone technology¹³¹ to new diagnostic technologies¹³² in applied science—transformational advances in the arts and sciences tend to originate with innovators working in areas outside their original fields of training or with teams that combine expertise from distant domains.¹³³

¹²² *Id.* at 1153.

¹²³ RICHARD K. LESTER & MICHAEL J. PIORE, *INNOVATION—THE MISSING DIMENSION* 53 (2004).

¹²⁴ *Id.* at 5.

¹²⁵ *Id.*

¹²⁶ *Id.* at 54.

¹²⁷ *See, e.g.*, HORACE FREELAND JUDSON, *THE EIGHTH DAY OF CREATION: MAKERS OF THE REVOLUTION IN BIOLOGY* (1979) (describing how the discovery of the double-helical structure of DNA was enabled by the migration of physicists to biology).

¹²⁸ *See, e.g.*, Charles H. Townes, *Resistance to Change and New Ideas in Physics: A Personal Perspective*, in *PREMATURITY IN SCIENTIFIC DISCOVERY: ON RESISTANCE AND NEGLECT* 46, 46–47 (Ernest B. Hook ed., 2002) (describing how the application of radio engineering techniques to astronomy led to the discovery of background radiation that provided evidence for the Big Bang theory).

¹²⁹ LESTER & PIORE, *supra* note 123, at 20 (explaining how this type of innovation involved “crossing the boundaries that separated manufacturing . . . from the previously distinct industries of textiles, laundering and finishing, and washing machines”).

¹³⁰ DIANA CRANE, *THE TRANSFORMATION OF THE AVANT-GARDE: THE NEW YORK ART WORLD, 1940–1985*, at 22 (1987).

¹³¹ LESTER & PIORE, *supra* note 123, at 15–17 (explaining how the development of cell phone technology was enabled by the combination of two-way radio and telephone engineering).

¹³² *Id.* at 21–23 (explaining how medical devices draw on both basic life sciences and clinical practice).

¹³³ LESTER & PIORE, *supra* note 123, at 21–23 (explaining how medical devices draw on both basic life sciences and clinical practice); DEAN KEITH SIMONTON, *ORIGINS OF GENIUS: DARWINIAN PERSPECTIVES ON CREATIVITY* 125 (1999); Julie E. Cohen, *Creativity and Culture in Copyright Theory*,

Psychological studies have also demonstrated how boundary-crossing collaborations contribute to creativity and innovation.¹³⁴ For example, as Gregory Mandel has summarized in previous work, empirical work in psychology shows that subjects exposed to dissimilar images tend to produce more creative works (as judged by independent observers) than subjects who do not receive this exposure.¹³⁵

Innovators who cross boundaries are also judged as being more creative by their peers. Scientists who have training or other experience outside of their own narrow disciplines are more likely to be singled out by their colleagues as creative.¹³⁶ And those with the best reputations and highest productivity are better able to call on a diversity of sources in their work.¹³⁷

The cognitive basis for these results is the psychological concept of “associative richness.”¹³⁸ Associative richness refers to the ability of creative people to draw unusual associations among seemingly unrelated concepts.¹³⁹ For example, when asked to name a word related to “table,” a less creative respondent might answer “chair.” A more creative respondent (evincing greater associative richness) might respond instead with “elbow.”¹⁴⁰ The idea underlying the correlation of boundary-crossing collaboration with greater creativity is that those engaged in these collaborations have a natural exposure to a wider array of seemingly unrelated ideas and therefore greater opportunities to express associative richness in their thinking.¹⁴¹

Despite its importance, the process of “interpretation” as Lester and Piore put it, is “not widely understood or even fully recognized” in both scholarly literature on innovation policy and actual managerial practice.¹⁴² We agree with Lester and Piore. In the next section, we show how the neglect of the interpretive process in the legal academy stems from (1) the failure to recognize the existence and importance of anti-innovation norms that prevent conversations across community boundaries and (2) an overfocus on

40 U.C. DAVIS L. REV. 1151, 1190 (2007); R. Keith Sawyer, *Creativity, Innovation, and Obviousness*, 12 LEWIS & CLARK L. REV. 461, 480–81 (2008).

¹³⁴ See, e.g., Mandel, *supra* note 115, at 2013–16.

¹³⁵ *Id.* at 2014 (citing SIMONTON, *supra* note 133, at 46).

¹³⁶ *Id.* (citing TERESA M. AMABILE, *CREATIVITY IN CONTEXT* 87 (1996)).

¹³⁷ *Id.* (citing Sarnoff A. Mednick, *The Associative Basis of the Creative Process*, 69 PSYCHOL. REV. 220, 223 (1962)).

¹³⁸ *Id.* at 2015.

¹³⁹ Liane Gabora, *Cognitive Mechanisms Underlying the Creative Process*, in PROCEEDINGS OF THE FOURTH INTERNATIONAL CONFERENCE ON CREATIVITY AND COGNITION 126, 128 (T. Hewett & T. Kavanaugh eds., 2002).

¹⁴⁰ *Id.*

¹⁴¹ See Mandel, *supra* note 115, at 2015.

¹⁴² LESTER & PIORE, *supra* note 123, at 8–9.

addressing the free-rider and appropriability problems through innovation policy.¹⁴³

Despite the social benefits generated by knowledge recombination across boundaries of inventor communities, specialized communities of innovators develop social norms to preserve their boundaries. As we argue below, these norms emerge initially out of rational self-interest, as they function as coordination devices that benefit the group and its members. Psychological processes embed these norms into community routines, however, ultimately leading to their socially inefficient overenforcement. Overenforcement of boundary-preserving social norms privileges narrow analytical problem-solving inside community boundaries over open-ended interpretation across them.

B. Three Types of Anti-Innovation Norms: Research Priority, Methodology, and Evaluation Norms

1. Research Priority Norms

An important feature that distinguishes one community of innovators or artists from another is which problems they prioritize for focus and study. Research priority norms in different communities thus separate legitimate from illegitimate research questions within that community. Identifying and framing important problems worthy of scientific or artistic exploration is, perhaps surprisingly, often more difficult than finding a solution to those problems. As Charles Darwin is said to have remarked looking back on his development of the theory of evolution: “I think it was more difficult to see what the problems were than to solve them, so far as I have succeeded in doing, and this seems to me rather curious.”¹⁴⁴ For this reason, research priority norms can serve an important focusing and coordinating function. By specifying particular problems as especially worthy of study, research priority norms guide community members to work together at solving them. In turn, having multiple people focus on a solution for a particular problem speeds up its resolution and provides deeper insights. This is the bright side of research priority norms.

For example, in the basic sciences, astronomers’ research priority has long been the observation of increasingly distant objects.¹⁴⁵ This research priority led to an intense focus in this community on the development of

¹⁴³ See also Pedraza-Fariña, *Social Origins*, *supra* note 15, at 430–35 (discussing how patent law undervalues the importance of problem-finding—often an “interpretive” undertaking—in innovation).

¹⁴⁴ ROBERT K. MERTON, *SOCIAL RESEARCH AND THE PRACTICING PROFESSIONS* 17–18 (Aaron Rosenblatt & Thomas F. Gieryn eds., 1982).

¹⁴⁵ See, e.g., Townes, *supra* note 128, at 46–47.

better and more sophisticated optical telescopes.¹⁴⁶ Similarly, in the biological sciences, oncologists and cancer biologists have long been interested in understanding the mechanisms that control cell division.¹⁴⁷ Such focus in cancer biology has led to a deeper understanding of how particular genetic mutations that deregulate proliferation give rise to cancer.¹⁴⁸ In the telephone equipment industry, increasing voice quality and preventing dropped calls was long a research priority.¹⁴⁹ The majority of research in the telephone industry was therefore focused on improving the “switch” technology responsible for signal quality.¹⁵⁰ Finally, in the art industry, different communities of artists developed their own, distinct aesthetic traditions.¹⁵¹ Each tradition prioritized different aesthetic problems and techniques in its art.¹⁵² Take, for example, the two distinct groups within Abstract Expressionism—the color-field painters and the gesture painters: whereas the color-field painters prioritized the visual impact of light and color, the gesture painters favored subjective, individualistic expression of emotion.¹⁵³ Much like the other innovator communities described in this

¹⁴⁶ *Id.*

¹⁴⁷ *See, e.g.*, Pedraza-Fariña, *Constructing Interdisciplinary Collaboration*, *supra* note 15, at 265–67.

¹⁴⁸ *See, e.g.*, Douglas Hanahan & Robert A. Weinberg, *The Hallmarks of Cancer*, 100 *CELL* 57, 57 (2000) (“The barriers to development of cancer are embodied in a teleology: cancer cells have defects in regulatory circuits that govern normal cell proliferation and homeostasis.”); Laura G. Pedraza-Fariña, *Mechanisms of Oncogenic Cooperation in Cancer Initiation and Metastasis*, 79 *YALE J. BIOLOGY & MED.* 95, 100 (2006) (“Understanding the mechanisms of oncogenic stimulation of proliferation and death is important to dissect specific cancer-initiation pathways and to develop therapeutics.”).

¹⁴⁹ *See, e.g.*, LESTER & PIORE, *supra* note 123, at 15–17.

¹⁵⁰ *Id.*

¹⁵¹ *See, e.g.*, CRANE, *supra* note 130, at 22 (“The fact that [art] styles generate a long-term commitment on the part of some artists is an indication that each style reflects a distinctive ‘worldview’ composed of attitudes toward past and contemporary artistic achievements, appropriate subject matter, and the acceptability of various techniques.”). It may seem odd to characterize expressive works as addressing a particular “research priority” of their respective artistic communities. Yet, different communities of artists do indeed have “preoccupations” or “priorities” that are examined through their chosen means of expression. For example, the confrontation between Abstract Expressionists and Pop artists had much to do with their differing preoccupations or research priorities. Abstract Expressionists saw themselves as engaged in a struggle for individualistic self-expression in an often hostile, man-made world. *See, e.g.*, MICHAEL LEJA, *REFRAMING ABSTRACT EXPRESSIONISM* 3 (1993) (arguing that Abstract Expressionist art had an “investment in the psyche of modern man, that it held forms and gestures to be revelatory,” and “that it was somehow responsive to the terrors of the man-made world”); TILMAN OSTERWOLD, *POP ART* 8 (2003) (characterizing Abstract Expressionism as focused on “subjectivism and . . . self-realization”). In contrast, Pop artists were preoccupied with analyzing the intersection of life and art, questioning the Abstract Expressionists’ subjectivist detachment from every-day life and objects, and bringing together “high-brow” and “low-brow” topics. *See, e.g., id.* at 8 (Pop artists “responded to the painting of subjective, psychosomatic mood with objective reflections of contingent reality which they saw as symbols of life as it was lived.”).

¹⁵² *Id.*

¹⁵³ *Id.* at 23.

paragraph, the distinct research priorities of each group allowed the emergence of a shared dialogue over the proper way to approach a canvas.¹⁵⁴

But research priority norms have an important dark side that impedes innovation. By emphasizing which research problems are worth studying they *exclude* other problems from analysis. Of course, the problems that are excluded by one community's research norms may be emphasized in a different community. The key exclusionary effect of research priority norms, however, is felt when solving a problem falls at the intersection of two or more communities, or simply outside any community's research priorities. When this is the case, research priority norms in effect deprioritize intersectional problems. But as research from the sociology and psychology of innovation shows, solving intersectional problems frequently generates as large, and often greater, social benefits than those prioritized by each innovator community. In other words, research priority norms act as anti-innovation norms when they are strongly enforced within a community, so that members—and in particular marginal members—are discouraged from focusing on intersectional problems. Note, however, that our argument does not require that intersectional problems (or problems that require expertise from more than a single community to be formulated and solved) be *more* socially valuable than problems located within community boundaries. Rather, we argue that—even assuming intersectional and internal problems have the same social value—research priority norms will lead to an overfocus on the latter and underfocus on the former type of problem. The key to understanding this effect is to recognize that research priority, methodology, and evaluation norms will inefficiently push fringe or marginal innovators (who reside at the boundaries of their community) to focus on “core” community problems, using “core” community methodologies. This is precisely what happened in the creative communities of astronomers, oncologists, telephone engineers, and Abstract Expressionists described above.

The existence of social norms is best demonstrated through episodes of enforcement: it is when transgressors are punished for deviating from accepted research priorities that the underlying norm often becomes visible. Take, for example, astronomers' focus on optics technology and on the visual exploration of the skies. The enforcement of the norm of visual exploration took place through reputational sanctions and shunning astronomers who became interested in using radio waves to explore the skies. The deviant astronomers had difficulty publishing their research in

¹⁵⁴ *Id.* at 62 (“The Abstract Expressionists redefined artistic conventions concerning the appropriate way to approach the canvas. They did not begin with a subject, the subject emerged from their work on the canvas.”).

recognized, peer-reviewed journals, securing federal and private funding, and obtaining university and industry employment.¹⁵⁵ In contrast, astronomers who followed priority norms were rewarded with reputational and career-advancement benefits.¹⁵⁶ In hindsight, however, the norm-breaking astronomers' were onto something: the discovery of Big Bang radiation was made possible not by mainstream astronomers but by a radio engineer at Bell Laboratories who had serendipitously trained his radio antenna onto the skies.¹⁵⁷

For their part, oncologists' focus on cell division led to the development of powerful chemotherapeutic drugs for cancer. These drugs, however, can have very detrimental effects on fertility.¹⁵⁸ Research on the impact of chemotherapeutic drugs on fertility, however, fell at the intersection of two communities: oncologists and endocrinologists. While oncologists privileged understanding dysregulated cell division, endocrinologists privileged understanding infertility in otherwise healthy women. The intersectional problem of "chemotherapeutic-driven infertility" was addressed by neither group.¹⁵⁹ And efforts to address it were met with important reputational and financial hurdles: neither the oncology nor the endocrinology communities were willing to provide financial backing for such projects.¹⁶⁰ At the same time, research projects that fell squarely within the research priorities of the respective oncology and endocrinology communities were routinely rewarded with grant awards and job-promotion opportunities.¹⁶¹

The ubiquitous cell phones that few of us could do without emerged at the intersection of communities of telephone and radio engineers. One key obstacle to the development of cell phone technology was the clashing research priorities of these two communities. As Lester and Piore explain, while signal quality was an "obsession" with telephone engineers, "[r]adio engineers had a reputation in the industry as cowboys: their knowledge was

¹⁵⁵ See, e.g., Townes, *supra* note 128, at 47–48 (describing how "big shot[s]" in astronomy strongly discouraged emerging astronomers' interest in radio waves and recounting how a faculty member in Harvard's astronomy department interested in radio astronomy was discouraged by the department from pursuing this line of work).

