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## Sticky Knowledge in Copyright

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# STICKY KNOWLEDGE AND COPYRIGHT

MARGARET CHON\*

Knowledge is sticky because it adheres to people along social routes, lodged within relational and collective modalities, as well as through copyright's proverbial fixed works that can be transacted more freely. Sticky knowledge may in fact constitute a much larger body of knowledge than we usually acknowledge in intellectual property and may intersect with copyright in unexpected ways. This Article delves into sticky knowledge, which has been referenced often outside of intellectual property and sometimes within the laws of patents and trade secrets but almost not at all within copyright law. Under what circumstances will sticky knowledge encourage robust knowledge transmission—or copyright's goal of "encouragement of learning"? Understanding the scope and reach of this kind of knowledge may point to optimal means to encourage knowledge spillovers and reliability.

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*I shall reconsider human knowledge by starting from the fact that we can know more than we can tell. This fact seems obvious enough; but it is not easy to say exactly what it means.<sup>1</sup>*

*Si tu sais que tu ne sais pas, alors tu sauras.<sup>2</sup>*

## INTRODUCTION

In producing what counts as knowledge, copyright is both over-inclusive and under-inclusive. Many have pointed to its over-inclusiveness.<sup>3</sup> Copyright's threshold, including its arguably low standards of originality and fixation, means that many works can and

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1. MICHAEL POLANYI, *THE TACIT DIMENSION* 4 (Univ. Chi. Press 2009) (1966).

2. Attributed to Amadou Hampâté Bâ (Tr: "If you know that you do not know, then you will know." *Amadou Hampâté Bâ*, WIKIPEDIA, [http://en.wikipedia.org/wiki/Amadou\\_Hamp%C3%A2t%C3%A9\\_B%C3%A2#Quotes](http://en.wikipedia.org/wiki/Amadou_Hamp%C3%A2t%C3%A9_B%C3%A2#Quotes) ; to whom is also attributed: "En Afrique, quand un vieillard meurt, c'est une bibliothèque qui brûle. — *In Africa, when an old man dies, it's a library burning.*" (1960 at l'UNESCO)). *Id.* Both of these quotes exemplify sticky knowledge; they are resistant to being verified in English by sources acceptable by Bluebook standards; the original sources have not been translated into English and/or distributed widely enough to verify accuracy. See E-mail from Cheikh Thiam, Assistant Professor, The Ohio State University, to Olufémi Táíwò, Director, Global African Studies, Seattle University (March 31, 2011, 5:31 EST) (on file with author) ("I don't know where exactly this quote, often attributed to A. H. B. is from, but it is something that is frequently repeated in Senegal and Mali. There is even a Wolof proverb that says it in the same words. And Ba's work is, in many ways, a transcription of the collective intellectual production of the Fulani and the Bambana. All his tales for example, are transcriptions of traditional tales. I would, therefore, not be surprised if he just used one of the Fulani and Bambana proverbs. It is also important to note that most of Amadou Hampête Bâ's work is still unpublished!"). Compare *infra* text accompanying notes 149–51 for further discussion.

3. Pamela Samuelson et al., *The Copyright Principles Project: Directions for Reform*, 23 (2010) (unpublished manuscript), available at [http://www.law.berkeley.edu/files/bclt\\_CPP.pdf](http://www.law.berkeley.edu/files/bclt_CPP.pdf):

The vast majority of copyrighted works created each year have little or no commercial value. Billions of works, such as emails and business memos, are created without the incentive of copyright and lack independent commercial value as expressive works. Many other works that people create, such as blog posts, are subject to copyright, although their authors intend to distribute them without restraint or with fewer restraints than the default rules of copyright impose. Many works are created with the intent to exploit their commercial value as expression, but lack that value at inception or perhaps enjoy evanescent commercial value that endures for a much shorter period than the current copyright term.

will be protected.<sup>4</sup> The construction of knowledge by copyright assumes that most meaningful creative knowledge can be captured, perhaps to a fault.

Much of this Article examines the opposite proposition: copyright's under-inclusiveness, even in an age of increasing digital creation and distribution. If knowledge was adequately captured by copyright-protected goods, then the mere existence of a book would obviate the need for a teacher and the presence of a painting would not require further explanation. Yet students still fill classrooms and implicitly demand by their presence that teachers explain the contents of their textbooks (if they can afford to buy them). And visitors to art museums often feel that they do not comprehend a work of art unless it is viewed within the context of an experienced critic's or docent's guidance. In many, if not in most, cases much knowledge is not fixed within and by copyright, although copyright girds much of what we can and do find valuable to know. For it is also true that even the best teachers often require books in order to be most effective, and even the highly articulate guide cannot convey the power of visual art through mere verbal description, however adroit.

Analogously, in the area of patent law, successful commercialization often involves more than licensing the patented invention *per se*, but also must include the penumbra of information required to practice invention—information not necessarily disclosed in the patent, or even if it is disclosed textually, needs further explanation or demonstration in person. And in early stage innovation, James Bessen has recently noted that “communication costs are significant not only because they provide a degree of appropriability, but they can also change the nature of innovative competition so that inventors might even share knowledge.”<sup>5</sup> These aspects of non-formalized knowledge

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4. Indeed, some have argued that the threshold is too low, resulting in many unnecessary works. Rochelle Cooper Dreyfuss, *Does IP Need IP? Accommodating Intellectual Production Outside the Intellectual Property Paradigm*, 31 CARDOZO L. REV. 1437, 1461 (2010) (“More controversially, one might question the social value of promoting massive amounts of user-generated content. Debra Halbert notes that an unauthorized Internet posting of Michael Jackson’s “Thriller” has been viewed over 34,000,000 times and has generated 8000 comments.”); Joseph Scott Miller, *Hoisting Originality*, 31 CARDOZO L. REV. 451, 465 (2009).

5. James Bessen, *Communicating Technical Knowledge* 7 (Bos. Univ. Sch. of Law Working Paper No. 10-35, 2010), available at <http://ssrn.com/abstract=1698802>; see also Ashish Arora, *Licensing Tacit Knowledge: Intellectual Property Rights and the Market for Know-How*, ECON. INNOVATION & NEW TECH. 41, 42–44 (1995) [hereinafter Arora, *Licensing Tacit Knowledge*] (arguing that the transfer of know-how or tacit knowledge is more valuable when used in connection with codified knowledge in the form of patents).

have sometimes been called know-how, tacit knowledge, and/or sticky information.<sup>6</sup>

Drawing from these various sources, I refer to this type of knowledge here mostly as “sticky knowledge.”<sup>7</sup> Unlike many of these other scholarly forays, the focus in this Article is less on appropriability of and commercial returns on sticky knowledge than on its potential for positive spillovers and its reliability.

The “sticky” part of “sticky knowledge” refers to the aspects of knowledge that have a stubbornly and sometimes irreducibly social dimension,<sup>8</sup> which is not simply equivalent to the artifact of the knowledge good itself, whether or not covered by intellectual property. Positive knowledge spillovers may occur when the benefits of exclusive rights in intellectual property are externalized to the public rather than internalized within the rights-holder’s bundle of rights.<sup>9</sup> Analogously,

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6. Ashish Arora, *Contracting for Tacit Knowledge: The Provision of Technical Services in Technology Licensing Contracts*, 50 J. DEV. ECON. 233, 233 (1996) [hereinafter Arora, *Contracting for Tacit Knowledge*] (“Recent research on the economic payoff from new technology has emphasized the importance of tacit knowledge or know-how.”); Eric von Hippel, *“Sticky Information” and the Locus of Problem Solving: Implications for Innovation*, 40 MGMT. SCI. 429, 430–31 (1994).

7. Others have used the term “sticky knowledge” but my use is slightly idiosyncratic. As this Article points out, all of the terms associated with this area are somewhat opaque. In this Article, I substitute the term “knowledge” for von Hippel’s term “information” because in copyright, we are largely concerned with “works” rather than with widgets, and knowledge is different from mere content or information.

8. HARRY COLLINS, *TACIT AND EXPLICIT KNOWLEDGE* 11 (2010) (describing weak or relational tacit knowledge, which has to do with relations between people that arise out of the nature of social life and “strong, or collective, tacit knowledge—the knowledge that the individual can acquire only by being embedded in society”); see also Robert Ahdieh, *Beyond Individualism in Law and Economics*, 91 B.U. L. REV. 43, 67 (2011) (“Broadly, the transfer of knowledge is not individualistic. Rather, as Arrow quotes Thorstein Veblen, ‘[t]he commonplace knowledge of ways and means, the accumulated experience of mankind, is still transmitted in and by the body of the community at large.’ The same is true of the creation of *new* knowledge, to which Arrow suggests economists have not been sufficiently attentive, given its centrality to economic growth. As with the transfer of existing knowledge, the acquisition of new knowledge is, in primary part, social in nature. An individualistic approach to knowledge would thus seem ill-advised.” (quoting Thorstein Veblen, *Professor Clark’s Economics*, 22 Q.J. ECON. 147 (1908), reprinted in THORSTEIN VEBLLEN, *THE PLACE OF SCIENCE IN MODERN CIVILISATION AND OTHER ESSAYS* 180, 186 (1919)) (footnotes omitted)); Yanis Varoufakis, *Where the Customers Are Always Wrong: Some Thoughts on the Societal Impact of a Non-Pluralist Economic Education*, 1 INT’L J. PLURALISM & ECON. EDUC. 46 (2009).

9. Brett M. Frischmann & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257, 258 (2007) (“[W]e explain that in IP, unlike real property, a wide range of externalities matter, because IP rights are much less certain than property rights and because the decision to create a legal entitlement will determine whether or not a transaction must occur. Second, we suggest that there is no reason to think that complete internalization of externalities is necessary to optimize investment incentives;

the “sticky” part of knowledge may be encouraged into more transparent and/or transactable forms of knowledge, resulting in positive spillovers.

Furthermore, drawing a critical distinction between what is commonly called “content” in the copyright world and “knowledge,” the “knowledge” part of “sticky knowledge” addresses the accuracy, authenticity, contextual reliability, or veracity dimensions of knowledge (what will be called “reliability” hereinafter). This is suggested by the difference between “connaissance” and “savoir” as put forth by Paul David and Dominique Foray:

The French language offers a distinction between ‘savoir’ and ‘connaissance’ that has no real equivalent in English, though it can be conveyed by adding the qualifier ‘reliable’. Reliable knowledge (‘savoir’) means certified, robust knowledge that has been legitimised by some institutional mechanism (be it scientific peer review or collective memory and belief systems). Other forms of knowledge (‘connaissance’) also enable action (knowing how to do the gardening, DIY) but have not been put through the same tests as certified knowledge. What separates the two has less to do with a contrast between the scientific and non-scientific than whether or not the knowledge has been subjected to institutional testing.<sup>10</sup>

Arguably all works protected by copyright have sticky knowledge components. These aspects often can be ameliorated by codification (such as fixation) or other forms of communication. Therefore, stickiness always lies on a continuum.<sup>11</sup> Often the reason for lack of communication or codification has its source in a social dimension. Nonetheless, sticky knowledge is often simply identified by its quality of not being codified rather than because it is embedded within social relations or because the knowledge is located in the social collective.<sup>12</sup> This Article attempts to disentangle the elision.

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at some point, there are decreasing returns (in terms of improved incentives) to allowing property owners to capture more of the value from their inventions.”)

10. Paul A. David & Dominique Foray, *Economic Fundamentals of the Knowledge Society*, 1 POL’Y FUTURES EDUC. 20, 46 n.1 (2003), [http://www.worlds.co.uk/pdf/validate.asp?j=pfie&vol=1&issue=1&year=2003&article=2\\_David\\_PFIE\\_1\\_1](http://www.worlds.co.uk/pdf/validate.asp?j=pfie&vol=1&issue=1&year=2003&article=2_David_PFIE_1_1).

11. Sajjad M. Jasimuddin et al., *The Paradox of Using Tacit and Explicit Knowledge: Strategies to Face Dilemmas*, 43 MGMT. DECISION 102, 103–05 (2005) (knowledge lies along a continuum of tacit and non-tacit).

12. COLLINS, *supra* note 8.

Despite being quite tangible, a work of art can be sticky because it can be literally difficult to find,<sup>13</sup> not to mention appreciated, upon viewing without the help of others, as mentioned above. A book may be sticky when it is not translated and therefore not accessible to persons who cannot read the original language. A technical term in computer code may be sticky because engineers in different parts of the world are not communicating with each other about what each of them thinks it means.<sup>14</sup> Art, book, and code in these examples are all “works” that are codified enough to be protected by copyright and yet their full knowledge-reach is not met. In other words, the social dimension captured by the term “sticky knowledge” is both threaded within works protected by copyright and circulated outside those works. To use Eric von Hippel’s terminology, “sticky information” does not travel freely because it may be costly to “transfer that information to a specified locus in a form usable by a given information seeker.”<sup>15</sup> Sticky knowledge is very much bound to people rather than to codes; communication among people is key.