¹⁵⁶ See *id.*

¹⁵⁷ Jansky's important discovery, however, remained underappreciated both by engineers and astronomers. In the words of an observer, "[n]either fish nor fowl, it was unable to be appreciated by either the scientists or engineers, and therefore lay untouched as an isolated curiosity." Woodruff T. Sullivan, III, *Karl Jansky and the Discovery of Extraterrestrial Radio Waves*, in *THE EARLY YEARS OF RADIO ASTRONOMY* 3, 3 (W. T. Sullivan, III ed., 1984).

¹⁵⁸ Pedraza-Fariña, *Constructing Interdisciplinary Collaboration*, *supra* note 15, at 261.

¹⁵⁹ *Id.* at 261–62.

¹⁶⁰ See *id.* at 265–67.

¹⁶¹ *Id.* at 267.

empirical, ad hoc, hands on. . . . Signal quality was often indifferent, fading in and out; communications were frequently interrupted and lost.¹⁶²

Finally, the hegemony of Abstract Expressionist thinking in New York City in the 1940s made it almost impossible for artists interested in less abstract, more representational art to gain recognition. As Diana Crane explains: “[A]t the very time that Abstract Expressionism was perceived as exhausted and bankrupt, it simultaneously exerted a hegemony so absolute that it offered young artists no room to maneuver.”¹⁶³ Alternative approaches to art, including Minimalism¹⁶⁴ and Pop art,¹⁶⁵ emerged in spite of such hegemony due to performance events that brought together dancers, painters, sculptors, musicians, and performing artists who developed a joint interest in “translat[ing] real-life activities into art.”¹⁶⁶ In these performance events, research priority norms were relaxed and boundaries between communities became fluid. In contrast to much of the dominant art world where aesthetic ideologies and loyalties were narrowly drawn and mutually exclusive, performance events allowed “visual artists [to] mingle[] as freely with dancers and performing artists as with other painters and sculptors, with the result that aesthetic influences moved easily back and forth across disciplines.”¹⁶⁷

2. Methodology Norms

Methodology norms (or *how* to study a problem) are as emblematic of a community of innovators’ essence as are the research problems such community chooses to address. In fact, under one interpretation of culture, culture is defined by the particular tools and routines a community uses for solving problems.¹⁶⁸ Methodology norms are inextricably tied to research priority norms. Often, research problems are prioritized based on what a particular community’s methodology (or way of understanding the world) can in fact study. Sociologists of science have called these “do-able

¹⁶² LESTER & PIORE, *supra* note 123, at 16–17.

¹⁶³ CRANE, *supra* note 130, at 25.

¹⁶⁴ *Id.* at 27.

¹⁶⁵ *Id.* at 32.

¹⁶⁶ *Id.*

¹⁶⁷ *Id.* at 31.

¹⁶⁸ See, e.g., Jeffrey C. Alexander, *Cultural Pragmatics: Social Performance Between Ritual and Strategy*, 22 SOC. THEORY 527, 565–66 (2004); Paul DiMaggio, *Culture and Cognition*, 23 ANN. REV. SOC. 263, 264–65 (1997); Ann Swidler, *Culture in Action: Symbols and Strategies*, 51 AM. SOC. REV. 273, 273 (1986) (defining culture as a “‘tool kit’ of symbols, stories, rituals, and world-views, which people may use in varying configurations to solve different kinds of problems”).

problems,” that is, problems that can be solved with the tools that have been developed and privileged in a particular community.¹⁶⁹

For example, astronomers’ research priority norm of studying increasingly distant stellar objects was coupled with (and influenced by) a methodology norm of using optical telescopes as the right technology to study the skies.¹⁷⁰ Similarly, the methodologies and painting techniques privileged by Abstract Expressionists—for example, allowing the composition to simply emerge from their spontaneous work on the canvas—were linked to their research priorities that emphasized individual self-expression and rejected representation of the outside world.¹⁷¹

Much like research priority norms, methodology norms can serve a positive social function by focusing and coordinating research efforts. But they can also have a negative, anti-innovation side. When particular methodologies become emblematic of a community’s identity, endorsing a particular methodology often means excluding alternative, nonconforming methodologies. Thus, astronomers first rejected what would later be known as radio astronomy; telephone companies resisted using what they considered inferior and often unreliable radio communication technology and its more flexible, ad hoc trouble-shooting methods;¹⁷² and Abstract Expressionists rejected Pop artists’ inclusion of representational, everyday commercial objects and pictures in their work.¹⁷³

Because intersectional problems are often best addressed by a combination of methodologies, the kinds of exclusion described above can have important negative social consequences. For example, in astronomy, the combination of optical and radio telescopes has provided insights that neither one of these approaches could provide on their own. While optical astronomy is ideal for the detection of objects such as stars and galaxies that emit a lot of visible light, radio astronomy allowed the detection of new types of objects that are undetectable with optical telescopes, such as pulsars and quasars.¹⁷⁴ These insights were delayed by initial resistance to radio astronomy techniques rooted in research priority and methodology norms of

¹⁶⁹ Joan H. Fujimura, *Constructing ‘Do-Able’ Problems in Cancer Research: Articulating Alignment*, 17 SOC. STUD. SCI. 257, 257 (1987).

¹⁷⁰ See, e.g., Townes, *supra* note 128, at 47.

¹⁷¹ See, e.g., CRANE, *supra* note 130, at 62.

¹⁷² LESTER & PIORE, *supra* note 123, at 16.

¹⁷³ CRANE, *supra* note 130, at 62 (“With Abstract Expressionism, the modernist aesthetic tradition became highly esoteric, excluding from its domain humanistic values, decoration, representation, and the rapidly expanding phenomenon of popular culture.”).

¹⁷⁴ See, e.g., Rene P. Breton & Tom Hassall, *The Future for Radio Astronomy*, 54 ASTRONOMY & GEOPHYSICS 6.36, 6.36–6.39 (2013).

the astronomy community.¹⁷⁵ In the development of cell phone technology, the “deep-rooted” “cultural differences between radio and telephone engineering” erected significant hurdles to collaboration and, more specifically, to the modification of key telephone technology (the switch) for use in the complex wireless cellular architecture.¹⁷⁶ Finally, in the art world, the cultural hegemony of Abstract Expressionism and its control over the arts economy posed important obstacles to young artists who resisted what they saw as Abstract Expressionists’ narcissistic tendencies and overfocus on art as a therapeutic tool.¹⁷⁷

There are two additional ways in which methodology norms can work as anti-innovation norms. First, methodology norms narrow the types of problems that a community will prioritize. While this narrowing can sometimes be efficient by serving a focusing and coordinating function, it is often inefficient. Prioritizing problems according to whether they can be solved using available methodology runs the risk of prioritizing unimportant problems (from a social welfare perspective) and deprioritizing problems whose solution requires a combination of methodological skills that no individual community alone possesses. The organizational sociology literature that attempts to explain patterns of institutional change has similarly emphasized the problem of methodology-bounded problems. As Neil Fligstein explains: actors’ interpretations of key organizational problems “will reflect their structural positions [i.e., group membership and training], and their solutions will reflect the interests of those structural positions.”¹⁷⁸ It is not necessarily the most important organizational problems that are being solved. Rather, which problems are prioritized and how they are solved depends on actors’ methodological ability to solve them and their power to impose their solution.¹⁷⁹

Second, methodology norms can lead to the development of particular community-specific “slang” or ways to describe a particular problem that, over time, become inaccessible to outsiders.¹⁸⁰ For this reason, many innovator communities travel on parallel paths, searching for solutions to the same problems but never realizing they are in fact working on the same problems because the different “slangs” used to describe these problems

¹⁷⁵ Townes, *supra* note 128, at 47–48.

¹⁷⁶ LESTER & PIORE, *supra* note 123, at 17.

¹⁷⁷ LAUREN RABINOVITZ, POINTS OF RESISTANCE: WOMEN, POWER & POLITICS IN THE NEW YORK AVANT-GARDE CINEMA, 1943-71, at 108–09 (1991).

¹⁷⁸ Neil Fligstein, *The Spread of the Multidivisional Form Among Large Firms, 1919–1979*, 50 AM. SOC. REV. 377, 388 (1985).

¹⁷⁹ *Id.* at 388–89.

¹⁸⁰ See, e.g., HARDIN, *supra* note 26, at 79–80.

mask their similarities. A prominent example of this phenomenon arises in the area of mathematics, in which the solution to a fifty-year-old conjecture was finally achieved when a team of mathematicians and computer scientists realized that two problems faced by computer scientists (a “graph compression” problem) and one faced by mathematicians and physicists (a “quantum physics” problem) were in fact different framings of the same problem.¹⁸¹

3. *Evaluation Norms*

The final set of social norms that can impede innovation arise from how innovator communities evaluate the worth of the work of their members. Evaluation norms often serve to reinforce research priority and methodology norms. What is considered good work by core community members reflects the community’s research and methodological priorities and will create incentives for marginal group members to conform to those priorities in order to access the benefits of group membership. What *types* of evaluation norms a community will favor varies, but there are six common types of evaluation norms that are prevalent in innovator communities. Specifically, good work is often considered the type of work that is: (1) patented, (2) published in peer-reviewed journals, (3) published in *specific* peer-reviewed journals, (4) vetted by core members of particular innovator communities, (5) meets particular productivity standards, or (6) increases a company’s market share. Much like research priority and methodology norms, evaluation norms have a bright side: they reinforce a community’s good practices in terms of methodology, they channel community members’ efforts to specific research priorities, and, in some instances, they reduce search costs for “good” work.

Following our discussion of research and methodology norms, the dark side of evaluation norms should come as no surprise: when overenforced, evaluation norms inefficiently maintain research priority and methodological blinders that prevent boundary-crossing innovations. Indeed, there is increasing awareness on the part of funding agencies that community-specific evaluation norms can discourage transdisciplinary research, and a growing literature in innovation policy addressing how to develop better evaluation norms.¹⁸² Two examples can clarify this point. The first continues

¹⁸¹ See Nikhil Srivastava, *The Solution of the Kadison-Singer Problem*, YOUTUBE (May 31, 2015), <https://www.youtube.com/watch?v=lnRHuuMjKrQ> [<https://perma.cc/UD88-CKNB>] (video tutorial); see also Pedraza-Fariña, *Social Origins*, *supra* note 15 (describing in detail the solution of this fifty-year old mathematical problem, the Kadison-Singer problem).

¹⁸² See, e.g., Brian M. Belcher et al., *Defining and Assessing Research Quality in a Transdisciplinary Context*, 25 RES. EVALUATION 1, 14 (2016) (“The lack of a standard and broadly applicable framework

the story of efforts to investigate and treat infertility arising from cancer treatments. The proposals of an enterprising group of scholars who wanted to focus their research efforts on understanding the impact of chemotherapeutic drugs on fertility were rejected by multiple funding agencies. In the words of one of these researchers:

[Our project] was very good, but then the grants would fall between the cracks because the portfolio for the NIH had no way to understand fertility in a cancer setting. . . . It fit neither under the NCI [(National Cancer Institute)] nor the NICHD [(National Institute for Child Health and Human Development)].¹⁸³

In other words, the protocols each one of these agencies used for evaluating which projects were worthy of funding reinforced the research priorities of each community represented in each institute (cancer and reproductive endocrinology, respectively).

The second example concerns efforts to translate basic research findings into clinically relevant applications. Quite frequently, for basic science to translate into clinical applications or marketable interventions such as drugs or new methods of treatment, scientists must work closely with their clinical or industry counterparts.¹⁸⁴ This type of collaboration, however, is often complicated by the different evaluation norms of the basic science, clinical science, and industry communities. While researchers who focus on basic science, typically housed at universities or research institutes, are evaluated on the basis of the number and quality of peer-reviewed publications featuring their research,¹⁸⁵ their industry counterparts are often discouraged from publishing their results; rather, “good work” in an industry context is often reflected in the number of patents to an inventor’s name.¹⁸⁶ As a consequence, academia–industry collaborations require an adjustment of each community’s evaluation methods. For example, successful biotechnology companies were able to attract academic scientists by relaxing their secrecy requirements and allowing scientists to publish their findings in peer-reviewed journals (thus maintaining their status as good academic

for the evaluation of quality in [transdisciplinary research, TDR] is perceived to cause an implicit or explicit devaluation of high-quality TDR or may prevent quality TDR from being done.”)

¹⁸³ Pedraza-Fariña, *Constructing Interdisciplinary Collaboration*, *supra* note 15, at 23.

¹⁸⁴ See, e.g., Peter Lee, *Transcending the Tacit Dimension: Patents, Relationships, and Organizational Integration in Technology Transfer*, 100 CALIF. L. REV. 1503, 1521–39 (2012).

¹⁸⁵ See, e.g., Chris Tachibana, *New Tools for Measuring Academic Performance*, SCL. MAG. (Feb. 10, 2017, 9:00 AM), <http://www.sciencemag.org/features/2017/02/new-tools-measuring-academic-performance> [<https://perma.cc/D38Z-MPP9>].

¹⁸⁶ Mark G. Brown & Raynold A. Svenson, *Measuring R&D Productivity*, 31 RES. TECH. MGMT. 11, 11 (1998) (“Typical *outputs* [of an R&D lab] include patents, new products, new processes, publications, or simply facts, principles, or knowledge that were unknown before.”).

scientists).¹⁸⁷ Conversely, in academic science, patents are increasingly being used as a signal of productivity.¹⁸⁸ Leaving aside worthy objections against the proprietization of academic science, this realignment of evaluation norms to create a form of evaluation hybrid has been credited with the success of biotechnology firms in Silicon Valley and Boston.¹⁸⁹

4. Conclusion

This section summarized how (1) research priority, (2) methodology, and (3) evaluation norms can have anti-innovation effects through their overenforcement. How, then, do these norms emerge, and how are they maintained in the first place? What leads to their overenforcement? The next section provides a psychological account of anti-innovation norm emergence. In so doing, we couple the macrolevel descriptions of innovator behavior provided by social norms research with microlevel explanations rooted in psychology.

C. The Psychological Underpinnings of Anti-Innovation Norms

How do particular social norms emerge in innovative communities, and why do they persist even when they have anti-innovation effects? The explanation lies partly in individual-level psychological biases. We posit that an understanding of two biases in particular—the status quo bias and the conformity bias—does much to explain the persistence of the anti-innovation norms we discuss here. Though the biases, like the norms themselves, can serve beneficial functions, they can also lead to entrenchment and overenforcement of social norms that ultimately stymie innovation-enhancing, boundary-crossing collaborations.

¹⁸⁷ See, e.g., Laura G. Pedraza-Fariña, *Spill Your (Trade) Secrets: Knowledge Networks as Innovation Drivers*, 92 NOTRE DAME L. REV. 1561, 1578 (2017) [hereinafter Pedraza-Fariña, *Trade Secrets*].

¹⁸⁸ See, e.g., Paul R. Sanberg et al., *Changing the Academic Culture: Valuing Patents and Commercialization Toward Tenure and Career Advancement*, 111 PNAS 6542, 6543 (2014).

¹⁸⁹ Pedraza-Fariña, *Trade Secrets*, supra note 187, at 1577–79.

1. Psychological Biases Generally

Psychologists have long been aware that people are subject to bias in their decisionmaking.¹⁹⁰ These cognitive biases can impair judgment and lead to suboptimal choices in a range of situations.¹⁹¹

During the lead-up to and aftermath of the 2016 presidential election, for example, there was much talk in the media of confirmation bias: the tendency for people to seek out and selectively remember information that confirms their existing beliefs.¹⁹² Instead of basing political decisions on rational thought, this propensity leads people to process information in ways that are highly driven by emotional considerations.¹⁹³ Commentators pointed to the role the bias may have played in exacerbating the divide among voters of different political stripes.¹⁹⁴ Facebook—its algorithms designed to show users stories it thinks they want to see based on their prior account activities—was particularly targeted as an enabler and aggravator of

¹⁹⁰ See, e.g., Benedetto De Martino et al., *Frames, Biases, and Rational Decision-Making in the Human Brain*, 313 SCI. 684, 684 (2006) (noting humans' "systematic biases in choice behavior"). Daniel Kahneman and Amos Tversky are widely credited with empirically elucidating the details of humans' biased decisionmaking, based on earlier suggestions by the economist Herbert Simon. For examples of their foundational work, see, for example, Daniel Kahneman et al., *Experimental Tests of the Endowment Effect and the Coase Theorem*, 98 J. POL. ECON. 1325, 1329–36 (1990); Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, 47 ECONOMETRICA 263, 265–73 (1979); Daniel Kahneman & Shane Frederick, *Representativeness Revisited: Attribute Substitution in Intuitive Judgment*, in HEURISTICS AND BIASES: THE PSYCHOLOGY OF INTUITIVE JUDGMENT 49 (Thomas Gilovich et al. eds., 2002); Amos Tversky & Daniel Kahneman, *Availability: A Heuristic for Judging Frequency and Probability*, 5 COGNITIVE PSYCHOL. 207, 208–09 (1973). For examples of Simon's work, see, for example, Herbert A. Simon, *A Behavioral Model of Rational Choice*, 69 Q.J. ECON. 99, 99–100 (1955); Herbert A. Simon, *Rational Decision Making in Business Organizations*, 69 AM. ECON. REV. 493, 495 (1979).

¹⁹¹ Katherine L. Milkman et al., *How Can Decision Making Be Improved?*, 4 PERSP. ON PSYCHOL. SCI. 379, 379 (2009) (describing how biases can lead to costly errors in decisionmaking, like "undersav[ing] for retirement, engag[ing] in needless conflict, marry[ing] the wrong partners, accept[ing] the wrong jobs, and wrongly invad[ing] countries"). But see William S. Cooper, *Decision Theory as a Branch of Evolutionary Theory: A Biological Derivation of the Savage Axioms*, 94 PSYCHOL. REV. 395, 395 (1987) (arguing that cognitive biases may have an evolutionary basis such that "behavior previously thought to be irrational might turn out to be biologically rational"); Martie G. Haselton & David C. Funder, *The Evolution of Accuracy and Bias in Social Judgment*, in EVOLUTION AND SOCIAL PSYCHOLOGY 15, 16–17 (Mark Schaller et al. eds., 2006) (same).

¹⁹² See Michael Shermer, *The Political Brain*, SCI. AM. (Jul. 1, 2006), <https://www.scientificamerican.com/article/the-political-brain> [<https://perma.cc/XJ9D-LDDF>] (describing research elucidating the neural underpinnings of confirmation bias in politics).

¹⁹³ See *id.* (describing an experiment wherein subjects had their brains scanned while evaluating statements made by Republican and Democratic presidential candidates—while parts of the brain associated with logical reasoning were dormant during this task, areas associated with emotional processing and reward were extremely active).

¹⁹⁴ See, e.g., Scott Bixby, 'The End of Trump': How Facebook Deepens Millennials' Confirmation Bias, GUARDIAN (Oct. 1, 2016, 8:00 AM), <https://www.theguardian.com/us-news/2016/oct/01/millennials-facebook-politics-bias-social-media> [<https://perma.cc/QX3P-7TED>].

confirmation bias.¹⁹⁵ As an illustration, the *Wall Street Journal* constructed “red” and “blue” Facebook feeds, the side-by-side comparison emphasizing, in a striking way, how different the world looks from conservative and liberal perspectives.¹⁹⁶

The potential harms arising from confirmation bias in the political sphere are many, including, on the individual level, a narrow and unrealistic worldview,¹⁹⁷ and on the societal level, a decreased capability for “shared values and common discourse.”¹⁹⁸ Scholars have written about the damage confirmation bias can wreak in other areas as well, including scientific research¹⁹⁹ and criminal investigations.²⁰⁰

Confirmation bias is just a single example of how people systematically depart from rational thinking. Psychologists have empirically identified myriad other ways in which bias creeps into our decisionmaking.²⁰¹

Our focus here is on how cognitive biases can lead to anti-innovation norms. Specifically, the status quo bias and the conformity bias help explain why research priorities, methodologies, and evaluation norms become entrenched in ways detrimental to innovation.

2. *Status Quo Bias*

a. *The bias*

The status quo bias describes the empirically identified tendency for decisionmakers to prefer the current state of things over change, even when

¹⁹⁵ See, e.g., Selena Larson, *Facebook Shows You What You Want to See Post-Election*, CNN MONEY (Nov. 9, 2016, 9:39 PM), <http://money.cnn.com/2016/11/09/technology/filter-bubbles-facebook-election/index.html> [<https://perma.cc/4NPE-TL2V>]; Bixby, *supra* note 194.

¹⁹⁶ *Blue Feed, Red Feed: See Liberal Facebook and Conservative Facebook, Side by Side*, WALL STREET J., <http://graphics.wsj.com/blue-feed-red-feed> [<https://perma.cc/2J6X-LXK3>].

¹⁹⁷ Michelle Tang, *I Know You Are and So Am I: The Dangers of Confirmation Bias*, HUFFINGTON POST (published Oct. 6, 2016, 2:13 PM; updated Dec. 6, 2017), http://www.huffingtonpost.com/michelle-tang/i-know-you-are-and-so-am-_b_12375786.html [<https://perma.cc/FUD6-WW2L>].

¹⁹⁸ Ken Stern, *Maybe the Right-Wing Media Isn't Crazy, After All*, VANITY FAIR (Nov. 3, 2016, 5:00 AM), <http://www.vanityfair.com/news/2016/11/the-right-wing-media-isnt-crazy> [<https://perma.cc/H2CB-4PXD>].

¹⁹⁹ See, e.g., Daniele Fanelli, *Do Pressures to Publish Increase Scientists' Bias? An Empirical Support from US States Data*, PLOS ONE (Apr. 21, 2010), <http://dx.doi.org/10.1371/journal.pone.0010271> [<https://perma.cc/6B3U-3ZGE>] (describing how scientists' confirmation bias is exacerbated when there is high publication pressure).

²⁰⁰ See, e.g., Carole Hill et al., *The Role of Confirmation Bias in Suspect Interviews: A Systematic Evaluation*, 13 LEGAL & CRIMINOLOGICAL PSYCHOL. 357, 365 (2008) (describing how expectations of guilt lead to “self-fulfilling prophecy”-type suspect interviews); Saul M. Kassin et al., *The Forensic Confirmation Bias: Problems, Perspectives, and Proposed Solutions*, 2 J. APPLIED RES. MEMORY & COGNITION 42, 45 (2013) (describing how the confirmation bias can corrupt lay witness memories and forensic scientific results).

²⁰¹ See, e.g., COGNITIVE ILLUSIONS: A HANDBOOK ON FALLACIES AND BIASES IN THINKING, JUDGEMENT AND MEMORY (Rüdiger F. Pohl ed., 2004) (describing a number of these biases).

change would enhance utility.²⁰² A person might prefer to stick with her existing health plan, for example, though switching would result in substantial economic and nonpecuniary benefits.²⁰³

There are a number of reasons why humans have this bias—some of which serve completely rational ends. One of these ends is reducing transition costs associated with a change, which might outweigh the benefits of the switch.²⁰⁴ Relatedly, there might be advance uncertainty about the utility to be gained from a change in any particular direction that makes the move costly relative to the status quo.²⁰⁵

Apart from these rational reasons for favoring the status quo, there are irrational psychological factors that may also contribute to the preference. Daniel Kahneman and Amos Tversky famously demonstrated that people are loss averse: when making decisions they give more weight to potential losses than to potential gains of equal magnitude, and they weigh costs and benefits relative to their individual starting point.²⁰⁶ A person contemplating a change from the status quo may thus choose not to act even when the potential gains outweigh the potential losses because she weighs the losses more heavily in her analysis.²⁰⁷

Related to loss aversion is the phenomenon of regret avoidance.²⁰⁸ People try to avoid situations where it might appear, after the fact, that they have made a wrong choice, even when the choice was in fact correct in light of the then-available information.²⁰⁹ Indeed, as Kahneman and Tversky have shown, people feel more regret when a loss in utility is the result of a new action rather than an adherence to the status quo.²¹⁰

Regret avoidance is influenced by, and helps entrench, existing social norms. William Samuelson and Richard Zeckhauser offer the example of a parent deciding whether to bring his infant along on a fifteen-minute trip to

²⁰² William Samuelson & Richard Zeckhauser, *Status Quo Bias in Decision Making*, 1 J. RISK & UNCERTAINTY 7, 8 (1988) (describing experiments revealing a status quo bias).

²⁰³ See *id.* at 26–31 (describing the results of an experiment in which subjects preferred to stay with an existing hypothetical health plan despite demonstrated preferences for other options).

²⁰⁴ *Id.* at 33–34.

²⁰⁵ *Id.* at 34.

²⁰⁶ Daniel Kahneman & Amos Tversky, *Choices, Values and Frames*, 39 AM. PSYCHOLOGIST 341, 342 (1984).

²⁰⁷ Samuelson & Zeckhauser, *supra* note 202, at 35–36. Interestingly, Samuelson and Zeckhauser demonstrate experimentally that the status quo bias persists even in the absence of loss aversion. Thus, though the status quo bias is consistent with loss aversion, it is not completely explained by it.

²⁰⁸ *Id.* at 38.

²⁰⁹ *Id.*

²¹⁰ Daniel Kahneman & Amos Tversky, *The Psychology of Preference*, 246 SCI. AM. 160, 160 (1982).

the grocery store.²¹¹ Although the risks to the infant of driving in the car are higher than those of being left alone for a short time, the parent's choice is framed by regret avoidance, which in turn is framed by social norms. If something happened to the infant while home alone, the parent, according to prevailing social norms, would likely be perceived as having made the "wrong" choice and would accordingly feel greater guilt and regret. This interaction of social norms with regret avoidance will likely prompt the parent to bring his baby along, though it is the objectively more dangerous course of action.²¹² As more parents, driven by regret avoidance, make this choice, the norm becomes further entrenched.