And of course, communication through cultural expression may overcome stickiness: music is often characterized as a universal language. Expressive knowledge through art can convey precisely what we otherwise can’t say or cannot even otherwise “know.”<sup>16</sup> And the creativity that may flow from “misunderstanding” and reinterpreting, remixing, and transforming accepted views of knowledge is endemic to the expressive field of copyright.

Works, to use the copyright term of art, run the gamut from purely expressive and creative to those that may have more educational or utilitarian functions. As one part of an overall system of knowledge governance, copyright covers knowledge directed at pure entertainment as well as that generated for education or news reporting: from fanciful to factual, as we say in the fair-use analysis. For almost all these types of works, however, sticky knowledge has a role to play in fostering knowledge reliability as well as knowledge spillovers. Scholars inside

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13. Bob Tedeschi, *Apps as Tour Guides Through New York Museums, Step by Step*, N.Y. TIMES, Sept. 9, 2010, at B6.

14. ANNALEE SAXENIEN, REGIONAL ADVANTAGE: CULTURE AND COMPETITION IN SILICON VALLEY AND ROUTE 128, at 157 (1994).

15. von Hippel, *supra* note 6, at 430 (“[D]efin[ing] the stickiness of a given unit of information in a given instance as the incremental expenditure required to transfer that unit of information to a specified locus in a form usable by a given information seeker. When this cost is low, information stickiness is low; when it is high, stickiness is high.”). Put another way, Harry Collins posits a weak form of tacit knowledge (relational), which exists when knowledge is logistically demanding (it would cost too much for an organization to invest in knowledge systems to replace the tacit knowledge). COLLINS, *supra* note 8, at 94.

16. I am indebted to Madhavi Sunder for this insight.

and outside the field of law have unduly confined the discussion of this type of knowledge to the patent and trade secret realms,<sup>17</sup> perhaps not recognizing that it may assist us in understanding whether and when it promotes the various goals of copyright.<sup>18</sup> It has obvious implications, too, for conceptualizing the nature of intergenerational equity—a significant dimension of distributional justice—or other aspects of human flourishing; ends to which copyright is ostensibly dedicated through its “encouragement of learning.”<sup>19</sup>

Thus this Article addresses several types of information paradoxes, different in kind, but not in significance from Kenneth Arrow’s information paradox. The latter forms the central thesis of the economic analysis of much of present-day intellectual property law,<sup>20</sup> but the paradox explored here is the knowledge of not knowing what we know.<sup>21</sup>

One under-inclusion results from distributional asymmetry, caused in part by a global divide in access to knowledge, where some may have too much knowledge and others not enough.<sup>22</sup> Another under-inclusion is caused ironically by the over-abundance of digital information combined with indifference to the salience of sticky knowledge, perhaps in conjunction with the lack of a curator’s or editor’s skill and guidance in piecing different knowledge domains

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17. See discussion *infra* Part II.

18. Perhaps this is because, as Greg Mandel, Jeanne Fromer, and others have pointed out, we have separated the realms of patent and copyright law into distinct creative areas. Gregory N. Mandel, *Left Brain versus Right Brain: Competing Conceptions of Creativity in Intellectual Property Law*, 44 U.C. DAVIS L. REV. 283 (2010); see also Jeanne C. Fromer, *A Psychology of Intellectual Property*, 104 NW. U. L. REV. 1441 (2010).

19. See 8 Ann., c. 19 (1710) (*An Act for the Encouragement of Learning, by Vesting the Copies of Printed Books in the Authors or Purchasers of such Copies, during the Times therein mentioned*), available at <http://www.copyrighthistory.com/anne.html>; see also U.S. CONST. art. 1, § 8; Diane Leenheer Zimmerman, *The Statute of Anne and Its Progeny: Variations Without a Theme*, 47 Hous. L. REV. 965, 971 (2010) (tracing ambiguity in the act’s “encouragement of learning” goal); Copyright Act of 1790, available at <http://www.copyright.gov/history/1790act.pdf>.

20. KENNETH J. ARROW, *ESSAYS IN THE THEORY OF RISK-BEARING* 152 (1971) (“[The] fundamental paradox in the determination of demand for information [is that] its value for the purchaser is not known until he has the information, but then he has in effect acquired it without cost.”).

21. See Bessen, *supra* note 5, at 3 (revisiting Arrow’s model, which “assumes zero communication costs”); see also Stuart Hannabuss, *Narrative Knowledge: Eliciting Organisational Knowledge from Storytelling*, 52 ASLIB PROC. 402, 402 (2000) (describing “unconscious incompetence”).

22. I have explored this at great length elsewhere and will touch upon it again briefly, see *infra* Part IV, as it is relevant to the question of intergenerational equity. See Margaret Chon, *Intellectual Property and the Development Divide*, 27 CARDOZO L. REV. 2821, 2823–31 (2006).



(sticky and non-sticky) together.<sup>23</sup> Even open-content or open-source formats may be subject to systematic forms of social bias that are unconscious but pervasive and significant,<sup>24</sup> and thus sticky knowledge may shape the reliability and distribution of even the most potentially inclusive and well-intended knowledge-production systems, such as distributed peer production.<sup>25</sup>

Once one recognizes the sticky knowledge aspects of copyright, then what? The multiplicity of copyright's domains is bewildering and can obscure the different sticky knowledge pieces that should be connected in some way to non-sticky knowledge. Different areas of copyright might demand differing degrees of tolerance with respect to the information paradoxes of under-inclusion explored here. Much of what copyright covers is arguably more open ended (often towards the highly touted goal of creativity) than patent's subject matter, imbued as it is with specific design constraints that inventors may face.

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23. Frank Pasquale, *Copyright in an Era of Information Overload: Toward the Privileging of Categorizers*, 60 VAND. L. REV. 135, 165 (2007) ("After developing the pollution analogy further, I make the case for considering information overload as an externality below."); see also Edward Lee, *Warming Up to User-Generated Content*, 2008 U. ILL. L. REV. 1459, 1548. Jessica Litman argues, however, that we are at a point in copyright history where the public-law framework should be disintermediated. Jessica Litman, *Real Copyright Reform*, 96 IOWA L. REV. 1, 39 (2010).

24. JOAN C. WILLIAMS, *RESHAPING THE WORK-FAMILY DEBATE: WHY MEN AND CLASS MATTER* 29 (2010) (citing Shelley Correll et al., *Getting a Job: Is There a Motherhood Penalty?*, 112 AM. J. SOC'Y 1297, 1316 (2007) (finding that women who listed membership in the PTA in otherwise identical resumes were 79 percent less likely to be hired than women with identical resumes but without PTA membership, 100 percent less likely to be promoted, offered \$11,000 less in salary, and held to higher performance and punctuality standards than non-mothers)); see also Jerry Kang & Kristin Lane, *Seeing Through Color-Blindness: Implicit Bias and the Law*, 58 UCLA L. REV. 465, 516 (2010) ("Recall the résumé study that demonstrated discrimination against Lakisha over Emily. That study found that '[a] White name yields as many more callbacks as an additional eight years of experience on a resume.' We tend to focus on the harm to the individual, but from the firm's perspective, this evidence shows inefficient, non-profit-maximizing behavior." (footnote omitted)).

25. Julie E. Cohen, *Configuring the Networked Citizen*, in *IMAGINING NEW LEGALITIES* (Lawrence Douglas et al. eds., forthcoming 2011) (manuscript at 8-9) (on file with author):

[One] way to approach the question of legal responsibility for the ongoing configuration of networked individuals and communities is to consider more generally how society ought to structure accountability for the design of networked information technologies and artifacts. Among U.S. scholars of technology law and policy, those questions too have conventional answers. Many scholars who write about law and technology issues tend to think that the development of technical standards and the evolution of digital products and services are matters best regulated by the market rather than by government. Effective technology policy thus is a matter of respectful tinkering at the edge of essentially private processes.

Nonetheless, there is a “reliability” value to copyright’s “encouragement of learning” project analogous to the “efficiency” or “best mode” specifications in patent and trade secret law—a value that can guide the certification of content that rises to the level of “savoir.” One claim here is that we may overestimate the potential of content (digital or otherwise) by itself to promote knowledge. Creating content and creating knowledge are vastly separate projects. In this sense, this Article seeks to identify ways in which copyright law may not encourage learning despite its liberality with respect to subject matter, and more generally where intellectual property law, despite its mandate of “progress,” might be nonetheless regressive.<sup>26</sup>

Moreover, knowledge governance is capacious: copyright is just one aspect of knowledge management and is itself undergoing a rapid transition in its modalities, ranging from a Byzantine public-law framework to a pluralistic mix of de-centered private ordering combined with technological protection measures and even structured settlements involving major market actors. While the newer governance modalities are not unproblematic,<sup>27</sup> some of the tools in the areas of governance, broadly construed, may assist in formulating the incentives within these knowledge governance spaces. For example, contractual terms of service might be viewed as a critical governance mechanism to facilitate the attribution, creation, dissemination, and protection of certain kinds of sticky knowledge that may be under-produced. This is not to say that the standard doctrinal categories are irrelevant; surely sticky knowledge will affect our understanding of the scope of the derivative-work right, for example.

In parsing this potentially powerful but under-utilized conceptual tool of sticky knowledge, I turn in Part I to the literature outside of intellectual property, where the concept of “tacit knowledge” has been a much more frequent inhabitant, in order to determine some first principles of this notoriously slippery concept. Part II then returns to

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26. Cf. Barton Beebe, *Intellectual Property Law and the Sumptuary Code*, 123 HARV. L. REV. 809, 814 (2010) (“We are thus increasingly relying on intellectual property law not so much to enforce social hierarchy as simply to conserve — or in Pierre Bourdieu’s terminology, to ‘reproduce’ — our system of consumption-based social distinction and the social structures and norms based upon it. The result is that intellectual property law now consists of two conflicting sides: the familiar progressive side of the law, which works, in the terms of the U.S. Constitution, ‘To promote the Progress of Science and useful Arts,’ and the unappreciated sumptuary side of the law, which is not progressive but rather socially and technologically reactionary.” (footnotes omitted)).

27. JULIE E. COHEN, CONFIGURING THE NETWORKED SELF: LAW, CODE, AND THE PLAY OF EVERYDAY PRACTICE (forthcoming 2012); Margaret Chon, *Global Intellectual Property Governance (Under Construction)*, 12 THEORETICAL INQUIRIES L. 349, 374–76 (2011), <http://www.bepress.com/til/default/vol12/iss1/art12/>.

intellectual property. Unlike much of the literature from which I draw a fuller understanding of sticky knowledge, however, I am less concerned with the appropriability and exclusivity of knowledge, and more concerned with its potential for diffusion or knowledge spillovers and its quality of “savoir.” Copyright is one mode among many of knowledge governance, although it is often appreciated only as a mechanism for commercial transactions. In Part III, the Article concludes with reflections about knowledge governance and intergenerational equity: where we may fail to address the fact that we “know more than we can tell” and therefore where our current doctrines and governance mechanisms may fall short.

## I. STICKY KNOWLEDGE

### A. *Outside of Law*

Michael Polanyi, who is widely credited with first articulating the concept of tacit knowledge, stated that “[w]e know a person’s face, and can recognize it among a thousand, indeed among a million. Yet we usually cannot tell how we recognize a face we know. So most of this knowledge cannot be put into words.”<sup>28</sup> This is a statement about inarticulable knowledge, as well as holistic knowledge.<sup>29</sup> Originally

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28. POLANYI, *supra* note 1, at 4 (emphasis added). The element of holistic or Gestalt understanding within tacit knowledge is not emphasized in this Article. See Robin Cowan et al., *The Explicit Economics of Knowledge Codification and Tacitness*, 9 INDUS. & CORP. CHANGE 211, 212 (2000) (“Reference to the findings of Gestalt psychology in regard to other perceptual phenomena formed another important aspect of Polanyi’s conceptualization of tacit knowledge: people appear to be perceptually (and/or intellectually) aware of some objects and things about the world only as *entities*—as illustrated by the identification of a particular human face or voice. Knowledge of this kind consists of *holistic* understandings, and thus is not completely amenable to purely reductionist analyses.”). Nor is Polanyi’s exploration of the personal passion as an element of tacit knowledge explored here. MICHAEL POLANYI, *PERSONAL KNOWLEDGE: TOWARDS A POST-CRITICAL PHILOSOPHY* (rev. ed. 1962).

29. Later, Polanyi rejected the term “science” as perhaps too imbued with connotations of logical positivism and not enough with the social dimension discussed here. Polanyi stated in a discussion with Carl Rogers at San Diego State University:

Yes, let us not attribute particular merit to something by saying, “This is scientific.” Let’s describe its value and its reliability, its penetration and so many other terms; and the example which you mention is very much to the point; namely, creativity. Now, this is one of the objects which leads a very precarious existence because the supposed methods of science cannot deal with it; they can’t do anything about it. And therefore, the theory which science makes of itself tries to exclude it. It says, “Oh, this is just psychology or sociology or something which doesn’t belong to us. It’s not logic.” I think that all this is unnecessary and actually misleading.

denoting that certain aspects or types of knowledge are ineffable yet still discernable, sticky knowledge defies attempts at being “expressed in a particular language and recorded on a particular medium.”<sup>30</sup>

While this powerful concept of a type of knowledge that “cannot be put into words” has taken root in many disciplines,<sup>31</sup> it is also still curiously indeterminate fifty years after being announced. This is a result partly of its multi-layered set of meanings that have only been parsed through repeated analytical forays. “Tacit knowledge” is often used interchangeably with “know-how,”<sup>32</sup> but the two terms are distinct, in part because of their respective genealogies and different usages. Whereas tacit knowledge retains a pentimento of its origins in the philosophy of science, and is currently associated more with the economics and management literature, know-how is more typically associated with applied and commercial science or research, along with legal scholarship and practice.<sup>33</sup> As Cowan, David, and Foray note in mock despair,<sup>34</sup> complete consensus around the concept of “tacit knowledge” is elusive. Nonetheless it is fair to say that the current literature coalesces around several insights: rather than a dichotomy between sticky knowledge and codified knowledge, many posit a knowledge continuum (or even cycle),<sup>35</sup> offering various accounts for

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Dialogue between Michael Polanyi & Carl Rogers, in San Diego, Cal. (Mar. 5, 1966), available at <http://www.missouriwestern.edu/orgs/polanyi/polanyi-rogers%20dialog-pdf.pdf>.

30. David & Foray, *supra* note 10, at 25.

31. Interestingly, much of the literature of what is called here sticky knowledge has been developed outside of the governance of knowledge (*qua* intellectual property), and within the disciplines of anthropology, economics, geography, history of science, information science, management, philosophy, science, technology and society studies, and/or sociology of science—where its definitions have been more diverse than within intellectual property. This tells us something already about sticky knowledge—knowledge, including sticky knowledge, can be cordoned off by the invisible boundaries of local epistemic communities.

32. Arora, *supra* note 5, at 42.

33. The definition of know-how arises in cases involving trade secrets. For example, Judge Arlin M. Adams defined it as “an employee’s general knowledge, skill, and experience . . . even if these were acquired during employment.” *SI Handling Sys., Inc. v. Heisley*, 753 F.2d 1244, 1267 (3d Cir. 1985) (Adams, J., concurring).

34. Cowan et al., *supra* note 28, at 211 (“With increasing frequency these days references appear in the economics literature to ‘tacit knowledge’. More often than not the meaning of this term itself is something that remains literally tacit—which is to say, those who employ it are *silent* as to its definition.”).

35. Cristiano Antonelli, *The Business Governance of Localized Knowledge: An Information Economics Approach for the Economics of Knowledge*, 13 *INDUSTRY & INNOVATION* 227, 237 tbl.1 (2006).

lack of codification,<sup>36</sup> including economic and stubbornly social dimensions of knowledge. The social aspects are often overlooked in the legal literature.<sup>37</sup> These are explored more below.

Sticky knowledge inevitably surrounds the transmission of formalized knowledge. Christiano Antonelli claims that: “A fully codified knowledge that can be easily transmitted and communicated does not exist. Relevant absorption and assimilation activities are necessary even for codified knowledge to be transferred among individuals and organizations.”<sup>38</sup> As discussed in the beginning of this Article, the fact that a book is fixed does not eliminate this question of absorptive capacity, which is “the ability . . . to recognize the value of new information, assimilate it with existing knowledge and apply it to create new capabilities.”<sup>39</sup> Moviegoers, opera lovers, and dance aficionados, for example, may still feel the need to discuss the impact and meaning of what they have just experienced in theaters, gaining insight from different perspectives of critics or others more sophisticated in the audience, and then applying this awareness to their own creative interpretations. The interpersonal dynamics that are so critically important in the transfer of knowledge are complicated further by culturally specific sticky knowledge as well as the absorptive capacity of the receiver. To elaborate on von Hippel’s original insight, which he explored with respect to “problem-solvers,”<sup>40</sup> the concept of sticky knowledge applies to all of copyright’s knowledge exchangers (whether producers or so-called users or consumers). Their respective absorptive capacities provide a limit to knowledge diffusion. Thus

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36. Almost all the literature lists some of these reasons, but none list all. COLLINS, *supra* note 8, at 141–42 (for the most recent and logically developed catalogue).

37. *Id.* at 123–25.

38. Antonelli, *supra* note 35, at 230.

39. Jamie D. Collins & Michael A. Hitt, *Leveraging Tacit Knowledge in Alliances: The Importance of Using Relational Capabilities to Build and Leverage Relational Capital*, 23 J. ENGINEERING & TECH. MGMT. 147, 161 (2006); *id.* at 163 (summarizing a case study of NedCar Mitsubishi where “[m]iscommunication also occurred because the two firms sometimes had different terms for the same part or, conversely, the same term for different parts”); see also Ajay Agrawal, *Engaging the Inventor: Exploring Licensing Strategies for University Inventions and the Role of Latent Knowledge*, 27 STRATEGIC MGMT. J. 63, 64 (2006) (describing “teachability” as an aspect of tacit knowledge); Tim Reiffenstein, *Codification, Patents and the Geography of Knowledge Transfer in the Electronic Musical Instrument Industry*, 50 CAN. GEOGRAPHER 298, 314 (2006) (describing how the Japanese firm Yamaha recognized the value of American innovation, whereas U.S. Silicon Valley firms ignored it).

40. von Hippel, *supra* note 6; see also Fromer, *supra* note 18, at 1484–94 (describing patent law generally as “problem solving” and copyright law as “problem finding”).

sticky knowledge lies along a continuum, rather than being dichotomous with codified knowledge.<sup>41</sup>

### I. ECONOMIC DIMENSIONS

Sticky knowledge is often reduced to simply uncodified knowledge, regardless of the reasons for the lack of codification. However, once the reasons for lack of codification are diagnosed, sticky knowledge might be encouraged into more explicit forms of knowledge—or alternatively, a decision could be made to leave the knowledge tacit. Through a memorable line borrowed from Jack Goody, David and Foray remind us that: “With the emergence of codification, ‘the problem of memory ceases to dominate intellectual life.’”<sup>42</sup> In any event, codification is often a choice.

Knowledge may be uncodified for economic<sup>43</sup> or non-economic reasons. Communication and/or codification of sticky knowledge can be non-trivially costly. Much of the economic literature focuses on the costs of making knowledge explicit, especially with increasing distance from its origin.<sup>44</sup> Codification also “consists in translating knowledge into symbolic representations so that it can be stored on a particular medium.”<sup>45</sup> The implication is that the medium itself must be susceptible to common interpretation by code-readers, and thus codification may be subject to the predictable problems of technological obsolescence, which adds a contingency to the cost equation.<sup>46</sup>

One aspect that can be easily confused with lack of codification is that of the “displaced codebook.” As Dan Burk succinctly describes this, “knowledge has been codified, but then internalized, so that the

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41. See Antonelli, *supra* note 35; see also Ikujiro Nonaka, Ryoko Toyama & Akiya Nagata, *A Firm as a Knowledge-Creating Entity: A New Perspective on the Theory of the Firm*, 9 *INDUS. & CORP. CHANGE* 1, 10 (2000) (claim of cycling between tacit and codified knowledge); Reiffenstein, *supra* note 39, at 300.

42. David & Foray, *supra* note 10, at 26 (quoting JACK GOODY, *THE DOMESTICATION OF THE SAVAGE MIND* 143 (1977)).

43. Maurice Cassier, *Appropriation and Commercialization of the Pasteur Anthrax Vaccine*, 36 *STUD. HIST. & PHIL. BIOLOGICAL & BIOMEDICAL SCI.* 722, 737, 739 (2005); see also Paul A. David, *Knowledge, Property, and the System Dynamics of Technological Change*, in *PROCEEDINGS OF THE WORLD BANK ANNUAL CONFERENCE ON DEVELOPMENT ECONOMICS 1992*, at 215, 219–21 (L. Summers & S. Shah eds., 1993).

44. Cowan et al., *supra* note 28, at 211, 212, 226.

45. David & Foray, *supra* note 10, at 26.

46. See Robin Cowan & Dominique Foray, *The Economics of Codification and the Diffusion of Knowledge*, 6 *INDUS. & CORP. CHANGE*, 595, 603 (1997) (explaining that the technology by which information is stored and managed changes over time).

code is no longer manifest.”<sup>47</sup> Cowan and others describe this as “normal technology,” positing that many knowledge communities rely on a highly elaborate and codified knowledge base (shared jargon, norms, specifications, and so on) that may be referenced only if and when a dispute arises.<sup>48</sup> This is a different situation (from a cost perspective, for instance) than one in which the knowledge has never been codified at all.

One example might be that the norms of scholarly citation take into account what must be referenced explicitly and what can be taken for granted as tacit or background knowledge.<sup>49</sup> In the rarified world of legal citation, we are bound by *Bluebook* format once we do decide to cite to something, but many areas of discretion exist regarding if and when to drop a footnote. After writing many law review articles, many of us just “know it when we see it.” If a dispute does arise over what should be cited, we might refer to the enormous body of scholarly literature for comparison—this could be thought of as an implicit, displaced codebook that has been built up by custom. In contrast to the situation of the displaced codebook, much knowledge that could be codified simply is not. Even in the scholarly world, which of course is heavily text oriented, examples include scholarly insights into a field that may never result in publication<sup>50</sup> or even diligent preparation for classroom teaching that is never eventually taught or transmitted in any way. Again, implicit in these examples is a cost factor—it may not be worth the investment to codify the knowledge, even though it is surely possible to do so.

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47. Dan L. Burk, *The Role of Patent Law in Knowledge Codification*, 23 *BERKELEY TECH. L.J.* 1009, 1015 (2008) (citing Cowan et al., *supra* note 28, at 230–33).

48. Cowan et al., *supra* note 28, at 224.

49. Arthur S. Brisbane, Op-Ed., *Scholarly Work, Without All the Footnotes*, *N.Y. TIMES*, Oct. 3, 2010, at WK8 (discussing norms of attribution and citation in journalism as opposed to scholarship, in response to controversy over Guy Deutscher’s article *Does Your Language Shape How You Think?*, *N.Y. TIMES*, Aug. 29, 2010, at MM42).

50. Agrawal, *supra* note 39, at 78 (“To this end, it is interesting to speculate about the broader policy implications of this study in terms of the practical application of new knowledge generated from university research in general. It seems reasonable to assert that the knowledge studied here is particularly applied relative to that generated by university research overall, from disciplines such as biology, chemistry, and physics as well as political science, sociology, and economics. It may, in fact, be even more important to engage the researcher in the transfer of university knowledge more broadly defined since the knowledge examined here was constructed from inventions that were explicitly licensed with commercial intentions.”).

## 2. SOCIAL DIMENSIONS

In Polanyi's original work and more sharply in recent research, an essential aspect of sticky knowledge emerges in its social dimension. Harry Collins describes what he calls weak (or relational) tacit knowledge—that is, sticky knowledge that could be codified but is not, for a variety of social reasons, including deliberate concealment or mismatched saliences and the like.<sup>51</sup> As an example of the first type of sticky knowledge, scientists visiting other laboratories may find answers to their questions that are not completely forthcoming.<sup>52</sup> With regard to mismatched saliences, Collins gives an example of a party to a knowledge transfer assuming that the other party had access to an essential piece of knowledge, which the second party in fact did not.<sup>53</sup>

In the management literature, one finds references to “social capital,” including its most important relational component, trust.<sup>54</sup> As Jamie Collins and Michael Hitt define it:

Social capital has both a relational and a structural dimension. This view is conceptually closely related to [the] assertion that social capital involves elements of ‘who you know’, as well as how one actor is connected to other actors in a network. The existence of firm-level social capital involves relationships between firms.<sup>55</sup>

Structural relationships are indeed essential (for firms must be able to connect with each other first in order to develop or capitalize upon social capital). But these initial meta-level relationships may not be sufficient to complete the knowledge transfer in the absence of

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51. COLLINS, *supra* note 8, at 91–97.