The concept of sunk costs is also a relevant factor here. A completely rational actor would understand that previously incurred costs should not determine future actions.²¹³ But after large personal or financial investments, real people may feel reluctant to cut their losses and may instead be tempted to "throw good money after bad" in an attempt to redeem or justify their initial course of action.²¹⁴ This tendency too is driven in part by social considerations. A person might be reluctant to admit to others, through a change of course, that the original plan was a failure.²¹⁵

A final reason for the status quo bias is the phenomenon of cognitive dissonance avoidance—a desire to maintain a consistency of thought and avoid conflicting ideas and beliefs.²¹⁶ Because people like to think of themselves as competent decisionmakers, they rationalize past decisions (including bad ones) to conform to this belief.²¹⁷ This colors future decisionmaking as well.²¹⁸ If someone has rationalized to herself that a past mistake was in fact a good decision in order to avoid cognitive dissonance, she may believe that a corrective or alternative course of action is unnecessary.²¹⁹

b. How the status quo bias leads to anti-innovation norms

We explained previously that research priority, methodology, and evaluation norms can become entrenched and overenforced in innovative

²¹¹ Samuelson & Zeckhauser, *supra* note 202, at 38.

²¹² *Id.*

²¹³ *E.g.*, Vernon L. Smith, *Rational Choice: The Contrast Between Economics and Psychology*, 99 J. POL. ECON. 877, 890 (1991) ("According to the usual interpretation of economic theory, the optimizing firm or individual should ignore sunk costs in weighing gains and losses at the margin . . .").

²¹⁴ *Id.* at 890–91; Samuelson & Zeckhauser, *supra* note 202, at 37.

²¹⁵ Samuelson & Zeckhauser, *supra* note 202, at 37; Smith, *supra* note 213, at 890–91.

²¹⁶ *Id.* at 38–39.

²¹⁷ *Id.* at 39.

²¹⁸ *Id.*

²¹⁹ *See id.*

communities, leading to suboptimal innovation. Though these norms serve legitimate purposes, it is community members' unwillingness to depart from them even when doing so would be socially beneficial that is troubling. The status quo bias helps explain this reluctance.

Take, for instance, research priorities. In a world of scarce time and resources, each innovative community must prioritize particular types of projects over others. Thus, astronomers focused on optics, oncologists prioritized cell division, the telephone industry drilled down on voice quality, and Abstract Expressionists emphasized subjective, individualistic expression. But why did these priorities become so entrenched in their respective communities that group members ignored, and were sometimes even overtly hostile to, other possibilities? A simple, partial explanation is that group members were all biased toward maintaining the status quo.

The mechanisms underlying the status quo bias help us understand why. Consider transition costs. Adopting new research priorities, or even collaborating with those whose priorities are different from yours, entails significant transition costs. These costs may include, but are not limited to, the efforts required to define new priorities, reconcile disparate practice styles, and learn the unique language and terminology that tends to evolve in particular communities.²²⁰ For instance, an oncologist trained in cell division has most likely spent most of her career learning the techniques and language of cell biology, and probably knows very little about the techniques and language of endocrinology. Investing the time and effort required to learn enough about endocrinology to enable a successful collaboration incurs opportunity costs that, when coupled with uncertain benefits,²²¹ may seem prohibitive.²²² The oncologist could simply spend that time and effort pursuing more familiar research questions with more predictable—though perhaps lower—payoffs.

The psychological factors that contribute to a preference for the status quo also help explain research priority norms. Loss aversion will cause the risks one incurs by branching out in a new direction to loom larger than the prospective gains. This skewed cost-benefit analysis is exacerbated by the desire to avoid the enhanced regret that follows when failure results from a departure from accepted norms. Thus, the Abstract Expressionist who chooses to buck the status quo by pursuing more realist avenues will be judged more harshly by her peers and will feel more regret if the endeavor fails than if she had taken no such action.²²³ It is much safer from her

²²⁰ Pedraza-Fariña, *Social Origins*, *supra* note 15, at 417–22.

²²¹ *See id.*

²²² Samuelson & Zeckhauser, *supra* note 202, at 26–31.

²²³ *Cf. id.* at 38 (arguing that regret avoidance is one cause of status quo bias).

perspective not to follow this course of action in the first place, even if creative gains are sacrificed.²²⁴

These psychological factors may also be amplified in community settings. Loss aversion will wield a particularly strong influence when the potential losses are comparatively large and may affect multiple people beyond the actor.²²⁵ Likewise, regret avoidance, driven by social norms, may play an outsized role when the actor is being “watched” by various parties inside and outside the community, including colleagues, employees, competitors, stockholders, and commentators. The actor might thus prefer to maintain the status quo rather than move in a novel and innovative direction, even when the new course will likely result in creative and economic benefits. If failure occurs, the actor who maintained the accepted status quo—like the parent who brings his child on the short errand—will be judged less harshly by others and will experience less regret.²²⁶

The sunk costs fallacy and a desire to avoid cognitive dissonance also likely contribute to the entrenchment and overenforcement of research priority norms. An actor who pursues an initial course of action may be particularly reluctant to change direction, not only out of an unwillingness to cut his losses, but also because a change might suggest to observers inside and outside his community that his initial efforts were misguided.²²⁷ Cognitive dissonance avoidance will exacerbate this reluctance if a decisionmaker has internalized and rationalized his previous decisions.²²⁸ The astronomer who has devoted his career to a visual exploration of the skies may thus be unwilling to try something new—radio waves, for example—even if his efforts are not yielding results, because doing so might be experienced as a painful admission to others—and himself—that his life’s work was a waste of time.

Importantly, this line of thinking also gives the astronomer an incentive to prevent *others* from trying something new as well.²²⁹ To maintain the perception that his efforts were not misguided, it is necessary that those around him act in ways that support this view. Scaling up to the population

²²⁴ Samuelson and Zeckhauser offer up Copernicus as a real-life example of the harsh judgment that results when an innovator attempts to buck the status quo. Copernicus was deemed mad by his peers for suggesting that the earth revolved around the sun and not vice versa. *Id.* at 46–47.

²²⁵ *See id.* at 35–36.

²²⁶ *Id.* at 38 (discussing organizational decisionmaking and regret avoidance).

²²⁷ *Id.* at 37–38.

²²⁸ *See id.* at 38–39.

²²⁹ This is a case in which “other-regarding” preferences can be quite strong, because they are synergistic with “self-regarding” preferences. *Cf.* McAdams, *supra* note 20, at 414–15 (using the esteem-theory of norms to explain how majorities “may impose their other-regarding preferences on minorities through norms, even when doing so is not efficient”).

level gives you a community of astronomers who have each invested significant resources in a particular research priority, and who each have strong psychological incentives to maintain the perception that this was the right course of action. It is easy to see how norms that operate to prevent others from adopting different research priorities become stringently enforced in these communities, to the potential detriment of innovation.²³⁰

Though we focus here on how the status quo bias leads to the entrenchment and overenforcement of research priority norms, the same analysis applies to methodological and evaluation norms. Just as transition costs, loss aversion, regret avoidance, cognitive dissonance avoidance, and an irrational approach to sunk costs help explain why communities become reluctant to adopt new research priorities, so too do they help us understand why these same communities stick with established methodologies and evaluation norms. The short answer is that it is both physically and psychologically costly to do otherwise.

3. *Conformity Bias*

a. *The bias*

The conformity bias describes a tendency to forego independent and autonomous decisionmaking in favor of following social norms.²³¹ Everyday manifestations of the bias can be seen in humans' shared propensity to wear the same style of clothing worn by their peers, frequent the same restaurants as them, listen to the music they listen to, and otherwise conform their behavior to the norms of their social group.²³²

Although some of the social psychology literature equates the conformity bias with mere susceptibility to social influence, other scholars have pointed out that the bias is in fact a complex and multifaceted phenomenon.²³³ Under this more sophisticated view of conformity, the degree to which an actor conforms in any given situation will depend equally on the decision to be made and the goals of the decisionmaker.²³⁴ Broadly speaking, however, the tendency toward conformity has been empirically

²³⁰ An interesting question that has not yet been addressed by the empirical literature is whether members of certain communities are more prone to these psychological biases than others. For example, we might expect certain communities (e.g., attorneys) to attract people who are more risk averse while others (e.g., the visual arts) might attract people who are less risk averse. If this is in fact the case, it would influence our analysis, but further work is needed.

²³¹ Divya Padalia, *Conformity Bias: A Fact or Experimental Artifact?*, 59 *PSYCHOL. STUD.* 223, 223 (2014).

²³² Mirre Stallen et al., *Peer Influence: Neural Mechanisms Underlying In-Group Conformity*, *FRONTIERS HUMAN NEUROSCI.*, March 2013, at 1, 5.

²³³ Padalia, *supra* note 231, at 225.

²³⁴ *Id.* at 226.

demonstrated over a swath of behaviors ranging from the commonplace to the criminal.²³⁵

That said, conformity is not necessarily an undesirable characteristic. Indeed, evolution may have favored conformist behaviors because they contributed to humans' survival.²³⁶ For one thing, conformity reduces information costs by harnessing the wisdom of the group.²³⁷ If a large number of people are acting in a particular way, a logical conclusion for any given individual considering a particular course of action is that the group's behavior is safe or otherwise beneficial.²³⁸ The actor can thus use the group's behavior as a heuristic for appropriate behavior without having to reinvent the wheel by researching various courses of action himself.²³⁹

Conformity also plays an identity signaling role.²⁴⁰ Group membership carries with it numerous physical and psychological benefits, including protection, shared resources, validation of belief systems, a sense of self-worth, a sense of belonging, and the achievement of shared goals through collective action.²⁴¹ One obvious way to signal belonging to a particular group is through conformity to that group's norms and behaviors.²⁴²

Yet while the conformity bias often produces tangible benefits, it can also at times lead people astray.²⁴³ In the creative fields, the tendency toward conformity can lead to anti-innovation norms.

b. How the conformity bias leads to anti-innovation norms

An understanding of conformity and its underlying mechanisms helps explain how research priority, methodology, and evaluation norms can become entrenched and overenforced in innovative communities. To illustrate, consider methodology norms. As we have explained, particular

²³⁵ Stallen et al., *supra* note 232, at 1 (stating that the bias has been observed even in situations where “identity signaling is not an issue,” such as energy conservation, and noting that policymakers have attempted—with mixed results—to harness the bias to curb antisocial behaviors like littering, drug use, and violence).

²³⁶ See, e.g., B. Douglas Bernheim, *A Theory of Conformity*, 102 J. POL. ECON. 841, 843 (1994); Julie C. Coultas, *When in Rome . . . An Evolutionary Perspective on Conformity*, 7 GROUP PROCESSES & INTERGROUP REL. 317, 319 (2004) (hypothesizing that “conformity probably evolved as a cheap heuristic for selecting adaptive behaviour”).

²³⁷ See Coultas, *supra* note 236, at 319.

²³⁸ *Id.*

²³⁹ See *id.* at 318.

²⁴⁰ Stallen et al., *supra* note 232, at 1.

²⁴¹ Megan L. Knowles & Wendi L. Gardner, *Benefits of Membership: The Activation and Amplification of Group Identities in Response to Social Rejection*, 34 PERSONALITY & SOC. PSYCHOL. BULL. 1200, 1200 (2008); cf. HARDIN, *supra* note 26, at 77 (describing the “epistemological benefits” of group membership).

²⁴² Stallen et al., *supra* note 232, at 1.

²⁴³ See *id.* at 319 (discussing how conformity might lead to maladaptive behaviors generally).

creative groups often prioritize specific methodologies and reject others. Astronomers prioritized optic methods while rejecting radio astronomical methodologies,²⁴⁴ telephone companies were reluctant to look beyond their own methods to radio communication technologies,²⁴⁵ and Abstract Expressionists emphasized the creation of abstract and individualistic designs on unstretched and unprimed canvasses while resisting Pop-artists' use of representational objects and pictures.²⁴⁶ How might a tendency toward conformity have contributed to these groups' unwillingness to embrace different methodologies—a reluctance that delayed important creative advances?

Consider, first, the information-cost-reducing function of conformity. Imagine you are a novice astronomer just beginning your graduate studies. Your uncommonly flexible supervisor gives you complete independence to devise your own research agenda, using whatever methodologies you see fit. Even assuming that practicalities like the availability of specific lab equipment pose no obstacle, it would not be surprising if you chose an agenda that made use of the optic methodology predominant in your field.

Why?

After reading the leading papers in the field, talking to colleagues, and doing the other necessary legwork, you likely (consciously or unconsciously) made an assumption. You assumed that the optic methodology used by your colleagues, the leaders in the field, and every other astronomer you had ever heard of, was the most productive—if not the only reasonable—course of action. In other words, you made use of the collective wisdom to reduce your own information costs. Although you did some research to reach this conclusion, you did not investigate *all* possible methodologies, study their pros and cons, etc. You saved yourself a lot of time and effort by relying on the conformity heuristic. If you represent the typical graduate student, it is easy to see how a social norm prioritizing a predominant research methodology quickly becomes entrenched in this way.

Consider next the identity-signaling function of conformity. Now imagine that you are a young artist in the 1940s trying to break into the New York art scene. Your identity as an artist is not fully formed, but you recognize (consciously or unconsciously) the advantages of belonging to a group of like-minded creators—networking opportunities, mentorship, and a sense of belonging, to name a few. All the artists you know belong to the Abstract Expressionist school, and they all use specific methods in their

²⁴⁴ Townes, *supra* note 128, at 48.

²⁴⁵ LESTER & PIORE, *supra* note 123, at 16.

²⁴⁶ CRANE, *supra* note 130, at 62.

work: they all work on unstretched, unprimed canvasses, and they all emphasize abstract, individualistic expression. At the same time, they reject more realistic forms of expression; indeed, they seem to pride themselves on this rejection, as if their identity as artists depended on it. You want desperately to fit in with this group. What creative methodology will you likely choose?