52. *Id.* at 91.

53. *Id.* at 95–96.

54. See Collins & Hitt, *supra* note 39, at 148 (“Building relational capital involves development of trust, information sharing and joint problem solving. The inherently complex process of transferring tacit knowledge requires greater attention to the relational dimension of social capital than does transferring other forms of knowledge. In particular, tacit knowledge transfer requires greater trust between partners than does explicit knowledge transfer.” (citation omitted)); see also POLANYI, *supra* note 1, at 61 (“Think of the amazing deployment of the infant mind. It is spurred by a blaze of confidence, surmising the hidden meaning of speech and adult behavior. This is how it grasps their meaning. And each new step can be achieved only by entrusting oneself to this extent to a teacher or leader. . . . It appears then that traditionalism, which requires us to believe before we know, and in order that we may know, is based on a deeper insight into the nature of knowledge and of the communication of knowledge than is a scientific rationalism that would permit us to believe only explicit statements based on tangible data . . .”).

55. *Id.* at 155 (citations omitted).



individual-level relationships.<sup>56</sup> As explored further in Part II, this insight has many implications for knowledge governance of intellectual-property-protected goods:

Knowledge reproduction has . . . long hinged on the ‘master-apprentice’ system (where a young person’s capacity is moulded by watching, listening and imitating) or on interpersonal transactions among members of the same profession or community of practice. These means of reproducing knowledge may remain at the heart of many professions and traditions, but they can easily fail to operate when social ties unravel . . . .<sup>57</sup>

In short, people and their relationships—including their quirks and their ability to connect, as well as their possible disconnects—are critical for knowledge diffusion.<sup>58</sup>

Sticky knowledge is not just about connecting actors to a knowledge network, but also about connecting them to knowledge that resides in the larger collective. For lawyers or law professors, whose profession famously hinges on risk analysis and subjective judgment calls within a defined interpretative universe (“it depends”), this may seem very familiar. A strongly social sticky knowledge depends on the ability to respond to complex and nuanced signals from others, and therefore can never be fully codifiable—what Harry Collins dubs Social Cartesianism.<sup>59</sup> This kind of sticky knowledge resides literally within the body of the social.

Trust is integral to working with these stronger kinds of stickiness, along with its essential characteristics of absorptive capacity and cultural specificity. Effective social interactions contribute to the development of trust, facilitating the knowledge transfer process. Due to its inherently idiosyncratic nature, transfer of sticky knowledge is likely to be most effective when the parties involved trust one another. In fact, some have argued that trust is a prerequisite for sharing sticky

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56. *Id.* at 156.

57. David & Foray, *supra* note 10, at 25.

58. Collins & Hitt, *supra* note 39, at 148; *see also* Antonelli, *The Evolution of the Industrial Organisation of the Production of Knowledge*, 23 *CAMBRIDGE J. ECON.* 243 (1999). If institutional knowledge networks can be analogized to the structural component of inter-firm networks in management literature, then the subsequent relational dimension of sticky knowledge and its consequences for knowledge transfer overall must be examined.

59. COLLINS, *supra* note 8, at 125–26. He defines Social Cartesianism, where “[t]he collectivity, rather than the individual, is the location of the knowledge.” *Id.* at 131.

knowledge.<sup>60</sup> This is a foundational principle in trade secret law, much of which is premised on the formation of confidential relationships.<sup>61</sup> Trust is a component that should be considered in relation to all sorts of knowledge transmission and diffusion, including that associated with copyright.

The ability to access sticky knowledge is contingent also on specific social groups. This is a point about relative social power, but it is also an observation about the different kinds of knowledge susceptible to codification. There may be tremendous advantages to codification in the area of medicine, where peer-to-peer transactions of somewhat standardized knowledge increasingly occur, compared to the area of education, where:

Curiously enough, however, teachers at the elementary and secondary level, on the other hand, do not fit the template of the modern knowledge-based communities, even though they make intensive use of knowledge. There may be a massive amount of innovation going on as individual instructors strive to find solutions to their teaching problems, but, perhaps because those problems involve working with ‘unstandardised materials’, i.e. their students, relatively few of those pedagogical innovations are passed on to, and shared by, the rest of the community.<sup>62</sup>

And much of the unconscious (sometimes thought of as intuitive or non-rational) aspect of sticky knowledge is in the form of cultural assumptions, background, experience, heuristics—what Jack Balkin has termed cultural “memes” or “cultural software.”<sup>63</sup> Thus another component of sticky knowledge is “implicit”<sup>64</sup>—that is “the acquisition of knowledge that takes place largely independently of conscious

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60. See, e.g., Collins & Hitt, *supra* note 39, at 159.

61. See UNIF. TRADE SECRETS ACT § 1, 14 U.L.A. 437 (amended 1985) (“‘Improper means’ includes . . . inducement of a breach of a duty to maintain secrecy . . . .”); RESTATEMENT (FIRST) OF TORTS § 757 (1939).

62. David & Foray, *supra* note 10, at 29; accord COLLINS, *supra* note 8, at 170 (“Education is socialization—it [is] the common learning of a language. Some of it can be substituted by information transmission but when too much is substituted, it becomes something else. Education, then, is always going to be inefficient. And, since the Internet is a broadcast medium, it is not going to substitute for education.”).

63. See generally J.M. BALKIN, *CULTURAL SOFTWARE: A THEORY OF IDEOLOGY* (1998).

64. Andrea Pozzali, *Tacit Knowledge, Implicit Learning and Scientific Reasoning*, 7 MIND & SOC’Y 227 (2008).

attempts to learn.”<sup>65</sup> Concepts such as implicit bias or implicit social cognition undergird all forms of sticky knowledge.<sup>66</sup>

In sum, sticky knowledge represents much more than simply the un-codified characteristics of knowledge, although it is often described by that surface quality. It consists of the attributes that are not only constrained by the economics of information, but also integrally bound up with social relations and the social collective such as absorptive capacity and cultural specificity. Some kinds of sticky knowledge can be easily encouraged along the continuum into more articulable or explicit knowledge. Other kinds of sticky knowledge may be more elusive or costly to codify because of the existence of implicit codes (including displaced codebooks) within specific knowledge communities, institutional arrangements and accompanying absorptive capacities of these institutions (including their internal cultural competencies), the degree of social capital (including trust) among knowledge partners, the degree of standardization of knowledge within specific social groups, and/or the challenges associated with implicit social cognition (including implicit bias). Altogether, these factors point to a social construct of knowledge within a narrative of science shaped as much by culture and situated perspectives as by facts on the ground.<sup>67</sup> Indeed, rather than simply a positive account of science performed by individual knowledge seekers, Polanyi’s view of this type of knowledge was deeply grounded in its normative and immanent function within specific intergenerational epistemic communities.<sup>68</sup>

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65. ARTHUR S. REBER, *IMPLICIT LEARNING AND TACIT KNOWLEDGE: AN ESSAY ON THE COGNITIVE UNCONSCIOUS* 5 (1993); see also Kang & Lane, *supra* note 24, at 467 (discussing this realm of decision-making, which sits at “the nexus of social psychology, cognitive psychology, and cognitive neuroscience” has evolved into a new body of science called “implicit social cognition”). This not only applies to issues of race, but to any significant social category, leading Kang and Lane to term the general problem of not seeing one’s own implicit bias “category blindness or category agnosticism.” *Id.* at 468 n.4.

66. See Kang & Lane, *supra* note 24, at 490–92 (discussing behavioral realism); see also Jerry Kang, *Trojan Horses of Race*, 118 HARV. L. REV. 1489 (2005) (discussing how unconscious assumptions are often not made explicit except through deliberate techniques of awareness, such as implicit bias tests, which can reveal aspects such as racial animus).

67. See, e.g., SANDRA HARDING, *WHOSE SCIENCE? WHOSE KNOWLEDGE? THINKING FROM WOMEN’S LIVES* (1991).

68. POLANYI, *supra* note 1, at 61 (“But if we know a great deal that we cannot tell, and if even that which we know and can tell is accepted by us as true only in view of its bearing on a reality beyond it, a reality which may yet manifest itself in the future in an indeterminate range of unsuspected results; if indeed we recognize a great discovery, or else a great personality, as most real, owing to the wider range of its yet unknown future manifestations: *then the idea of knowledge based on wholly identifiable grounds collapses*, and we must conclude that the transmission of knowledge from one

The food served in so-called “Korean taco trucks” illustrates some of the social dimensions described above. This cuisine, which has its genesis in Los Angeles and is furthered by the digital technology of Twitter,<sup>69</sup> is a fusion of Korean “kalbi” barbecue with Mexican tortillas and toppings.<sup>70</sup> Many have recently noted that knowledge in some areas of food innovation is governed more by social norms than by formal intellectual property law.<sup>71</sup> Despite the lack of formal or even informal legal protection, however, this innovation has been slow to diffuse throughout urban areas. Barriers to knowledge exchange lie partly in sticky knowledge’s interpersonal realm. Knowledge consumers require the absorptive capacity to appreciate what the knowledge purveyor is trying to convey, perhaps across two or more different cultures or languages. Knowledge producers may be tasked with building consumer trust around a culinary innovation, yet the experimental, still-evolving recipes may not lend themselves to standardization within a more familiar franchise system. And bias for hotdogs or other foods more familiarly associated with trucks may abound. (Or it is possible that these producers are guarding their recipes precisely through deliberate stickiness, similar to trade secrets—discussed further in the next Subsection.) While this is not a knowledge tragedy by any means, this example can remind us (at least those who love both Korean and Mexican food) of how sticky knowledge may prevent full knowledge reliability or spillover.

### *B. Within Intellectual Property*

Intellectual property dwellers are generally familiar with the concept of sticky knowledge but do not typically associate it with

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generation to the other must be predominately tacit.” (emphasis omitted and added)); see also POLANYI, *supra* note 1, at 244–45.

69. John T. Edge, *The Tortilla Takes a Road Trip to Korea*, N.Y. TIMES, July 28, 2010, at D1.

70. *Id.* (“Granted, Koreans have long eaten kalbi wrapped in lettuce leaves, in a taco-like fashion. But it’s a 21st-century paradox that Korean food, still considered exotic by many Americans, has begun to gain widespread acceptance, when wrapped in a Mexican flatbread and topped with taco truck embellishments.”).

71. Kal Raustiala & Chris Sprigman, *Who Owns the Korean Taco?*, N.Y. TIMES FREAKONOMICS (July 2, 2010, 10:30 AM), <http://freakonomics.blogs.nytimes.com/2010/07/02/who-owns-the-korean-taco/> (“From a copyright perspective, cuisine is a lot like fashion. Recipes are unprotected by copyright, and so anyone can copy another’s recipe. Actual dishes—the ‘built food’ you order in a restaurant—can also be copied freely. And as anyone who has eaten a molten chocolate cake or miso-glazed black cod knows, popular and innovative dishes do seem to migrate from restaurant to restaurant. The bottom line is that almost anything creative a chef does—short of writing the menu, which *is* protected by law—can be copied by another chef.”).

copyright. The stickiness of such knowledge is something that can be used in a deliberate way to ensure that it is not diffused or that it is diffused only under controlled conditions such as the licensing of inventions. The sticky knowledge associated with the Pasteur anthrax vaccine (despite the absence of patent protection for pharmaceuticals in France in the nineteenth century), for instance, ensured in some cases that this knowledge was not disseminated at all unless the actual person (scientist) wanting access agreed to stay at the Pasteur Institute itself where this vaccine was prepared.<sup>72</sup> This technique of preserving monopolistic control over technology is well known of course to modern-day patent lawyers who often draft patent claims in ways that do not reveal the underlying “know-how” that is required to practice the invention—sticky knowledge that may be in the minds and hands of the original inventor(s) or their collaborator(s). What is startling is how little we have explored sticky knowledge in copyright (the realm of expressive activity, manifested through civic, creative, cultural, and educational forms of knowledge) compared to areas such as patent and trade secret law (the realm of inventive activity).<sup>73</sup>

Interestingly, scholars outside the field of intellectual property law generated the early socio-legal work that compared innovation capacity generated by Silicon Valley as opposed to Boston’s Route 128.<sup>74</sup> Shubha Ghosh recently extended their insights to the international realm.<sup>75</sup> Others such as Catherine Fisk have focused on factors that contribute to employee loyalty and/or mobility in the context of trade secret protection.<sup>76</sup> Ronald Gilson describes employee tacit knowledge

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72. See Cassier, *supra* note 43, at 737 (discussing a production and distribution model proposed by Pasteur that represented a maximum concentration of production and knowledge at one central location).

73. See Arora, *supra* note 5, at 43–46; see also James Bessen, *Patents and the Diffusion of Technical Information*, 86 *ECON. LETTERS* 121 (2005).

74. SAXENIAN, *supra* note 14, at 29–58; Ronald J. Gilson, *The Legal Infrastructure of High Technology Industrial Districts: Silicon Valley, Route 128, and Covenants Not to Compete*, 74 *N.Y.U. L. REV.* 575 (1999).

75. See Shubha Ghosh, *Open Borders, Intellectual Property & Federal Criminal Trade Secret Law*, 9 *J. MARSHALL REV. INTELL. PROP. L.* 24 (2009); see also ANNALEE SAXENIEN, *THE NEW ARGONAUTS: REGIONAL ADVANTAGE IN A GLOBAL ECONOMY* (2006).

76. See Catherine L. Fisk, *Knowledge Work: New Metaphors for the New Economy*, 80 *CHI.-KENT L. REV.* 839, 863 (2005); Érica Gorga & Michael Halberstam, *Knowledge Inputs, Legal Institutions and Firm Structure: Towards a Knowledge-Based Theory of the Firm*, 101 *Nw. U. L. REV.* 1123, 1187 (2007); see also Robert P. Merges, *The Uninvited Guest: Patents on Wall Street, in PROPERTY RIGHTS DYNAMICS: A LAW AND ECONOMICS PERSPECTIVE* 116 (Donatella Porrini & Giovanni Battista Ramello eds., 2007) (discussing tacit knowledge in the context of securitization of assets such as intellectual property); Alan Hyde, *Intellectual Property Justifications for Restricting Employee Mobility: A Critical Appraisal in Light of the*

as “skill or expertise, as opposed to easily codifiable information, that employees acquire through experience.”<sup>77</sup> Others similarly indirectly contrast it to codified knowledge.<sup>78</sup>

Many of these studies interrogate the methods of binding sticky knowledge to an institution or encouraging its diffusion. In the context of firm-based knowledge governance, for example, Érica Gorga and Michael Halberstam regard intellectual property and contracts as two mechanisms to manage the two major problems associated with sticky knowledge: leakage (through employee departures) and hoarding (through employee unwillingness to share).<sup>79</sup> Firms relying on sticky knowledge are vulnerable to individual employee (or perhaps, in the university context, graduate research assistant) actions rather than to the public-goods problem associated with codification techniques more familiar to intellectual property scholars.

Thus, the central question in many of these accounts becomes: what measures should be taken to incentivize employees to either remain with or leave a firm, and/or disclose their sticky knowledge appropriately and fully in order to encourage optimal innovation where tentative evidence suggests a policy in favor of “mobility of workers and of spillover-inducing information”?<sup>80</sup> In this sense, while their definitions of sticky knowledge may be narrow (excluding a more explicit consideration of the social dimension), the conclusions from these studies often implicitly point to a view of sticky knowledge that focuses on optimal social relations and institutions—albeit focusing on

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*Economic Evidence* (Rutgers L. Sch.–Newark, Research Papers Series, Paper No. 070, 2010), available at <http://ssrn.com/abstract=1630536>.

77. Gilson, *supra* note 74, at 577 n.10; accord Hyde, *supra* note 76.

78. Gorga & Halberstam, *supra* note 76, at 1144 (“[T]he degree to which knowledge has been articulated, codified, or standardized on the one hand, and the degree to which it is *tacit* or unarticulated, uncoded, or unstandardized on the other. The distinction has been put in different ways. A prime example of tacit knowledge is an individual skill, such as a local pilot’s ability to safely bring a ship into the harbor and to its berth . . . . This ‘know-how’ supercedes [sic] the general rules of navigation and cannot be codified or standardized, but depends upon sense and long experience working within a particular local context.”); see also Burk, *supra* note 47, at 1012–16 (citing Cowan & Foray, *supra* note 46); Michael Madison, *Beyond Creativity: Copyright as Knowledge Law*, 12 VAND. J. ENT. & TECH. L. 817, 820–22 (2010); Katherine J. Strandburg, *Norms and the Sharing of Research Materials and Tacit Knowledge*, in WORKING WITHIN THE BOUNDARIES OF INTELLECTUAL PROPERTY: INNOVATION POLICY FOR THE KNOWLEDGE SOCIETY 85, 97, 102–05 (Rochelle C. Dreyfuss et al. eds., 2010) (citing Cowan et al., *supra* note 28).

79. Gorga & Halberstam, *supra* note 76, at 1149; cf. Arora, *supra* note 5, at 41–42 (arguing that binding sticky knowledge to a patent may protect licensing parties—interfirm knowledge exchange partners—against opportunistic behavior).

80. Ghosh, *supra* note 75, at 35.

the firm or the university as the privileged unit of analysis.<sup>81</sup> Because these scholars operate in the realm of trade secrecy and employee non-disclosure agreements (or non-competes), they also frequently invert the typical assumption of Arrow's information-disclosure paradox: that is, the problem is that knowledge is not easily disclosed.

Burk, Strandburg, and Bessen have each recently linked sticky knowledge to patent law.<sup>82</sup> The former two view it primarily as a barrier to knowledge reliability and spillovers whereas Bessen argues that it may facilitate knowledge exchange.<sup>83</sup> For example, Strandburg focuses on its role in user-innovation norms, including the realm of academic research.<sup>84</sup> She suggests mechanisms both to encourage diffusion and codification of sticky knowledge within these research communities, including standardized equipment, protocol and/or tools, in addition to circulating scientists among laboratories.<sup>85</sup> By contrast, Bessen describes how "some technologies follow a sort of life cycle of technical knowledge. In the early stage . . . knowledge is communicated via costly personal instruction, making geographic localization, social networks, employee mobility and migration important and competition between new technology firms soft."<sup>86</sup> In these accounts, sticky knowledge may either impede or encourage technical-knowledge exchange required for optimal inventive activity.

Turning to copyright specifically, how might we expand our understanding of the various functions of sticky knowledge so as to encourage long-term dynamic effect on creativity and learning? That the social dimension of knowledge shapes cultural products incentivized by copyright should not come as a surprise, but where do we locate its sticky knowledge relative to other forms of intellectual property? Burk has drawn a parallel between copyright and trade secret, claiming that

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81. For example, Gorga and Halberstam, as well as Fisk, conclude that employee stock options have served to bind employee loyalty in the absence of non-compete agreements or other legally enforceable mechanisms. See Fisk, *supra* note 76, at 844-46; Gorga & Halberstam, *supra* note 76, at 1187-92.

82. See Bessen, *supra* note 5, at 5; Burk, *supra* note 47, at 1015; Strandburg, *supra* note 78, at 97, 102-05; Katherine J. Strandburg, *User Innovator Community Norms: At the Boundary Between Academic and Industry Research*, 77 *FORDHAM L. REV.* 2237 (2009).

83. Burk, *supra* note 47, at 1021-28; see also *id.* at 1016-17 (documenting how and where tacit knowledge may need to be made more explicit in patent law, such as in disclosure provisions or in the cataloguing of relevant prior art).

84. Strandburg, *supra* note 78, at 97.

85. *Id.* at 102-04.

86. Bessen, *supra* note 5, at 4 ("In later stages . . . knowledge is formalized, teaching relies more on formal instruction, markets can more readily emerge for general human capital and the interactions between new technology firms are more strategic.").

they both allow relevant actors to choose between appropriability through disclosure or secrecy (in the case of copyright, through non-publication).<sup>87</sup> But the sticky knowledge surrounding copyright may be the inadvertent result of social relations, rather than a conscious choice. Sticky knowledge affects the “Progress of Science”<sup>88</sup> or knowledge overall as well as copyright’s function as an “engine of free expression.”<sup>89</sup> Unlike the patent and trade secret realms, the potential for sticky knowledge to increase positive knowledge reliability and spillovers is unexplored. Part II sketches a preliminary framework for sticky knowledge and copyright.

## II. COPYRIGHT

Embedded within copyright law are many assumptions about the creative process and cultural activity.<sup>90</sup> These include ignoring the significance of sticky knowledge as a factor in its own right and, in particular, its social dimensions. Once a work is created (and possibly protected by copyright), sticky knowledge can encourage or impede knowledge diffusion. They also impact the reliability of knowledge, which is something that patent scholars worry about in a different way (inventions must demonstrate utility in order to obtain protection). Reliability is also important in copyright, especially in regard to civic and educational expression, and in the increasingly contentious digital-

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87. Dan L. Burk & Brett H. McDonnell, *The Goldilocks Hypothesis: Balancing Intellectual Property Rights at the Boundary of the Firm*, 2007 U. ILL. L. REV. 575, 607 (“[I]t is interesting to note that copyright is the form of intellectual property most compatible with parallel trade secrecy. Whereas the patent applicant must make an election, choosing between maintaining the invention as a trade secret or disclosing it to the public in return for patent protection, owners of copyright need not make such an election. Copyright attaches at the moment that the original, intellectual work is fixed in a tangible medium of expression, regardless of whether the work is ever published. Indeed, unpublished works may receive some additional protective consideration under copyright, as the choice of when to release the work to the public is an important right to be reserved to the copyright holder. Copyright thus creates some degree of incentive for disclosure, but can operate in situations where appropriability concerns militate in favor of confidentiality. In other words, copyright occupies an intermediate position between the disclosure regime of patent exclusivity and the misappropriation regime of trade secrecy.”).

88. U.S. CONST, art. I, § 8.

89. *Harper & Row, Publishers, Inc. v. Nation Enters.*, 471 U.S. 539, 558 (1985).

90. See, e.g., Madhavi Sunder, *IP<sup>3</sup>*, 59 STAN. L. REV. 257, 259–61 (2006); see also MADHAVI SUNDER, *iP* (forthcoming 2011) (on file with author); see also Julie E. Cohen, *Copyright, Commodification, and Culture: Locating the Public Domain*, in THE FUTURE OF THE PUBLIC DOMAIN: IDENTIFYING THE COMMONS IN INFORMATION LAW 121 (Lucie Guibault & P. Bernt Hugenholtz eds., 2006); Julie E. Cohen, *Creativity and Culture in Copyright Theory*, 40 U.C. DAVIS L. REV. 1151, 1151–54 (2007).



information environment in which we find ourselves.<sup>91</sup> A deeper understanding of sticky knowledge inevitably leads to the conclusion that knowledge reliability and knowledge spillovers are not friction free.<sup>92</sup> They must always contend, for example, with issues of absorptive capacity and trust associated with people interacting with each other.

Some theorists have begun to articulate these social dimensions, including largely invisible social-capital issues, within what might be called an incipient governance analysis of copyright. For example, Julie Cohen has described “the situated user,” the figure within a particular social matrix through which copyright must do its magic,<sup>93</sup> and articulates in detail a “networked self” through which a cultural matrix embedded within a technical architecture manifests himself or herself.<sup>94</sup> Similarly, Madhavi Sunder is developing a theory of “fair culture,” which seeks a role for law in promoting equal capacity to meaningfully participate in making . . . culture. . . . [and where] participatory culture is normatively valuable in its own right.”<sup>95</sup> Others are generating accounts of copyright that focus on the “user” in “user-generated content”—as opposed to the supply-side stories of copyright.<sup>96</sup> Many of these theories valorize the role of (for lack of a better term) the copyright “user.”<sup>97</sup> By contrast, an active knowledge exchange posits various participants in a creative cultural and learning environment, where each might be systematically and structurally impacted by social disconnects, whether through lack of social capital, absence of trust, presence of implicit bias, or other dimensions of sticky

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91. Cf. Sonia K. Katyal, *Filtering, Piracy Surveillance and Disobedience*, 32 COLUM. J.L. & ARTS 401, 402–03 (2009) (extolling the virtues of semiotic democracy).

92. Antonelli, *supra* note 35, at 250 (“Articulable knowledge consists of a mix of tacit and codified knowledge and it can be considered a step in a process of codification. As such it exhibits intermediate conditions of appropriability. In such conditions knowledge spillovers are possible but require substantial efforts to be absorbed by perspective users.”).

93. Julie E. Cohen, *The Place of the User in Copyright Law*, 74 FORDHAM L. REV. 347, 349 (2005).

94. Cohen, *supra* note 25; see also COHEN, *supra* note 27.

95. SUNDER, *supra* note 90.

96. See, e.g., Debora Halbert, *Feminist Interpretations of Intellectual Property*, 14 AM. U. J. GENDER SOC. POL’Y & L. 431, 433 (2006); Rebecca Tushnet, *I Put You There: User-Generated Content and Anticircumvention*, 12 VAND. J. ENT. & TECH. L. 889, 891–94 (2010). Madison, while not identifying a figure as such, has recently addressed what he has called the “pattern-oriented approach to fair use.” Michael J. Madison, *A Pattern-Oriented Approach to Fair Use*, 45 WM. & MARY L. REV. 1525, 1684–86 (2004).