Of course, not every artist in the 1940s did choose to adopt the methods and ideology of the Abstract Expressionists,²⁴⁷ though many did. The point is not that everyone identifies with *a particular* group and adopts their methodologies in order to signal their membership with the group. Instead, it is that most people identify with *some* group and adopt the methodologies of that group, thereby entrenching group methodology norms. We would think it strange, for example, if an artist who was mentored by an Abstract Expressionist, spent most of his time with other Abstract Expressionists, attended Abstract Expressionist events, and so on, adopted primarily realist methodologies in his work. This is because the conformity bias operates on the peer or group level. Individuals conform their behaviors to those of their peer group: those whom they perceive as being similar to them and whom they identify with.²⁴⁸

The same holds true for creative and scientific communities. An outsider might assume that all visual artists, or all scientific researchers working in the physical sciences would consider themselves as belonging to a unified group. This assumption would be wrong. Instead, creative personnel tend to identify with those they define as being within their

²⁴⁷ In fact, it was the coming together of diverse artists with alternative interests that eventually led to the Pop art and Minimalist movements. *See id.* at 25.

²⁴⁸ *See, e.g.,* Marion Doull et al., *Peer Support Strategies for Improving the Health and Well-Being of Individuals with Chronic Diseases*, 3 COCHRANE DATABASE SYSTEMATIC REVIEWS 1, 2 (2005) (defining a peer as “an individual who shares common characteristics with the ‘targeted’ group or individual”—common characteristics might include “age, gender, disease status, socioeconomic status, religion, ethnicity, place of residence, culture, or education”). For purposes of conformity, peer groups can be defined surprisingly narrowly. *See* Michael Shiner, *Defining Peer Education*, 22 J. ADOLESCENCE 555, 557–58 (1999) (explaining that peer identities “derive from a multiplicity of sources” and that individuals may harbor multiple and even conflicting peer identities based on relatively narrow criteria). A high school student, for example, will not be driven by the conformity bias to dress and act like every other student at her school, although an objective outsider might see all the students as belonging to the same demographic group. *See id.* (cautioning that “it should not be assumed that age constitutes a sufficient basis for identification between people.”). Instead, she will likely identify with a subgroup of students—the “jocks” or the “band geeks”; the “punks” or the “cool kids”—and tailor her clothing, actions, and tastes accordingly. *See, e.g.,* John Kelly, *10 Types of Teens: A Field Guide to Teenagers*, HOWSTUFFWORKS.COM (May 26, 2010), <http://lifestyle.howstuffworks.com/family/parenting/tweens-teens/10-types-of-teens.htm> [<https://perma.cc/BAA4-UV3F>].

“field”—often a surprisingly narrow concept.²⁴⁹ Researchers working in areas that might seem to an objective observer to be remarkably similar or logically related to another field are nonetheless considered outsiders by those on the inside.²⁵⁰ The infamous self-imposed divide among mathematicians, physicists, and engineers, for instance, is so clichéd that it has spawned its own series of mathematician-physicist-engineer jokes.²⁵¹ And even within the field of mathematics, the cultural gulf between “pure” and “applied” mathematicians is well-known.²⁵² Each of these subgroups has its own shared language, holds its own scientific conferences, and abides by a distinct set of cultural and research norms.²⁵³

The identity-signaling function of conformity helps us understand not only how methodology norms become entrenched but also how they become overenforced. This is in part because peer groups define themselves not only by what they *are* but also by what they *are not*. Thus, the young artist who aspires to the Abstract Expressionist school will choose not to adopt realist techniques in order to signal his identity. Further, the rest of the group will also work to prevent him from adopting these techniques. If he did so, it would dilute the group’s identity, which is based not only on the presence of abstract, individualistic expression but also on the absence of realism. Each member has an incentive to police the group’s other members to ensure the

²⁴⁹ See Mary Henkel, *Academic Identity and Autonomy in a Changing Policy Environment*, 49 HIGHER EDUC. 155, 167 (2005) (explaining how “early specialisation” within a particular scientific field helps establish a discipline-based identity among scientists).

²⁵⁰ *But see id.* at 167 (noting that the degree to which this is true may be discipline-specific and explaining that “[a]s compared with physics” the authors found “less evidence among biological scientists of shared myths or emotional commitment to the idea of a disciplinary culture or community”).

²⁵¹ See, e.g., Chris Riesbeck, *A Mathematician, a Physicist, and an Engineer...*, NW. ELECTRICAL ENGINEERING & COMPUTER SCI., <http://www.cs.northwestern.edu/~riesbeck/mathphyseng.html> [<https://perma.cc/YL8M-DCV4>]. A typical example:

A mathematician and an engineer are sitting at a table drinking when a very beautiful woman walks in and sits down at the bar.

The mathematician sighs. “I’d like to talk to her, but first I have to cover half the distance between where we are and where she is, then half of the distance that remains, then half of that distance, and so on. The series is infinite. There’ll always be some finite distance between us.”

The engineer gets up and starts walking. “Ah, well, I figure I can get close enough for all practical purposes.”

Id. This joke also incidentally highlights the tendency for certain academic disciplines to define themselves in a gendered way. Though this, too, has implications for creative collaboration, a full treatment of the topic is unfortunately beyond the scope of this Article.

²⁵² See, e.g., Aleksandar Makelov, *Pure v. Applied*, EXCLUDED MIDDLE (Feb. 15, 2016), <https://amakelov.github.io/2016/02/15/Pure-vs-applied.html> [<https://perma.cc/PU9P-MLZM>].

²⁵³ See Henkel, *supra* note 249, at 167 (explaining how scientific identities are based in part on “rigorous training and specialisation in a discipline . . . within which the focus, theoretical base, methodologies and epistemic criteria have been developed.”).

group identity remains intact. The group, concerned with identity and conformity, thus actively rejects alternative methodologies—radio astronomy in the case of astronomers, radio technology in the case of telephone engineers, and representational forms in the case of Abstract Expressionists—even when in hindsight, doing so will delay significant creative and innovative advances.

The conformity analysis for methodology norms plays out similarly for research priority and evaluation norms. The information-cost-reducing and identity-signaling functions of conformity will lead groups to hew to specific research priority and evaluation norms even when departing from these norms would be socially beneficial.

D. Theoretical Implications of Anti-Innovation Norms

1. Free Riding vs Other Innovation Dilemmas

It is now canonical to begin any exploration of IP and innovation law with a description of the problem of information as a “public good”—and the market failures that arise from the threat of free riding on others’ creative efforts.²⁵⁴ Free riding has become the central dogma of IP and innovation law. It has provided the basic explanatory framework to understand why governments must intervene in the markets for creative products and how to design such interventions. IP law itself, a key focus of legal scholars interested in innovation policy, is designed primarily to address free riding through time-limited property rights.²⁵⁵ But this singular focus on free riding—while perhaps justified more narrowly in the design of IP rights—has biased scholarship on innovation policy more broadly.

All of the studies on social norms and innovation synthesized in Part I focus almost exclusively on how creative communities rely on social norms to regulate copying behavior. The free-riding lens thus serves to frame the case studies, to focus the questions asked on one dilemma: how do innovator communities address the threat of copying? The studies’ conclusions are varied: in some cases, copying turns out not to be a threat at all; in others, social norms punish copying only when it comes too close to the original; yet in others, social norms punish copying of even general ideas.²⁵⁶ Yet, this focus on the regulation of copying behavior blinds this scholarship to other potential innovation dilemmas faced by innovator communities.

Rather than focusing on free riding as a key impediment to innovation, our analysis of three anti-innovation norms (research priority, methodology,

²⁵⁴ See references cited *supra* note 26.

²⁵⁵ See references cited *infra* note 284.

²⁵⁶ See *supra* Part I.

and evaluation norms) reveals another crucial innovation dilemma: that of boundary-crossing. The dilemma can be framed as follows: many socially beneficial innovations require identifying and solving problems at the intersection of multiple innovator communities, but incentivizing and coordinating such collaboration is hampered by social norms that aim to preserve community boundaries. Inside a firm, this dilemma can be reframed as a team assembly and coordination dilemma arising from clashing research priorities, methodology, and evaluation norms of team members.

Although our focus here is on boundary-preserving social norms, and the boundary-crossing innovation dilemmas that arise from them, this focus is not intended as an exhaustive list of the types of innovation dilemmas that these communities face. To the contrary, boundary-crossing is one of many additional innovation dilemmas that are obscured by the singular focus on free riding. In recent work, Brett Frischmann, Michael Madison, and Katherine Strandburg have called for a more systematic analysis of “knowledge commons”—which they define broadly as solutions to innovation dilemmas.²⁵⁷ Frischmann, Madison, and Strandburg similarly recognize that “knowledge commons may confront diverse obstacles or social dilemmas, many of which are not well described or reducible to the simple free rider dilemma.”²⁵⁸ Among the important innovation dilemmas that these authors identify are infrastructure dilemmas (related to the construction of shared platforms and data-processing systems) and dilemmas related to the coordination of research when there is only a scattered market for innovations (such as research on orphan diseases or diseases that affect only the poor).²⁵⁹ Broadening our focus from free riding to other innovation dilemmas also highlights the limits of IP law to address them, inviting consideration of other, often neglected, policy interventions beyond IP law.

Finally, an almost exclusive focus on free riding and on the ability of social norms to replace IP law has not only obscured other innovation dilemmas, it has also disconnected the emerging literature on IP and social norms from the broader literature on law and social norms. In contrast to the literature on IP and social norms, this broader literature has paid close attention to the dark side of social norms. Our analysis of the sociological and psychological bases of anti-innovation norms brings the literature on IP and social norms in conversation with this broader literature by showing how research priority, methodology, and evaluation norms can fit within the

²⁵⁷ Brett M. Frischmann, Michael J. Madison & Katherine J. Strandburg, *Conclusion*, in *GOVERNING KNOWLEDGE COMMONS* 469, 469–70 (Brett M. Frischmann, Michael J. Madison & Katherine J. Strandburg eds., 2014).

²⁵⁸ *Id.* at 471.

²⁵⁹ *Id.* at 471–72.

interpretive framework developed by law and social norms scholars. It also advances this broader literature by providing a psychological explanation that expands upon the prevailing rational-choice and game-theoretical analyses. We expand on these two contributions below.

2. *Engaging and Expanding On the Broader Law and Social Norms Literature*

The broader literature on law and social norms, and in particular the work of Russell Hardin²⁶⁰ described above, explains that social norms that are welfare reducing for society at large (or “norms of exclusion”) often emerge because they are welfare enhancing for core members of particular social groups. Thus, in these models, socially harmful social norms emerge through the self-interested actions of core group members.²⁶¹ As we summarized above, a key characteristic of “norms of exclusion” is that they are most commonly enforced upon marginal group members: they work by changing the interests of such marginal group members “to get them to act in conformity with the interests of the core of the group.”²⁶²

Our description of anti-innovation norms fits quite well with this existing narrative in the broader field of law and social norms. Take, for example, the research priority, methodology, and evaluation norms that emerged in communities of astronomers that prioritized the optical exploration of the skies. Their maintenance can be explained in part as a result of competition for scarce resources—namely, public and private funds to carry out research related to outer space—between groups of optical astronomers and radio engineers. Indeed, a complementary line of inquiry in the sociology of expertise describes the interaction between distinct expert groups as one of constant competition for control over *who* gets to address and solve particular social problems.²⁶³ Similarly, several of the examples explored in Part II demonstrate how core community members of innovator communities, who helped develop and steer the community’s research priorities, methodology, and evaluation norms, enforce those norms onto marginal community members. In innovator communities, these marginal community members can often be trainees—this was indeed the case in the Abstract Expressionism community, where core, established group members enforced their group’s social norms on trainees who wished to adopt more realistic approaches to painting.²⁶⁴

²⁶⁰ HARDIN, *supra* note 26.

²⁶¹ *Id.* at 72.

²⁶² *Id.*

²⁶³ See, e.g., Laura G. Pedraza-Fariña, *Understanding the Federal Circuit: An Expert Community Approach*, 30 BERKELEY TECH. L.J. 89, 108 (2015) (synthesizing scholarship on expert communities).

²⁶⁴ CRANE, *supra* note 130, at 25.

Hardin formalized this explanation for the emergence of norms of exclusion as follows:

1. F is an effect of X ;
2. F is beneficial for G ;
3. F maintains X by a causal feedback loop passing through G .²⁶⁵

Here, F is a signal of group identification; X is the social norm at issue; and G are the members of the relevant social group. We can work out this formal representation with a particular example and illustrate how a particular social norm can become overenforced.

Take X as the norm specifying the research priority of visual exploration of the skies, linked to the methodology norm of optical telescoping. Take F as a signal of group identification with astronomy arising from this norm. Take G as the members of astronomy innovation communities. The norm of the primacy of the optical exploration of the skies serves as a signal to identify “true” or “core” astronomers (Step 1). In turn, this signal benefits group members by leading to easier publication in peer-reviewed journals in astronomy, access to public and research funds, and more reputational benefits (Step 2). Identification with the research priority, methodology, and evaluation norms of the astronomy community thus maintains the norm of optics research priority through a causal feedback loop passing through the members of the relevant group.

The key to understanding this feedback loop is to realize that core group members who strongly identify with the group are likely to spend more of their time in it than members who identify more loosely with the group. Core members will spend more time developing the research priorities, methodologies, and evaluation norms of the group.²⁶⁶ Hence, these norms are likely to become more extreme as time passes, not because the group as a whole desires this consequence but because of the individual incentives of the core members of the group. Note how this feedback loop strengthens these norms, led by the preferences of core group members, but is unrelated to the potential coordination benefits of research priority, methodology, and evaluation norms, serving simply as a signal of group membership—in effect leading to their overenforcement.

In Posner’s signaling model, research priority, methodology, and evaluation norms also function as signals to other community members. But they do not signal group identity *per se*; rather, they provide evidence of being a hardworking, rigorous teammate—in other words, someone worth

²⁶⁵ HARDIN, *supra* note 26, at 82 (emphasis omitted).

²⁶⁶ See *infra* Part III.B.

collaborating with (a good type). Nevertheless, and as predicted by the signaling model, many marginal good types with idiosyncratic preferences will either subsume those preferences to send this signal or risk being shunned by their communities. In our case studies, those marginal members are likely individuals who are interested in unusual research problems or in unorthodox (or recombinant) methodologies.

We can also view research priority, methodology, and evaluation norms through the lens of the esteem theory of norms. Introducing a desire for the esteem of others into a model of individual preferences can produce social norms that shift the preferences of marginal group members in socially harmful directions (or what McAdams and ourselves have called norm “overenforcement”). This is particularly the case if core community members who enforce these norms are high-status, while marginal members are low-status.²⁶⁷

Our analysis adds to and deepens these models by providing a novel psychological account of the modeled behaviors. In other words, the broader sociology literature attempts to explain how norms emerge based on individuals’ behaviors, but it fails to give a full accounting of *why* individuals act as they do. The two psychological mechanisms we outlined in this Part—the status quo and conformity biases—help fill this gap.

For instance, due to the conformity bias, core group members—those who identify strongly with a particular group—have enhanced incentives to adopt and enforce the research priorities, methodologies, and evaluation norms of the group. Because these individuals’ personal identities are tied so closely to the identity of the group, the maintenance of these identities, and the psychological benefits that accrue from them, depend on robust norm enforcement.²⁶⁸ This strong enforcement by core members, in turn, gives peripheral members—those who may not identify quite as strongly with the group—a choice. They can either hew more closely to the norms being enforced by the core members or seek the tangible and psychological benefits that come with membership elsewhere—a different group for instance.²⁶⁹ Thus, an artist who is uncomfortable with the stringency of the norms being enforced by core Abstract Expressionists might seek the psychological benefits of group membership in another group like the Minimalists. Or, if he identifies more strongly with Abstract Expressionism than Minimalism, he might bite the bullet and adhere to the core Abstract

²⁶⁷ McAdams, *supra* note 20, at 416 (“The opinion of those who are highly esteemed tends to be valued more than the opinion of those who receive low esteem. Thus, high-status individuals will have relatively more influence on the creation of new norms.”).

²⁶⁸ See *supra* Section II.C.3.b.

²⁶⁹ See *id.*

Expressionists' norms, even if they are more rigid than he would prefer. Either way, the norms become more extreme over time, as the models described above predict.

The status quo bias also helps explain the behaviors of both core and peripheral group members in these models. Core members of groups are those who have spent significant time with the group. They are thus most likely to fall prey to the sunk cost fallacy and cognitive dissonance.²⁷⁰ This will cause them to resist any departure from established norms. Because they have spent the most time following these norms, the departure could be interpreted (by themselves or others) as an admission of previous failure.²⁷¹ For the same reason, i.e., to maintain the perception that their investments in a particular course of action were not wasted, these core members will enforce the norms on others in the group.²⁷²

The peripheral members, for their part, have not invested as much time following particular norms as the core members, so they may be less subject to sunk cost and cognitive dissonance considerations. But they will still be swayed by loss aversion—the enhanced regret that comes when a failure results after a departure from accepted norms.²⁷³ A new astronomer, though she has not invested the same resources in optic methods as her older peers, may nevertheless worry about using radio techniques simply because she will be judged more harshly by these peers if this approach fails.²⁷⁴ When potential failures are weighted more heavily than potential successes, this might be enough to keep peripheral members from branching out. As peripheral members fall in line, they will themselves become subject to sunk cost and cognitive dissonance concerns, thereby moving closer to the core and further entrenching the norms of the group, as the functionalist model predicts.

III. ANTI-INNOVATION NORMS: POLICY IMPLICATIONS

As discussed in Part I, the existing literature on social norms and innovation makes three main points. The first is that social norms can act as innovation enhancers by appropriating the traditional functions of IP law. As we demonstrated in Part II, however, this account is incomplete because it ignores the many instances in which social norms may hinder, rather than promote, innovative activities.

²⁷⁰ See *supra* Section II.C.2.b.

²⁷¹ See *id.*

²⁷² See *id.*

²⁷³ See *supra* Section II.C.2.a.

²⁷⁴ See *supra* Section II.C.2.b.

The second and third themes that emerge from the social norms and innovation literature concern the interaction between norms and IP law. Scholars have pointed out that IP law and social norms are interdependent, in the sense that IP has the potential to either enhance or reduce the innovation-promoting function of social norms.²⁷⁵ Relatedly, these scholars ask whether, given a choice, it is IP or social norms that present the best vehicle to foster innovation in any given context. While not incognizant of some potential downsides of social norms (like the unfair or nonuniform imposition of sanctions, or the potential for self-help measures to escalate into violence), they often answer this latter question by citing the relative advantages of social norms over formal IP law—advantages like reduced social costs and increased tailoring to the needs of particular innovative communities.

In this Part, we expand the conversation beyond the IP/social norms dichotomy previously presented in the literature. We agree, in general, that IP can interact with innovation-enhancing social norms in either positive or negative ways. We also agree that based on the precise nature of this interaction in any given context we might choose whether we want a regime that relies on formal IP law, social norms, or some combination of the two. But, as our elucidation of anti-innovation norms illustrates, this debate ignores the fact that not all social norms that arise in innovative communities are innovation enhancing. Once we shift our focus from social norms-as-IP-substitutes to a broader understanding of social norms that includes their anti-innovation features, it becomes evident that formal IP law, though it can do much to address anti-innovation norms, is also inherently limited in its ability to do so. This realization forces us out of a narrow IP-or-norms worldview and requires us to adopt a broader vision of innovation policy.

We expand on that broader vision here. First, we ask what formal IP law might do to address anti-innovation norms. We conclude that it is a necessary, though not sufficient, tool.

This leads us to this Article's main theoretical insight: that the innovation literature, with its focus on either IP or substitutes for IP (like pro-innovation social norms) has been hindered by its narrow focus on solving the public goods (or free-rider) problem. Though addressing this problem is surely an important component of innovation policy, our elucidation of anti-innovation norms demonstrates that it should not be the only component. Indeed, the anti-innovation norms we have identified in this Article have little or nothing to do with the public goods problem formal IP law is designed to solve.

²⁷⁵ See *supra* Section I.A.

Instead, anti-innovation norms influence the *types* of innovation a particular individual or team is likely to undertake by hindering productive knowledge recombination across community boundaries. Rather than pose a free-rider problem, then, anti-innovation norms pose a boundary-crossing innovation dilemma.²⁷⁶ Because IP law is designed primarily to address the free-rider problem, it is unsurprising that it cannot fully correct anti-innovation norms. In other words, strengthening IP protection will do little to change the background anti-innovation norms at work in a community, leading at best to *more* of the same *type* of innovation within a community²⁷⁷ but failing to increase socially valuable boundary-crossing creativity. As we show in this Part, certain IP doctrines such as nonobviousness in patent law and attribution rights in copyright can work at the margins to impact the direction of innovative activity. Nevertheless, when anti-innovation norms are at work, IP (or its substitutes) will almost always be an insufficient intervention to correct them. Again, this prompts us to broaden our vision to consider other policy interventions—both private and public—to address anti-innovation norms.

Taking the first steps in this direction, we offer some concrete policy solutions to the anti-innovation norms problem. Because creativity-enhancing collaborations are risky and have large public benefits that cannot be fully internalized, we propose that public interventions are in order. We focus on novel funding regimes and tax credits as examples. We stress, however, that these proposals are preliminary in nature and should serve mainly to highlight the need for creative solutions that go beyond the narrow boundaries of IP.

A. *What IP Can—and Cannot—Do to Address Anti-Innovation Norms*

The IP system is generally understood as a means of efficiently incentivizing innovation.²⁷⁸ Under the traditional, utilitarian account of IP, exclusive rights are granted to creators to encourage them to create things which, for various reasons arising from the public goods nature of intellectual products, rational actors would not create otherwise.²⁷⁹

²⁷⁶ See Madison, Frischmann & Strandburg, *supra* note 32, at 671 (criticizing “functionalist accounts” of IP for too myopic “a focus on excludability as a solution to public goods problems [which] can lead to isolated analysis of boundary problems”).

²⁷⁷ Increasing patent protection could also lead, at worst, to a decline in innovative output by weakening pro-innovation social norms and increasing hold up and patent thicket problems.

²⁷⁸ See, e.g., Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1597–99 (2003) (“[C]ourts and commentators widely agree that the basic purpose of patent law is utilitarian: We grant patents in order to encourage invention.”).

²⁷⁹ See *supra* note 50.

But this corrective does not fully address the anti-innovation norms identified here. IP, designed as it is to solve the free-rider problem, is inherently limited in its ability to influence the social and psychological factors that contribute to anti-innovation norms. Though we and others have identified how the IP system might help tackle anti-innovation norms, an understanding of the limitations of IP also prompts us to widen our vision of what it takes to optimally incentivize innovation.

1. IP's Failure to Address the Causes of Anti-Innovation Norms

As previously explained, IP is a market intervention designed to overcome the free-rider problems associated with creating intellectual products.²⁸⁰ The prospect of free riding undermines natural market incentives to invest in new intellectual goods;²⁸¹ IP aims to restore these incentives by providing time-limited monopolies to those who create intellectual products, allowing them to charge supracompetitive prices for their products and recoup their investments.²⁸²

This standard account of IP law sheds light on its inability to address anti-innovation norms. Put differently, the IP system is not designed to directly address the social structures of underlying technological communities. To the contrary, IP law is designed to increase the appropriability of those innovations such communities would routinely make were it not for the threat of free riding.²⁸³ The IP incentive, geared as it is towards encouraging the organization as a whole to invest more resources in creative projects generally, leaves it to the organization's discretion to choose what *types* of projects to focus on. In fact, this is traditionally seen as a strength of IP law: IP rights' reliance on decentralized market signals is thought to drive the efficient allocation of resources to inventive activity.²⁸⁴

²⁸⁰ See Fisher, *Theories of Intellectual Property*, *supra* note 50, at 169.

²⁸¹ David S. Olson, *Taking the Utilitarian Basis for Patent Law Seriously: The Case for Restricting Patentable Subject Matter*, 82 TEMP. L. REV. 181, 182 (2009).

²⁸² See Fisher, *Intellectual Property and Innovation*, *supra* note 30, at 3 (explaining that IP entitlements “enable innovators to charge persons who wish to obtain access to their creations, thus enabling innovators both to recoup the costs of innovation and to make a profit on their activities”); Menell, *supra* note 42, at 131 (explaining the traditional economic justification of IP as granting time-limited monopolies to inventors to “promote innovation and commerce requiring substantial up-front investments and risk” and to offset “the differential fixed costs borne by innovators and imitators”).

²⁸³ See, e.g., *id.* at 146 (explaining that traditional economic accounts of IP “emphasize a reward theory, seeing the appropriability of economic returns from investment as the driving force behind technological innovation” (emphasis added)).

²⁸⁴ In comparative analyses of IP versus other regimes for incentivizing innovation such as governmental subsidies and prizes, scholars argue that IP's advantage is its reliance on market signals to allocate resources towards inventions, rather than reliance on government agents to value the worth of a particular research project and allocate resources accordingly. See, e.g., Harold Demsetz, *Information and Efficiency: Another Viewpoint*, 12 J.L. & ECON. 1 (1969) (arguing that the copyright and patent systems

But these market signals are filtered through the existing technological environment, which is in turn bounded by anti-innovation norms. In other words, research priority, methodology, and evaluation norms constrain how communities perceive and respond to market signals. Conversely, consumer preferences—and the resulting market signals—are also limited by consumers’ abilities to articulate and recognize their own needs.²⁸⁵ In Lester and Piore’s case studies of boundary-crossing innovations such as cell phone technology, designer jeans, and medical devices, “interpretive” conversations across community boundaries were not guided by preexisting consumer preferences; rather, they served to articulate fuzzy consumer needs and even to create new ones by finding new problems or reframing old ones.²⁸⁶

An organization with adequate incentives, courtesy of the patent system, to invest in research and development might still be reluctant to undertake innovation-enhancing collaborative projects because its decisionmakers are subject to the conformity and status quo biases.²⁸⁷ To be sure, this organization will continue to be guided by its own research, methodology, and evaluative norms to produce patentable and copyrightable innovations. Yet patent and copyright law do not provide incentives for the organization to challenge its own—often implicit and sometimes irrational—anti-innovation norms and pursue other, more socially valuable innovations through boundary-crossing collaborations. Patent and copyright law take as a given the social and psychological constraints on innovation described in Part II.

This point—that IP law cannot change a firm or a community’s underlying social and psychological constraints on innovation—echoes

rely on market signals to ensure efficient channeling of research and development efforts towards innovations consumers actually want); Menell, *supra* note 42, at 143 (summarizing comparative institutional analyses of different policies to encourage innovation, and summarizing the standard critique of governmental subsidies as running the risk of “misallocat[ing] resources, however, because the government lacks adequate information to allocate, manage and monitor the use of subsidies effectively. Moreover, the provision of subsidies by the government generates rent-seeking by potential recipients which wastes resources directly and distorts the allocation of the subsidies”).

²⁸⁵ See, e.g., LESTER & PIORE, *supra* note 123, at 78 (“[W]hile the new technologies of production may have made it less costly to accommodate customers’ particular preferences, this is not the same thing as saying that the customer actually knows what those preferences are.”).

²⁸⁶ *Id.* at 76 (“In the analytical view, the customer has preexisting needs, and the job of the developer is to identify those needs and then to create products that meet them in an optimal way. . . . In the interpretive view, the customer has no needs until they are articulated, and this articulation is what the interaction between the designer and the customer is all about.”).