97. See, Jessica Litman, *Lawful Personal Use*, 85 TEX. L. REV. 1871, 1878 (2007).

knowledge.<sup>98</sup> By recognizing the salience of sticky knowledge, we might begin to understand when and where it might benefit from mechanisms to enhance disclosure and promote “savoir” between knowledge exchange partners, through copyright or other means.

Underlying these concerns is a governance question: what kinds of social arrangements, institutions, and/or mechanisms will facilitate (or stymie) knowledge reliability and knowledge diffusion?<sup>99</sup> Various governance modalities can be deployed to address these social relationships within knowledge networks to address the relationship of sticky knowledge to explicit knowledge.<sup>100</sup> In the corporate law context, for example, a literature on firm-based knowledge governance is emerging—drawing from knowledge economics and management; it is beginning to link the boundaries of the firm to “the special nature of knowledge resources.”<sup>101</sup> Understanding sticky knowledge opens up many possibilities, including a sense of where social relations may pose a limit to the transcendental or formalist legal framework in copyright. Analogously, as Madison, Frischmann, and Strandburg have written regarding the cultural commons in intellectual property:

*Experience* constitutes an important intellectual resource that simultaneously relates human beings to their inherited and evolving environment(s) and *constitutes a resource that may shape the intellectual environment*. Experience (or perception or observation) is not enclosed within IP regimes except when expressed and embodied in a particular qualifying form, such

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98. Kang & Lane, *supra* note 24, at 514–17 (“In another study with similar methodology, undergraduates were willing to trade away \$3249 (22 percent of the salary range of options) to work for a man instead of a woman.”).

99. Cf. Julie E. Cohen, *Copyright as Property in the Post-Industrial Economy: A Research Agenda*, 2011 Wis. L. Rev. XX. Moreover, sticky knowledge is highly relevant for institutional knowledge producers in educational spaces, whether operating within firms, NPOs (such as universities), NGOs, specific cultural commons, or as “users” in the UGC context.

100. Antonelli, *supra* note 35, at 229 (suggesting three governance mechanisms from a knowledge-economics framework: quasi-hierarchies, coordinated transactions, and constructed interactions).

101. Gorga & Halberstam, *supra* note 76, at 1125; see also Burk & McDonnell, *supra* note 87; Ronald J. Gilson, Charles F. Sabel & Robert E. Scott, *Contracting for Innovation: Vertical Disintegration and Interfirm Collaboration*, 109 COLUM. L. REV. 431, 499 (2009) (“The ‘short and remarkably imprecise’ contracts of the Japanese style, when braided with a governance process that supports mutual learning, become a regime that generates quite precise expectations and obligations. The tacit knowledge of innovation, often held to require the carefully controlled environment of the firm, is made explicit enough to be reviewed across organizational boundaries (even if it is far from being fully formalized) and thereby opens an entity to cutting-edge technology lodged in other entities.” (footnote omitted)).

as a copyrightable work of authorship or a patentable invention.<sup>102</sup>

Sticky knowledge issues associated with copyrighted works may be somewhat intractable or hidden. For example, the trust issues critical for reliable knowledge (as opposed to mere content) transmission are still in flux along digital networks. The veritable explosion of copyrighted information created by and through digital technologies through Internet intermediaries still contends with the stickiness of knowledge and the accompanying challenges posed by social relations, absorptive capacities, and institutional frameworks. Whether digital or print, the social capital in the form of mentoring and social networking required to produce certain kinds of elaborate cultural works—particularly the ones easily monetized through copyright, not the ones simply protected by copyright—is much more extensive than we candidly admit.<sup>103</sup> Trust is an important component of cultural exchange, and it can be breached through uneven power dynamics between the exchanging parties. As Sunder has pointed out, free flow of knowledge is not equivalent to fair flow.<sup>104</sup>

As described earlier, copyright is only one of many modalities of knowledge governance and is itself composed of numerous policy levers.<sup>105</sup> On the most reductionist level, it is a market-based mechanism for incentivizing creative “works” through the assignment of exclusive rights to an author upon the satisfaction of certain threshold statutory requirements. Copyright’s public-law framework—as a proportion of the overall regulatory landscape—has shifted rapidly since the advent of digital-networked technology to one that must accommodate regulatory mechanisms via ancillary private-ordering mechanisms such as licenses, terms of service or other contractual

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102. Michael J. Madison, Brett M. Frischmann & Katherine J. Strandburg, *Constructing Commons in the Cultural Environment*, 95 CORNELL L. REV. 657, 685 (2010) (emphasis added).

103. See Collins & Hitt, *supra* note 39, at 151 (describing the impact of externships on tacit knowledge transmission in the film industry). Writer Kazuo Ishiguro and filmmaker Alex Garland are neighbors who meet regularly to talk about their work, which led to collaboration on the film *Never Let Me Go*. Moira MacDonald, *Film Is Bonus of a Felicitous Friendship*, SEATTLE TIMES, Oct. 3, 2010, at H1; see also Dreyfuss, *supra* note 4, at 1449–56 (suggesting that social structure, leadership and human capital, and industry maturity are all factors that drive open innovation, in addition to dependence in IP rights).

104. Madhavi Sunder, *Bollywood/Hollywood*, 12 THEORETICAL INQUIRIES L. 275, 276–78 (2011), <http://www.bepress.com/til/default/vol12/iss1/art10/> (discussing the similarity between Satyajit Ray’s *The Alien* and Steven Spielberg’s *E.T. The Extra-Terrestrial* (Universal Pictures 1982)).

105. See *supra* text accompanying note 26.

arrangements,<sup>106</sup> social norms,<sup>107</sup> technical protection measures,<sup>108</sup> or even aggressive structural class-action lawsuits such as the Google Book Search litigation,<sup>109</sup> and through digital intermediaries generally.<sup>110</sup> Indeed, cyberlaw theorists have long relied upon a governance set piece suggested by Lawrence Lessig consisting of markets, norms, law, and (technical) architecture, also known as “code.”<sup>111</sup> Through its market-based provision of knowledge, copyright is also much more deeply implicated in First Amendment values than other areas of intellectual property.<sup>112</sup> As an alternate source to state-provided content, copyright is not immune, however, to issues of market control and consequent de facto censorship.<sup>113</sup> There are other issues with alternative forms of governance, which are beyond the scope of this Article.<sup>114</sup>

In this context, what roles does sticky knowledge play? Some possibilities are illustrated below with respect to works completely encased by copyright’s exclusive rights, works produced through open innovation methods, and works in the public domain. For each of these three categories within copyright’s penumbra, I provide two suggestive examples.

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106. See, e.g., Niva Elkin-Koren, *Tailoring Copyright to Social Production*, 12 THEORETICAL INQUIRES L. 309 (2011), <http://www.bepress.com/til/default/vol12/iss1/art11/>.

107. See, e.g., Steven A. Hetcher, *Using Social Norms to Regulate Fan Fiction and Remix Culture*, 157 U. PA. L. REV. 1869, 1874–80 (2009).

108. See, e.g., *MDY Indus., LLC v. Blizzard Entm’t, Inc.*, No. 09-15932, 2010 WL 5141269, at \*1, \*5–6 (9th Cir. Dec. 14, 2010).

109. Pamela Samuelson, *The Google Book Settlement as Copyright Reform*, 2011 WIS. L. REV. 479 (describing the quasi-legislative nature of the proposed settlement, including provisions that would allow massive private ordering of what is typically allocated to public-law decision-making); see also *See Authors Guild v. Google, Inc.*, No. 05-CV-8136-DC, slip op. at 1, 29 (S.D.N.Y. Mar. 22, 2011) (order rejecting proposed settlement).

110. See, e.g., Deven R. Desai, *Property, Persona, and Preservation*, 81 TEMP. L. REV. 67 (2008) (examining the role of service providers and software makers in the decision to terminate or deny access to people’s digital property).

111. LAWRENCE LESSIG, CODE: VERSION 2.0, at 123–25 (2006).

112. See generally NEIL WEINSTOCK NETANEL, COPYRIGHT’S PARADOX (2008).

113. See generally DAVID L. LANGE & H. JEFFERSON POWELL, NO LAW: INTELLECTUAL PROPERTY IN THE IMAGE OF AN ABSOLUTE FIRST AMENDMENT (2009).

114. See, e.g., Chon, *supra* note 27, at 374–76 (addressing challenges such as fragmentation, policy incoherence, and relative lack of due process); COHEN, *supra* note 27 (exploring the ways in which social practices of information use are mediated by context).

### A. Copyright

According to standard economic accounts, works protected by copyright's public-law framework are codified and thus become the objects of exclusive rights, which can then be transacted in a market. This assumes that copyright incentivizes the creation of knowledge, although much recent scholarly work has demonstrated that social norms,<sup>115</sup> intrinsic satisfaction,<sup>116</sup> or industry structure<sup>117</sup> can be as powerful motivators as copyright. Regardless, numerous transaction costs and market failures associated with sticky knowledge exist within the standard narrative. Of course, some copyright doctrines facilitate the expression of sticky knowledge. These may include cover licenses that allow bands to play music—thereby facilitating the dissemination of music<sup>118</sup>—or fair use for educational purposes, book reviews, and the like.<sup>119</sup>

This Section briefly examines two such market failures: licensing of orphan works and of derivative works. Let's say the rights holder cannot be located—the so-called orphan-works issue.<sup>120</sup> Stickiness characterizes this knowledge exchange: the author is missing (literally a social disconnect) and codification in the form of a Copyright Office registration of ownership and assignments is unavailable. The administrability of the 1976 Copyright Act is hampered by a major communication failure between potential knowledge-exchange partners. By contrast, the Creative Commons license might be viewed as an example of a governance alternative to licensing under the Copyright Act.<sup>121</sup> Perhaps most saliently for purposes of sticky knowledge, it assumes more readily that authors move around or die and that many people (whether licensors or licensees) are not situated to engage in

115. See Hetcher, *supra* note 107, at 1887–91.

116. Roberta Rosenthal Kwall, *THE SOUL OF CREATIVITY: FORGING A MORAL RIGHTS LAW FOR THE UNITED STATES* 11–22 (2010) (describing “The Intrinsic Dimension of Human Creativity”); Diane Leenheer Zimmerman, *Copyrights as Incentives: Did We Just Imagine That?*, 12 *THEORETICAL INQUIRES* L. 29 (2011), <http://www.bepress.com/til/default/vol12/iss1/art3/>.

117. Dreyfuss, *supra* note 4, at 1449–56.

118. 17 U.S.C. § 115 (2006) (Scope of exclusive rights in nondramatic musical works: Compulsory license for making and distributing phonorecords).

119. § 107 (Limitations on exclusive rights: Fair use).

120. See, e.g., Orphan Works Act of 2008, H.R. 5889, 110th Cong. (2008); Marybeth Peters, *The Importance of Orphan Works Legislation*, U.S. COPYRIGHT OFFICE – ORPHAN WORKS (Sept. 25, 2008), <http://www.copyright.gov/orphan/>.

121. Michael W. Carroll, *Creative Commons as Conversational Copyright*, in 1 *INTELLECTUAL PROPERTY AND INFORMATION WEALTH: ISSUES AND PRACTICES IN THE DIGITAL AGE* 445–48, (Peter K. Yu ed., 2007); *About*, CREATIVE COMMONS, <http://creativecommons.org/about> (last visited Feb. 5, 2011).

negotiations after the initial licensing choice. Whether within the public law or Creative Commons regimes, design features either inadvertently or explicitly take into account the dynamic flux of social relations.

As some of the leading theorists of sticky knowledge have observed, tacit knowledge defies attempts at being “expressed in a particular language.”<sup>122</sup> Thus even though a book is fixed (codified) and its rights-owner located, it may not be comprehensible to an audience due to language and other issues of absorptive capacity. This is a paradigmatic example of strong stickiness (cost-distance) due to social relations—language may be the strongest form of stickiness. Indeed the first exclusive right provided by the Berne Convention in 1886 was the translation right<sup>123</sup>—no doubt, to increase the stickiness (non-disclosure unless through licensing) of knowledge through copyright.<sup>124</sup>

The translation example can be extrapolated to other derivative works, such as the adaptation of movies from books, which may be a question of the “best mode,” analogous to patent law. Knowledge spillovers created by moving from text to visual and oral learning, or combining both, can be tremendous. For example, literacy rates in India have jumped due to Bollywood subtitles.<sup>125</sup> Recognizing stickiness might help policymakers recognize exceptions to the adaption or derivative-work right (or a narrower scope to the right or perhaps forms of compulsory licensing) where dissemination of the work might be of high value. Understanding sticky knowledge in this way might help us to re-conceptualize other issues of translations, such as those for the visually impaired.<sup>126</sup> In that regard as well, it is interesting to note that one major aspect of the proposed Google Book Search settlement was the freedom of Google to make non-display uses of the works, including improving its automated translation tools.<sup>127</sup> Although this apparently was not been a hot-button issue, it is a salutary aspect from the point of view of anyone who cares about the high transaction costs of derivative works generally and translations in particular. One might imagine a copyright analogy to the generics industries in pharmaceutical patent law, where the social dimensions of knowledge

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122. David & Foray, *supra* note 10, at 25.