²⁸⁷ See *supra* Section II.C.2b (describing how the status quo bias might cause organizational decision makers to steer clear of risky projects).

theories of firm behavior developed in evolutionary economics.²⁸⁸ Under evolutionary economic theories, firms are constrained in their “innovation possibilities” by their learning structures and routines.²⁸⁹ In turn, a firm’s learning structures and routines are cognitive concepts, “expressed in the minds of technologists and managers [and] . . . reflecting the individuals involved and the manner of their organization.”²⁹⁰ From this evolutionary perspective, the set of anti-innovation norms described in Part II—and their corresponding psychological maintenance mechanisms—serve to delineate a firm’s innovation possibilities.

In applying evolutionary economics to technology policy, evolutionary economist J. S. Metcalfe divides policy incentives into two kinds: those that take a firm’s innovation possibilities as a given and those that seek to change them.²⁹¹ Policy levers such as IP law that “increase the pay-off to innovation” by granting short-term monopoly profits fall squarely under the first category.²⁹² The incentives currently provided by the IP system simply do not address underlying sociological and psychological constraints on innovation.

Nor is it clear that IP, on its own, could fully do so. Because IP is focused on time-limited monopolies and financial incentives, reforms to IP doctrines, with the exceptions we explore below,²⁹³ may not have a significant long-term effect on anti-innovation norms. Specifically, economic analyses that explore how changes in patent and copyright law may impact the levels of research and development focus predominantly on

²⁸⁸ See, e.g., Giovanni Dosi & Richard R. Nelson, *Technical Change and Industrial Dynamics as Evolutionary Processes*, in 1 HANDBOOK OF THE ECONOMICS OF INNOVATION 52, 75 (Bronwyn H. Hall & Nathan Rosenberg eds., 2010) (“[E]ach body of knowledge specific to particular technologies, that is, each paradigm shapes and constrains the notional opportunities of future technical advance and also the boundaries of the set of input coefficients which are feasible on the grounds of that knowledge base . . .”); J. S. Metcalfe, *Evolutionary Economics and Technology Policy*, 104 ECON. J. 931, 935 (1994); Richard R. Nelson & Bhaven N. Sampat, *Making Sense of Institutions as a Factor Shaping Economic Performance*, 44 J. ECON. BEHAVIOR & ORG. 31–54 (2001); Richard R. Nelson & Katherine Nelson, *Technology, Institutions, and Innovation Systems*, 31 RES. POL’Y 265, 267 (2002) (“Thus, for scholars in both [evolutionary economics and new institutional economics], patterns of action need to be understood in behavioral terms, with improvements over time being explained as occurring through processes of individual and collective learning.”).

²⁸⁹ Metcalfe, *supra* note 288, at 935 (“Innovation possibilities set constraints on what can be achieved and elements of these constraints are faced by all technologists working within the relevant institutions and communities of practitioners.”); see also Nelson & Nelson, *supra* note 288, at 269 (“[E]volutionary theory sees economic actors as at any time bound by the limited range of routines they have mastered. Each of these has only a small range of choice. Further, the learning of new routines by actors is a time consuming, costly, and risky thing.”).

²⁹⁰ Metcalfe, *supra* note 288, at 934; see also Dosi & Nelson, *supra* note 288, at 74–75.

²⁹¹ Metcalfe, *supra* note 288, at 935–36.

²⁹² *Id.*

²⁹³ See *infra* Section III.A.2.

two features of IP rights: their breadth or scope and their length.²⁹⁴ Adjusting the length or breadth of IP rights alters the payoffs from obtaining IP protection, making innovation more or less appropriable. These changes do not, however, alter the underlying social norms that influence a firm's innovation possibilities.

2. *What IP Can Do*

We have just explained why IP is ill-suited to comprehensively tackle anti-innovation norms. This is not to say, however, that IP cannot mitigate the detrimental effects of these norms. Indeed, we²⁹⁵ and others²⁹⁶ have detailed in other work how IP—as currently structured or with changes to its doctrines—may promote higher individual and team creativity.

a. *Attribution rights in copyright and patent law*

We have written elsewhere about how attribution promotes creativity. Indeed, giving appropriate credit where it is due has been empirically shown to lead to enhanced motivation for creative work,²⁹⁷ more creative outputs,²⁹⁸ and increased desires to share research results.²⁹⁹

The pro-creativity effects of attribution have implications for anti-innovation norms as well. Because attribution promotes creativity in the ways identified, it can help creators overcome the status quo bias³⁰⁰ that constrains them to familiar research priority, methodology, and evaluation norms. And because it encourages sharing and disclosure behaviors, it can help promote boundary-crossing collaborations that might not otherwise occur.

IP law has a potential role to play in giving creators appropriate credit. Copyright, for instance, which does not currently list actual authors in registration statements of works made for hire, could begin to do so as a way of providing some minimal attributional and reputational benefit to

²⁹⁴ See, e.g., Menell, *supra* note 42, at 139 (summarizing economic analyses of patent length and breadth).

²⁹⁵ See, e.g., Bair, *Psychology*, *supra* note 115, at 349; Stephanie Plamondon Bair, *Rational Faith: The Utility of Fairness in Copyright*, 97 B.U. L. REV. 1487, 1488 (2017).

²⁹⁶ See, e.g., Dan L. Burk, *Patent Silences*, 69 VAND. L. REV. 1603, 1603 (2016) (arguing that patents may function as “boundary objects” that help facilitate collaboration among disparate communities).

²⁹⁷ See Bair, *Psychology*, *supra* note 115, at 340 (citing research showing that perceived fairness promotes motivation for creative work and that creators perceive their environment as fair when they receive appropriate credit for their work).

²⁹⁸ See Bair, *supra* note 295, at 1501–06.

²⁹⁹ Bair, *Psychology*, *supra* note 115, at 319.

³⁰⁰ See *supra* Section II.C.2 (explaining how the status quo bias can be explained in part by loss aversion).

creators.³⁰¹ Patent law currently does require inventors to be named on the patent, even when the patent has been assigned to someone else, but options for making the attribution right in patent law more robust abound as well.³⁰² In previous work, for example, one of us proposed an attribution system patterned after the academic publishing model.³⁰³ Upon peer review, creative advances singled out for special attention would receive coverage in specialized outlets or the wider popular press.³⁰⁴

b. Nonobviousness doctrine in patent law

In patent law, the nonobviousness doctrine seeks to reward with a patent only those inventions that would not have occurred (or would have been significantly delayed) absent a patent incentive.³⁰⁵ In other words, nonobviousness seeks to identify those inventions for which the prospect of free riding would be most detrimental. Both economic and social theories of nonobviousness view this doctrine as a mechanism to increase risk-taking by innovators and firms by encouraging investment in projects whose success is uncertain at the outset.³⁰⁶ Absent a nonobviousness doctrine, firms and individuals would be incentivized to invest in “low-hanging fruit”—those very incremental innovations requiring little investment, little creativity, and small inventive leaps leading to predictable results.³⁰⁷

The nonobviousness doctrine raises the bar. It tells inventors: to obtain a patent you must do something other than take the next incremental step in your particular technological domain. For this reason, nonobviousness is uniquely suited as a policy lever to mitigate anti-innovation norms. Investing in boundary-crossing innovation involves social and economic risks: flouting a community’s research priority, methodology, and evaluation norms could lead to loss of status, loss of group membership, and loss of all the pecuniary and nonpecuniary benefits associated with such group status and membership.³⁰⁸ In previous work, one of us proposed that the nonobviousness doctrine should encourage the specific risks involved in

³⁰¹ See Jeanne C. Fromer, *Expressive Incentives in Intellectual Property*, 98 VA. L. REV. 1745, 1794–98 (2012).

³⁰² See, e.g., *id.* at 1810–17; Bair, *Psychology*, *supra* note 115, at 349–50.

³⁰³ Bair, *Psychology*, *supra* note 115, at 350.

³⁰⁴ *Id.*

³⁰⁵ See, e.g., Michael Abramowicz & John F. Duffy, *The Inducement Standard of Patentability*, 120 YALE L.J. 1590, 1599 (2011); Robert P. Merges, *Uncertainty and the Standard of Patentability*, 7 HIGH TECH. L.J. 1, 3 (1992); Pedraza-Fariña, *Sociology of Innovation*, *supra* note 15, at 830–34.

³⁰⁶ Pedraza-Fariña, *Sociology of Innovation*, *supra* note 15 at 830–34.

³⁰⁷ See, e.g., *KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 417 (2007) (“[A] court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.”).

³⁰⁸ See, e.g., Pedraza-Fariña, *Sociology of Innovation*, *supra* note 15, at 857–61.

boundary-crossing collaboration.³⁰⁹ It could do so by evaluating whether the invention at issue resulted from the recombination of knowledge from distant technological domains.³¹⁰ Recombination of distant knowledge domains could serve as strong indicia of nonobviousness.³¹¹ Conversely, inventions that recombine knowledge from domains that are routinely brought together would merit more intense scrutiny.³¹²

But, even if adopted, these proposals to modify the nonobviousness doctrine would only work on an innovator who is both weakly influenced by anti-innovation norms and strongly influenced by patent law. We can more formally define such an innovator as one who, without a nonobviousness standard that favors boundary-crossing, is equally as likely to pursue boundary-crossing innovations as not.³¹³ Such an innovator is likely an innovator who, for a number of reasons, is on the outskirts of a particular innovator community or already has ties with more than one innovator community and thus is weakly bounded by any particular community's anti-innovation norms. Perhaps she is a maverick and has a personality that likes to flout convention; or perhaps she is a misfit whose ideas are routinely rejected by core group members.³¹⁴ To this inventor, a new nonobviousness standard that rewards boundary-crossing may nudge her to resist anti-innovation norms and engage in boundary-crossing research.

Consider, however, that the ability to obtain a patent is one of many elements innovators and firms take into account when choosing among research projects.³¹⁵ Further, mounting empirical evidence casts doubt on whether patent incentives play *any* role in incentivizing inventor and firm behavior in a variety of industries.³¹⁶ In those fields where inventors are not

³⁰⁹ *Id.* at 861; Pedraza-Fariña, *Social Origins*, *supra* note 15, at 444–45; see also Michal Shur-Ofry, *Non-Linear Innovation*, 61 MCGILL L.J. 563 (2016); Michal Shur-Ofry, *Connect the Dots: Patents and Interdisciplinarity*, 51 MICH. J.L. REF. 55, 59 (2017).

³¹⁰ Pedraza-Fariña, *Social Origins*, *supra* note 15, at 47–51.

³¹¹ *Id.*

³¹² *Id.*

³¹³ Robert Merges uses a broader concept of the “marginal inventor” as “the one who without the patent system is equally likely to pursue an invention as not.” MERGES, *supra* note 50, at 9.

³¹⁴ Mavericks are “creative actors who . . . feel constrained in their work by existing conventions and embark on challenging some of them.” Candace Jones et al., *Misfits, Mavericks and Mainstreams: Drivers of Innovation in the Creative Industries*, 37 ORG. STUD. 751, 755 (2016) (citing HOWARD S. BECKER, *ART WORLDS* (1982)). Misfits are “outsiders who . . . break or do not abide by social rules.” *Id.* at 756 (citing HOWARD S. BECKER, *OUTSIDERS: STUDIES IN THE SOCIOLOGY OF DEVIANCE* (1963)).

³¹⁵ See, e.g., Wesley M. Cohen et al., *Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not)* 1 (Nat'l Bureau of Econ. Research, Working Paper No. 7552, 2000) (finding that patents “tend to be the [mechanism] least emphasized by firms in the majority of manufacturing industries” to protect their investment in innovation); Lemley, *supra* note 11.

³¹⁶ See Lemley, *supra* note 11, at 1332–35.

incentivized by patents, changing the obviousness standard will not affect maverick or misfit behavior. And in those fields where patents do play some role in guiding inventor behavior, for the vast majority of inventors and firms, the nonobviousness doctrine is likely to only influence the choice of research projects among the bounded universe of projects within a particular community's research priorities, methodology, and evaluation norms. From a patent-centric perspective, it is certainly efficiency enhancing to tweak the nonobviousness doctrine to nudge this patent-induced marginal inventor towards boundary-crossing projects. But from a broader innovation policy perspective, a more comprehensive toolkit is needed to address anti-innovation norms.

c. Fair use doctrine in copyright law

Though we have not explored the potential for fair use to address anti-innovation norms in other work, we believe it is worth mentioning here.³¹⁷ The fair use doctrine provides a defense to copyright infringement³¹⁸ based on four factors.³¹⁹ The first of these factors asks about “the purpose and character of the use,”³²⁰ including whether the infringing use is “transformative.”³²¹ In an empirical study, Matthew Sag found that whether a work is deemed transformative plays a critical role in determining whether an infringing use will be deemed “fair” by the courts.³²²

To counter anti-innovation norms, the transformative inquiry could more explicitly take into account some of the concerns we discuss here. Courts could consider whether an infringing work was the kind of work that tends to be underproduced due to anti-innovation norms. If the infringer transported her use of the original across a boundary—from one community of artists to another, or from one medium to another, for example—a finding of transformativeness would be more likely to obtain. The goal, of course, would be to encourage this type of socially beneficial creation by minimizing liability for those who engage in it. These types of considerations may

³¹⁷ We also hope to expand on these ideas in future work.

³¹⁸ 17 U.S.C. § 107 (2012) (“[T]he fair use of a copyrighted work . . . is not an infringement of copyright.”).

³¹⁹ *Id.* (listing as fair use factors: “(1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes; (2) the nature of the copyrighted work; (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and (4) the effect of the use upon the potential market for or value of the copyrighted work”).

³²⁰ *Id.*

³²¹ *See, e.g.,* *Campbell v. Acuff-Rose Music, Inc.*, 510 U.S. 569, 579 (1994) (stating that an infringing work is considered transformative if it “alter[s] the [infringed work] with new expression, meaning, or message.”).