123. Berne Convention for the Protection of Literary and Artistic Works, art. 12, Sept. 9, 1886, S. TREATY DOC. NO. 99-27. The reproduction right, on the other hand, was only added with the Stockholm revision of 1967.

124. *Id.* art. 9; DANIEL C.K. CHOW & EDWARD LEE, INTERNATIONAL INTELLECTUAL PROPERTY: PROBLEMS, CASES, AND MATERIALS 175-76 (2006).

125. *Music Videos Expand Literacy*, N.Y. TIMES, Oct. 31, 2010, at WK2.

126. *Meeting the Needs of Visually Impaired Persons: What Challenges for IP?*, WORLD INTELLECTUAL PROPERTY ORGANIZATION, [http://www.wipo.int/meetings/en/2009/vip\\_ge/](http://www.wipo.int/meetings/en/2009/vip_ge/).

127. Samuelson, *supra* note 109, at 27-28.

exchange might be mitigated by facilitating export markets to or from emerging economies such as India (that has an English-language base in addition to its many indigenous languages).

### *B. Open Innovation*

Some works are partially protected by copyright but are characterized by governance structures that are often heralded as “open.” Their underlying standards, or other characteristics, allow many people, regardless of their social position, to participate in the creative community with fewer transaction costs and greater dynamic impact than works fully protected by copyright.<sup>128</sup> Nonetheless, sticky knowledge can operate even in this context, and this Section will provide two specific examples to make the point.

In the context of digital-networked content, it is almost banal now to observe that knowledge goods are often generated without full-bore intellectual property protection.<sup>129</sup> As Benkler explains, open source software is defined as:

[A]n approach to software development that is based on shared effort on a nonproprietary model. It depends on many individuals contributing to a common project, with a variety of motivations, and sharing their respective contributions without any single person or entity asserting rights to exclude either from the contributed components or from the resulting whole.<sup>130</sup>

Among the vaunted qualities of open source is that it allows many different contributors to work together in a distributed peer-production model. This suggests many tantalizing possibilities for the education sector,<sup>131</sup> as well as other areas such as agricultural biotechnology.<sup>132</sup> It

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128. See Steven Johnson, *Innovation: It Isn't a Matter of Left or Right*, N.Y. TIMES, Oct. 31, 2010, at BU7.

129. See YOCHAI BENKLER, *THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM* 68–75 (2006).

130. *Id.* at 63.

131. See, e.g., *The Literacy Project*, GOOGLE, <http://www.google.com/literacy/> (last visited Feb. 5, 2011); *MIT to Make Nearly All Course Materials Available Free on the World Wide Web*, MIT NEWS (April 4, 2001), <http://web.mit.edu/newsoffice/2001/ocw.html>; UNESCO, *Open Educational Resources: Open Content for Higher Education*, THE VIRTUAL UNIVERSITY AND E-LEARNING, [http://www.unesco.org/iiep/virtualuniversity/forumshome.php?queryforums\\_id=3](http://www.unesco.org/iiep/virtualuniversity/forumshome.php?queryforums_id=3) (last visited February 5, 2011); see also *Frequently Asked Questions About the Million Book Project*, CARNEGIE MELLON UNIVERSITY LIBRARIES, [http://brie1.library.cmu.edu/Libraries/MBP\\_FAQ.html](http://brie1.library.cmu.edu/Libraries/MBP_FAQ.html) (last visited Feb. 5, 2011). The

generally operates to maximize knowledge diffusion. That is, open source facilitates knowledge spillovers after becoming codified and may also encourage reliability through disclosure (many eyes make all bugs shallow). It has also generated new copyright mechanisms that encourage broad dissemination of works, such as the GNU General Public License. This is also a narrative of new governance in which self-governing non-state actors (in the form of the GNU/Linux community, etc.) purportedly took control of innovation, rather than relying on either the market or the state.<sup>133</sup>

Sticky knowledge has also played less of an overt role in this open-source story. However, in a recent study of a deliberate collaboration between open-source software projects and firms with embedded proprietary approaches, Siobhán O'Mahony and Beth Bechky show that identifying converging and diverging interests was a key factor in the success of producing more accessible user interfaces.<sup>134</sup> The collaboration began with the insight by open-source community groups that existing user interfaces were not easily accessible to those with a non-technical background.<sup>135</sup> By contrast, commercial collaborators wanted to leverage open source code in commercial markets.<sup>136</sup> Through what sociologists of science call "boundary organizations,"<sup>137</sup> parties negotiated over four domains including "governance, membership, ownership [including intellectual property], and control over production."<sup>138</sup> Among the governance issues that needed to be negotiated were project representation, control, and structure.<sup>139</sup> These are all paradigmatically issues around social relations, which surrounded the more detectable knowledge good. Resolution of these issues was a pre-requisite to successful knowledge transfer.

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Carnegie-Mellon University's Million Book Project is a project where books are scanned to supplement libraries in developing countries. *Id.*

132. See Keith Aoki, "Free Seeds, Not Free Beer": *Participatory Plant Breeding, Open Source Seeds, and Acknowledging User Innovation in Agriculture*, 77 *FORDHAM L. REV.* 2275, 2300 (2009).

133. *But see* Dreyfuss, *supra* note 4, at 1448-53 (commenting on the dependence of open innovation upon IP); Janet Hope, Dianne Nicol & John Braithwaite, *Regulatory Capitalism, Business Models and the Knowledge Economy*, in *REGULATORY CAPITALISM: HOW IT WORKS, IDEAS FOR MAKING IT WORK BETTER* 109 (John Braithwaite ed., 2008).

134. Siobhán O'Mahony & Beth A. Bechky, *Boundary Organizations: Enabling Collaboration Among Unexpected Allies*, 53 *ADMIN. SCI. Q.*, 422, 432-33 (2008).

135. *Id.* at 433.

136. *Id.* at 441.

137. *Id.* at 426. These "facilitate collaboration between scientists and non-scientists by remaining accountable to both." *Id.*

138. *Id.* at 432, 441.

139. *Id.* at 437-41.



A second example involves the open standard, defined as “a specification that is publicly available and freely implementable.”<sup>140</sup> Examples of open standards include the transmission protocols such as FTP, the language of Web pages (HTML), and the image format (PNG).

When standards are open and freely available, it becomes possible for anyone to develop an interoperable implementation. This reduces the ability of vendors to tie a standard to the purchase of other products, *i.e.*, vendor lock-in. This in turn facilitates multiple interoperable implementations, thus providing users with choice. Choice typically brings with it lower costs and technological variation.<sup>141</sup>

Rajiv Shah and Jay Kesan have described how the adoption of open source software through open standards by the state of Massachusetts in the absence of multiple vendors resulted in a lock-in that was no different from the adoption of proprietary software and proprietary standards. They conclude that “other governments considering open standard policies should incorporate a ‘running code’ requirement before adopting an open standard.”<sup>142</sup> Running code refers to “the existence of multiple interoperable implementations of an open standard” by at least two different vendors.<sup>143</sup> Code that is truly interoperable depends on specifications that require negotiation by different firms even if they are compatible with the same (theoretically open) standard. Again, before successful knowledge transfer, a certain minimal level of arms-length communication had to occur.

What these two examples suggest implicitly but strongly is that the sticky knowledge—the social knowledge and relationships within and

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140. Rajiv Shah & Jay Kesan, *Running Code as Part of an Open Standards Policy*, 14 FIRST MONDAY 1, <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/issue/view/291>.

141. *Id.* (citing Carl Shapiro & Hal R. Varian, INFORMATION RULES: A STRATEGIC GUIDE TO THE NETWORK ECONOMY 103–08 (1999) (citation omitted)).

142. *Id.*

143. *Id.* (“Open standards are often conflated with ‘open source’, but they are very different. Open source is a development model for software based on the public availability of the source code. While open source software typically relies upon and uses open standards, it should not be conflated with open standards. Open standards can also be incorporated into software developed through other development models, such as proprietary software.”); *see also* DAVID G. POST, IN SEARCH OF JEFFERSON’S MOOSE: NOTES ON THE STATE OF CYBERSPACE (2009) (describing running code in the context of IETF’s specification of TCP/IP).

between multiple social actors—is needed to bolster and maximize the long-term dynamic effect of knowledge within open-innovation models. The negotiation of differing governance structures, including social relationships and other sticky dimensions, is essential. Without this, knowledge can be less reliable or less capable of positive spillover effects.

### *C. Public Domain*

Public domain works are completely unprotected by copyright, for many different reasons.<sup>144</sup> One way to view these works is that they may be the least sticky of all because they are theoretically free from any need for any formal economic transactions within a market-based system of knowledge governance. However, these works also may be associated with some of the stickiest forms of knowledge—knowledge that is deeply inflected with absorptive capacity or social cognition—and may be why these works are in the public domain. What, if anything, could be done, to encourage reliability—that is, appropriate attribution and authenticity—as well as dissemination and/or disclosure of these works?

One recent example that implicates both domains of copyright and traditional cultural expression is the Deep Forest band. Not only did this band remix music from the Solomon Islands without proper and complete attribution to the original musicians<sup>145</sup>—thus stripping the original music of much of its cultural significance—but the music can be found now in all sorts of variations on information intermediaries, such as YouTube, set to exotic visual imagery that is an ethnic mash-up bearing no resemblance to any known tribal culture or form.<sup>146</sup> While all of these remixes are creative, as per copyright’s mandate, they are also arguably disrespectful to the original musicians and their cultural heritage. The mostly northern consumers of these music videos also continue to be mostly unenlightened about the nature of what they are hearing and seeing so far from the original sources (the cost-distance aspect of sticky knowledge).<sup>147</sup>

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144. See Pamela Samuelson, *Enriching Discourse on Public Domains*, 55 DUKE L.J. 783 (2006).

145. Antony Taubman has documented how the Deep Forest CD was drawn from a UNESCO heritage recording. See PowerPoint presented by Antony Taubman for the World Bank Distance Learning Course on Indigenous Knowledge, Traditional Knowledge, Traditional Creativity and Cultural Expressions: What Role for IP? (March 31, 2005) (notes on file with author).

146. Any search of “Deep Forest YouTube” will validate this statement.

147. Although this Article will not address this phenomenon in detail, mash-ups include the unsubstantiated “news” circling through various communities on the

A final example spans both the open-innovation category and the public-domain category and draws from Wikipedia, which has been lauded as a source of knowledge that is at least equivalent to if not superior to standard-print encyclopedic texts.<sup>148</sup> It is increasingly obvious that Wikipedia entries, while perhaps technically correct and increasingly wide ranging, continue to reflect various social biases of the peer-production community that contributes to them. The author community is skewed towards a heavily young and male demographic.<sup>149</sup> As of the date of this writing, for example, the lawyer Lutie Lytle has no Wikipedia entry. According to other sources, including other peer-produced sources, she was one of the first African-American female lawyers admitted to a bar in the United States and is reputed to be the first African-American female law teacher.<sup>150</sup> The anonymity of Wikipedia authorship, in contrast to the intentional author-attribution choices made by other peer-produced wikis such as BlackPast.org, may lead to very different kinds of knowledge production. Specialized knowledge such as the history of people of African ancestry might be better organized this way, because non-anonymous wikis can build on trust and social capital within specific ethnic and racial communities. At the same time, French-language Wikipedia authors are the original source of scarce information on Amadou Hampâté Bâ, whose work remains largely untranslated into English.<sup>151</sup> These examples illustrate how sticky knowledge influences pathways in the production of apparently neutral texts. Absorptive capacity, implicit bias, social capital and trust all influence who participates in the production of knowledge in this medium and what they know.

The public-domain examples caution us to take into account social norms that may prevent us from identifying the kinds of knowledge that are easily codified through dominant mechanisms, but nevertheless remain “tacit.” What are the social relations underlying these norms of

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Internet, resulting in inaccurate information such as President Obama’s religious affiliation. See, e.g., Bryan Adamson, *The Muslim Manchurian Candidate: Barack Obama, Rumors, and Quotidian Hermeneutics*, 24 *St. John’s J. Legal Commentary* (forthcoming), available at <http://ssrn.com/abstract=1666492> (last visited Feb. 6, 2011).