³²² *See* Matthew Sag, *Predicting Fair Use*, 73 OHIO ST. L.J. 47, 76 (2012).

already be present in the transformativeness inquiry to some extent,³²³ but an understanding of the anti-innovation norm dynamic justifies a more explicit and principled approach.

d. Patents as boundary objects

Apart from any particular IP doctrine, Dan Burk has argued that the patent document itself may act as a “boundary object” that facilitates communication and collaboration among disparate communities.³²⁴ According to Burk, the patent succeeds in this function in part because its language is precise enough to speak to multiple communities yet ambiguous enough to allow it “to maintain different identities in different social worlds.”³²⁵ These features “provide a point of commonality where disparate communities can collaborate and where contested meanings can be negotiated[,] . . . facilitat[ing] communication and cooperation between social domains.”³²⁶ In her study of physician–inventors, Katherine Strandburg has also identified a role for patents as boundary-crossing devices that facilitated collaboration between physicians and device industry engineers.³²⁷ Thus, patents may serve a structural function—enabling collaboration between different communities of innovators. On the other hand, patents may interfere with boundary-crossing collaboration in communities that adopt open-innovation models. As Clark Asay has argued, patents favor centralized innovation and may place the type of decentralized and modular innovation that takes place in open communities at a disadvantage.³²⁸

B. Policy Prescriptions: The Potential of a More Robust Innovation Policy

Although the preceding discussion makes clear that IP can do much to tackle anti-innovation norms, it should be equally clear that it cannot fully solve the dilemma. Here, we discuss additional policy levers that could be deployed to address the anti-innovation norms we have identified. As

³²³ See, e.g., *Sony Comput. Entm’t, Inc. v. Connectix, Corp.*, 203 F.3d 596, 606 (9th Cir. 2000) (finding that a video game emulator was transformative despite “similarit[ies] of uses and function” with the original because it created a new platform for game play).

³²⁴ Burk, *supra* note 296, 1623–24.

³²⁵ *Id.* at 1628.

³²⁶ *Id.* at 1624.

³²⁷ Strandburg, *supra* note 61, at 76.

³²⁸ Clark D. Asay, *Enabling Patentless Innovation*, 74 MD. L. REV. 431, 432–37 (2015). Patents may also entrench the status quo bias: the holder of a patent that has market power may be disincentivized from searching for improvements, “as she already enjoys a dominant position in the relevant market, and the improved version might not generate new demand but rather take sales away from the original product.” Ofer Tur-Sinai, *Cumulative Innovation in Patent Law: Making Sense of Incentives*, 50 IDEA 723, 734 (2010).

explained, the sociological and psychological barriers to creativity-enhancing collaborations make it unlikely that creative teams will engage in these endeavors on their own. Further, the benefits that accrue to the public from these collaborations (in the form of socially beneficial groundbreaking innovation, the establishment of new lines of research, etc.) cannot be fully internalized by the private parties that engage in them. And because the innovation incentives that IP offers are agnostic as to the *type* of innovation that occurs, private parties are much more likely to engage in less risky and psychologically taxing (but also less socially beneficial) lines of research that promise the same private benefits. For these reasons, legal interventions that offer private incentives to engage *specifically* in creativity-enhancing collaborative research are in order. We now discuss two of these: novel funding regimes and tax incentives.

1. Collaborative Team Grants

The National Institutes of Health (NIH) and the National Science Foundation (NSF) are the primary governmental funding agencies for scientific research in the United States. As such, they provide much of the funding, in the form of grants, for biomedical and public health research conducted at universities and research institutes throughout the country.³²⁹ Its counterpart in the arts is the National Endowment for the Arts (NEA).³³⁰

Although several existing NIH grants are designed to encourage collaboration, none of them target the formation of boundary-crossing teams that are so crucial to innovation and that anti-innovation norms discourage. Rather, current NIH initiatives designed to foster collaboration are focused more extensively on big data collection and annotation. Big data analysis is often more about constructing a shared infrastructure for data analysis and coordinating its collection than it is about generating new and innovative ideas. Indeed, many of these projects “involve application of known methods *on a large scale* to an important problem.”³³¹ Similarly, the NEA funds individual fields, such as dance, design, visual arts, music, literature, and theatre, but does not currently emphasize collaboration across them.³³² The

³²⁹ NAT'L INST. HEALTH, <https://www.nih.gov> [<https://perma.cc/YS83-36DC>]; NAT'L SCI. BOARD, <https://www.nsf.gov/nsb> [<https://www.nsf.gov/nsb>]. See generally W. Nicholson Price II, *Grants* (draft on file with author) (providing an in-depth examination of the NIH grant system as an innovation-lever).

³³⁰ See NAT'L ENDOWMENT FOR ARTS, <https://www.arts.gov> [<https://perma.cc/KVE8-563L>].

³³¹ Ronald N. Germain, *Healing the NIH-Funded Biomedical Research Enterprise*, 161 CELL 1485, 1489 (2015) (emphasis added); see also Bruce Alberts et al., *Rescuing US Biomedical Research from Its Systemic Flaws*, 111 PNAS 5773, 5776 (2014) (“To combat the tendency for fields to become parochial, agencies should develop funding mechanisms that encourage the growth of new fields, both by direct support for new science and by a rigorous regular evaluation of existing programs.”).

³³² See *Grants*, NAT'L ENDOWMENT FOR ARTS, <https://www.arts.gov/grants> [<https://perma.cc/F4KQ-EZEV>].

NSF funds a broader range of boundary-crossing opportunities under their targeted “solicited interdisciplinary programs.”³³³ These grant opportunities target research areas, such as BigData, Macrosystems Biology, and Regional Climate Prediction, that the NSF identifies as priority funding areas.³³⁴ Nevertheless, unsolicited interdisciplinary proposals are likely to face hurdles to receiving NSF funding similar to those facing NIH proposals because, as the NSF itself recognizes, “there might not be an obvious natural [core program] ‘home’ for every interdisciplinary proposal.”³³⁵

One possibility for overcoming anti-innovation norms, then, is to introduce a grant mechanism at the NIH, NEA, and NSF that requires collaboration across boundaries. At the NIH and NSF, such a mechanism could solicit proposals from researchers from any disciplinary background to research intractable problems whose solution requires the insights and joint work of multiple technological domains. The grant could also be expanded to include proposals from industry or industry–academia initiatives (public–private partnerships) that specifically engage multiple research communities and disciplines.³³⁶ Indeed, the NIH did enact, for a period of seven years, a set of grants (the “Roadmap Grants”) that sought to encourage the assembly of boundary-crossing teams.³³⁷ The Roadmap Grant project was tethered to the “Common Fund”—a discretionary pool of funds that each successive NIH Director can use to shape science policy during her tenure.³³⁸ Currently, there is no grant equivalent to the NIH Roadmap Grant for Interdisciplinary Research. Under several measures, however, the Roadmap Grant project was very successful and worth replicating on a larger scale.³³⁹ In other work, for example, we detail how the Roadmap Grant facilitated research in the novel area of “oncofertility,” which deals with the fertility issues of cancer patients.³⁴⁰ These prescriptions are also relevant to other grant-making agencies both in science and technology and in the arts,

³³³ See *How Does NSF Support Interdisciplinary Research?*, NAT’L SCI. FOUND., https://www.nsf.gov/od/oia/additional_resources/interdisciplinary_research/support.jsp [<https://perma.cc/5ZSZ-PXQ9>].

³³⁴ *Id.*

³³⁵ *Id.*

³³⁶ See, e.g., Liza S. Vertinsky, *Patents, Partnerships, and the Pre-Competitive Collaboration Myth in Pharmaceutical Innovation*, 48 U.C. DAVIS L. REV. 1509, 1526 (2015).

³³⁷ See *NIH Roadmap and Roadmap-Affiliated Initiatives*, NAT’L INST. HEALTH, <https://www.niehs.nih.gov/funding/grants/announcements/roadmap/index.cfm> [<https://perma.cc/LT8Y-8C59>].

³³⁸ *Id.*

³³⁹ Pedraza-Fariña, *Constructing Interdisciplinary Collaboration*, *supra* note 15 at 8.

³⁴⁰ *Id.* at 22–25.

such as the NSF, the Department of Defense, and the NEA, as well as private grant-making institutions.³⁴¹

To optimally design such a grant, grant-making agencies or institutions should create stand-alone bodies specifically tasked with coordinating these new grants and with researching effective team management practices. Otherwise, existing bodies within these organizations given jurisdiction over the grants may find themselves subject to the very same anti-innovation norms (prioritizing specific research goals, methodologies, and evaluation norms dictated by their preexisting agendas) the grant mechanism is designed to overcome.³⁴² The grants should also be administered with a conscious degree of flexibility. A flexible approach aligns best with the type of high-risk, uncertain research the grants are meant to foster. Grant reviewers should allow some deviation from a team's original proposal, provided the overall subject matter of the research fits with the problem to be addressed by the team.³⁴³

2. *Tax Credits for Collaborative Research Involving Nontraditional Teams*

Another mechanism by which the government may directly incentivize the type of collaborative research discouraged by anti-innovation norms is through tax incentives. Currently, tax incentives in the United States, in contrast to those of other countries with intensive research and development industries, are generic—they enable firms to deduct *any* research and development costs. Precisely because tax credits are generic, any uniform increase in tax subsidies is likely to lead to a dynamic misallocation of resources by oversubsidizing research avenues dictated by anti-innovation norms while doing nothing to discourage underinvestment in interdisciplinary collaborative projects.³⁴⁴ To correct this distortion, the United States could adopt a special type of tax credit requiring nontraditional collaboration between industries that specialize in different technical

³⁴¹ One private initiative that is structured to encourage boundary-crossing collaboration is the research center “Janelia Farms” funded by the Howard Hughes Research Institute. Janelia Farms’ philosophy is to fund “risky, long-term projects that may often fall outside the realm of most funding and academic goals. [These projects] bring together myriad disciplines – perhaps combining physicists, computer scientists and biologists to build a new microscope. It’s not necessarily what you’d find in a university biology department.” *Janelia’s Philosophy*, JANELIA RES. CAMPUS, <https://www.janelia.org/janelia-philosophy> [https://perma.cc/TBQ5-75BV]. Janelia Farms research has been successful in generating Nobel Prize-winning science in just eleven years of operation. *Id.*

³⁴² See, e.g., Pedraza-Fariña, *supra* note 263.

³⁴³ Pedraza-Fariña, *Constructing Interdisciplinary Collaboration*, *supra* note 15, at 34–35.

³⁴⁴ See, e.g., Daniel J. Wilson, *Beggar Thy Neighbor? The In-State, Out-of-State, and Aggregate Effects of R&D Tax Credits*, 91 REV. ECON. STAT. 431 (2009).

domains (a cross-technology tax credit).³⁴⁵ The tax credit could be designed so that it is available for a limited number of years per collaborative project.

Many other countries currently have a collaborative tax credit available to industries, and the design of the U.S. cross-technology tax credit could begin by looking to these models for initial guidance. For example, Belgium, Denmark, Japan, and France provide tax credits for industries collaborating in the development of products with universities or research institutes (thus fostering clinical/industrial-basic research collaboration).³⁴⁶ Canada provides a tax credit for all companies collaborating with eligible universities, research institutes, or research consortia.³⁴⁷ Most of these tax credits focus on one particular type of collaboration: that between basic science and clinical/industrial communities. A tax credit for joint ventures between industries in different technological environments is another possibility.

The advantage of a collaborative tax credit over collaborative team grants is that it obviates the need for an expert panel—with all of its built-in biases—to decide *ex ante* which projects are and are not worth funding. Collaborative tax credits represent a uniform push towards collaborative research. Of course, the uniformity of the incentive can also dull its impact, since it cannot identify and target those projects likely to be more socially significant.

CONCLUSION

The turn to social norms in IP scholarship signals an important shift in legal scholars' understanding of innovation dynamics. By challenging the dominant narratives that placed IP rights at the center of innovation policy, social norms have come to represent the promise of informal, low-cost incentives.

But this line of scholarship has two important blind spots. First, it remains shackled to overly narrow notions of innovation dilemmas that privilege free riding as the central problem facing innovators. Second, it neglects to fully explore social norms' potential dark side.

This Article describes types of social norms that, rather than take the place of IP as an innovation incentive, serve to delay innovation. We term these types of social norms anti-innovation norms.

³⁴⁵ Although a comprehensive discussion of selection criteria is beyond the scope of this Article, potential signals that a project is boundary-crossing might include the fact that a project brings together people who work in different traditionally-defined scientific disciplines or who use different methodological approaches.

³⁴⁶ See, e.g., Robert D. Atkinson, *Expanding the R&E Tax Credit to Drive Innovation, Competitiveness and Prosperity*, 32 J. TECH. TRANSFER 617, 617–28 (2007).

³⁴⁷ *Id.*

Through our analysis of anti-innovation norms, we make three main theoretical contributions to both IP and innovation theory, and to the field of law and social norms more broadly. First, the set of anti-innovation norms described in this Article is unconnected to the free-rider problem. Our account thus challenges the dominant free-riding dogma in traditional IP narratives, which views the threat of copying as *the* most important innovation dilemma to be addressed through governmental interventions. Second, shifting our focus from free riding to other innovation dilemmas also highlights the limits of IP law to address them. Although changes in IP doctrines, such as attribution rights in copyright law and the nonobviousness doctrine in patent law, can address anti-innovation norms to some extent, IP law cannot provide a comprehensive solution. Third, our account of social norms is the first to merge macrolevel (sociological) and microlevel (psychological) accounts of how social norms emerge and are maintained. We thus expand upon existing analyses of norm emergence predominant in the broader law and social norms scholarship. In so doing, we bring IP and social norms literature into the conversation with the broader field of law and social norms, a field that has long grappled with social norms' potential detrimental effects on society.