148. BENKLER, *supra* note 129, at 70–74, 280–89.

149. See Noam Cohen, *Define Gender Gap? Look Up Wikipedia’s Contributor List*, *N.Y. TIMES*, Jan. 31, 2011, at A1 (finding that 13 percent of contributors were women; the average age of the contributors is in the mid-twenties).

150. Lytle, Lutie (1875–?), contributed by Elwood Watson, <http://www.blackpast.org/?q=aah/lytle-lutie-1875>; see also *Lutie Lytle: The Third African-American Woman Lawyer*, THE ROBINSON LIBRARY, <http://www.robinsonlibrary.com/law/unitedstates/history/lytle.htm> (last visited Feb. 6, 2011).

151. See *supra* note 2.

silence and what kinds of institutional mechanisms can be brought to bear to foster greater clarification?

### III. KNOWLEDGE GOVERNANCE AND INTERGENERATIONAL EQUITY

How can knowledge-governance frameworks support greater reliability and spillovers of knowledge to further copyright's goal of encouraging learning over the long-term? Because sticky knowledge permeates all possible domains of copyright and indeed all of intellectual property, the observations here are necessarily partial and preliminary.<sup>152</sup> Where sticky knowledge, copyright, and intergenerational equity come together is aptly described by the concept of trading zones, which sociologists of science describe as "emergent, provisional spaces in which disparate communities meet and temporarily coordinate their activities."<sup>153</sup> These fluid and luminal governance spaces suggest tension among various vectors, including the static inefficiencies and dynamic efficiencies generated by copyright, the on-going structural inequalities in access to resources and representation, as well as the intergenerational consequences of all of the above.

If we construe governance mechanisms broadly, we can create intra- and inter-firm market incentives or social norms as well as other ways to encourage knowledge transmission through institutional mechanisms, of course including public-law reform. But as Antonelli writes, "[k]nowledge interactions, as distinct from transactions, [are] . . . the product of intentional action directed to make knowledge communication possible."<sup>154</sup> Many of the social qualities of sticky knowledge require attention to this intentionality, including its critical ingredient of trust.

With respect to copyright, one often assumes that creating content is enough to convey knowledge, and to assume away the problem of sticky knowledge. The previous Sections have shown that all knowledge goods still have some residue of the social, or perhaps even parochial, although it is more commonplace to extol the trends of globalization and hybridity as well as the ease of access provided by digital-networked technology.<sup>155</sup> By focusing on sticky knowledge, the social and institutional arrangements around knowledge goods may be

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152. Similarly, Katherine Strandburg has examined its function primarily in the specific context of academic research, patents, and user innovation. Strandburg, *supra* note 78, at 97, 102–05.

153. O'Mahony & Bechky, *supra* note 134, at 453 (2008).

154. Antonelli, *supra* note 35, at 228.

155. POST, *supra* note 143, at 31–46 (describing the geometric growth of the Internet).

analyzed through the lens of what has recently been termed global governance, revealing implications for intergenerational equity. Defined recently as “organized efforts to manage the course of events in a social system,”<sup>156</sup> among the chief characteristics of newer governance approaches are the greater interaction among public, private, and civil society sectors, which intersect and manage the course of social events.<sup>157</sup> Whether termed co-regulation,<sup>158</sup> global administrative law,<sup>159</sup> governance by information,<sup>160</sup> intersystemic governance,<sup>161</sup> multi-stakeholder governance,<sup>162</sup> new governance,<sup>163</sup> or nodal governance<sup>164</sup>—all of these approaches are characterized by a greater attention to “power relations among legal spheres, the extent to which any legal sphere expresses local normative standards, and social

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156. Scott Burris, Michael Kempa & Clifford Shearing, *Changes in Governance: A Cross-Disciplinary Review of Current Scholarship*, 41 AKRON L. REV. 1, 3 (2008); see also Janet Hope, Dianne Nicol & John Braithwaite, *Regulatory Capitalism, Business Models and the Knowledge Economy*, in REGULATORY CAPITALISM: HOW IT WORKS, IDEAS FOR MAKING IT WORK BETTER 109, 115–26 (John Braithwaite ed., 2008); Orly Lobel, *The Renew Deal: The Fall of Regulation and the Rise of Governance in Contemporary Legal Thought*, 89 MINN. L. REV. 342, 345–48 (2004).

157. See Chon, *supra* note 27, at 353–56; Errol Meidinger, *Multi-Interest Self-Governance Through Global Product Certification Programmes*, in RESPONSIBLE BUSINESS: SELF GOVERNANCE AND LAW IN TRANSNATIONAL ECONOMIC TRANSACTIONS 259, 286–87 (Olaf Dilling, Martin Herberg & Gerd Winter eds., 2008) (stating that standard-setting and certification in the area of sustainable forestry management, for example, involves multi-stakeholder governance, in which various non-state actors such as non-governmental organizations (NGOs) or trade associations set private standards ultimately adopted by public agencies).

158. *E.g.*, Jane K. Winn, *Electronic Commerce Law: Direct Regulation, Co-Regulation and Self-Regulation*, CAHIERS DU CENTRE DE RECHERCHES INFORMATIQUE ET DROIT (forthcoming) (manuscript at 8–11), available at <http://ssrn.com/abstract=1634832>.

159. *E.g.*, *Global Administrative Law – Resources: Concept and Working Definition*, INSTITUTE FOR INTERNATIONAL LAW AND JUSTICE, <http://www.iilj.org/GAL/GALworkingdefinition.asp> (last visited Feb. 5, 2011).

160. *E.g.*, Andrew T.F. Lang, *Legal Regimes and Regimes of Knowledge: Governing Global Services Trade* (London Sch. Econ. Legal Studies, Working Paper No. 15, 2009), [www.lse.ac.uk/collections/law/wps/wps.htm](http://www.lse.ac.uk/collections/law/wps/wps.htm) (last visited Feb. 5, 2011); see also Kevin E. Davis, Benedict Kingsbury & Sally Engle Merry, *Indicators as a Technology of Global Governance* (Inst. Int’l Law & Justice, Working Paper No. 2, 2010), available at <http://www.iilj.org/publications/documents/2010-2.Davis-Kingsbury-Merry.pdf>.

161. Robert E. Ahdieh, *From Federalism to Intersystemic Governance: The Changing Nature of Modern Jurisdiction*, 57 EMORY L.J. 1 (2008).

162. *E.g.*, Meidinger, *supra* note 157, 259–60.

163. *E.g.*, Lobel, *supra* note 156, 345–48.

164. *E.g.*, Peter Drahos, *Intellectual Property and Pharmaceutical Markets: A Nodal Governance Approach*, 77 TEMP. L. REV. 401 (2004).

interactions among spheres,”<sup>165</sup> as well as to non-state actors, alternative norms, and different governance sites and modalities.

Nodal governance, for example, describes sites “where knowledge, capacity and resources are mobilized to manage a course of events.”<sup>166</sup> In the intellectual property area, Madison, Frischmann, and Strandburg have analogously articulated the notion of a cultural commons, based on Elinor Ostrom’s work in the natural resources area.<sup>167</sup> A cultural commons, independent of markets or states, consists of venues in which viable and flexible soft norms for intellectual property may develop in “institutions intermediate between private property and the state . . . sometimes called “common property” or “limited commons” and generally . . . collective (but not necessarily governmental or even formal) means for sharing and making productive and sustainable use of resources . . . . [in forms] various and highly contextual.”<sup>168</sup> These alternative models of governance all share an emphasis on the interplay among various actors and on norm generation through both public law and other mechanisms.

In copyright, as in most forms of intellectual property, a major form of intergenerational equity is through the allocation of public versus private rights to set the appropriate balance of short-term (static) versus long-term (dynamic) effects.<sup>169</sup> How does copyright law and policy address this and other aspects of intergenerational (including educational) justice<sup>170</sup> through its treatment of knowledge, sticky or

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165. Sally Engle Merry, *International Law and Sociolegal Scholarship: Toward a Spatial Global Legal Pluralism*, 41 *STUD. L. POL. & SOC’Y (SPECIAL ISSUE)* 149, 151 (2008) (“Despite the excellent legal scholarship on international law processes . . . there has been relatively little sociolegal scholarship in this domain. One consequence of th[is] absence . . . is a lack of attention to three critical domains of sociolegal analysis: the relations of power among legal actors and legal regimes, processes of meaning making and legal consciousness, and the impact of various structures of social relationships on informal social processes such as shaming and social pressure.”).

166. Scott Burris, Peter Drahos & Clifford Shearing, *Nodal Governance*, 30 *AUSTRAL. J. LEGAL PHIL.* 30, 37 (2005).

167. Madison, Frischmann & Strandburg, *supra* note 102, at 675–83.

168. *Id.* at 676; *see also* Antonelli, *supra* note 35 (positing newer governance approaches between the extremes of pure markets and pure organizations for the exploitation of localized technology).

169. Brett M. Frischmann, *Evaluating the Demsetzian Trend in Copyright Law*, 3 *REV. L. & ECON.* 649 (2007) (arguing that the intellectual property policy balance might be better understood as that between (1) allocating public versus private rights, (2) promoting and internalizing externalities, and (3) promoting commercially valued and socially valued activities).

170. HARRY BRIGHOUSE & INGRID ROBEYNS, *Introduction: Social Primary Goods and Capabilities as Metrics of Justice*, in *MEASURING JUSTICE: PRIMARY GOODS AND CAPABILITIES* 1, 211 (2010). According to Brighouse and Robeyns, this is where the zones of “[w]ell-being and agency freedom[]” intersect, where, for example, the

otherwise? The more knowledge we codify through copyright and its penumbra, perhaps the greater its reliability and spillover. But certain kinds of knowledge remain uncommunicated for many reasons: cost (whether in the form of displaced codebooks), implicit bias, lack of absorptive capacity, lack of standardization, unraveling social ties with attendant lack of trust, and so on. Progress in knowledge creation facilitated most directly by intellectual property policy tends to coincide with realms where codified knowledge systems are dominant. Sticky knowledge systems, by contrast, are typically (although not totally or always) overlooked in copyright policymaking. In the area of education, which is so critical to intergenerational flourishing, sticky knowledge may be more salient than codified knowledge:

The sectors where knowledge creation has occurred at an extremely rapid pace are those in which the interrelationships between science and technology are especially close and intense. These are the sectors capable of carrying out controlled experiments and thoroughly testing results while maintaining constant liaison and feedback between the various stages of experimentation and application. . . .

Many sectors visibly fail to meet these conditions for rapid progress. In the field of education, for instance, science does not much ‘enlighten’ the art of teaching. It can hardly be said to play a very strong role as a factor enabling the direct production of systematic knowledge which translates into ‘programmes that work’ in the classroom and lecture theatre. Education is not a field that lends itself well to experimentation: what works with a pilot school may prove hard to replicate elsewhere. . . . Education [] constitutes a realm where knowledge is little codified. There is no equivalent in teaching to the kinds of reference books and documents used by doctors, lawyers or engineers. So, young teachers begin their careers without the help of those ‘sets of codified instructions’. As a rule, the profession of teaching is not organised to keep practitioners informed of alternative approaches and solutions tested by others; instead, they proceed by intuition and imitation of recognised practices in the repertoire of ‘master teachers’.<sup>171</sup>

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emphasis might be on “freedom to access a lesson through appropriate pedagogies . . . [or] the freedom to access information about education, engage in discussion, and make up one’s mind about access to education for an adult without violence and shame.”

171. *Id.*

The standard copyright accounts focusing on exploitation of the public-goods aspect of intellectual property have influenced the knowledge-production paths in many areas, including the education domain—as compared to local knowledge or sticky knowledge. An emphasis on public-law frameworks has contributed to the possible undervaluation of norms or other softer mechanisms of governance discussed in this Section. Understanding the reach of sticky knowledge may point to regulatory alternatives to encourage knowledge reliability and knowledge spillovers where that knowledge is typically difficult to collate, demonstrate, gather, and/or pass on to others. Education, ironically, is one of those latter realms, and knowledge governance cannot be one-size-fits-all in this context.<sup>172</sup> Teece pointed out many years ago in his seminal work on complementary assets that service, delivery, maintenance, and technical support (for example, for computer software) often determine the commercial viability of patented or fully disclosed knowledge goods.<sup>173</sup> These mostly service-based or social aspects surrounding any particular knowledge good—once protected by patent or copyright law—are critical.

In the educational sphere, complementary assets can include social arrangements for optimal use of knowledge (whether in the form of teacher training, student and institutional support, etc.) or such combined social/physical infrastructure examples as XO computers for educational delivery of knowledge to developing-world children.<sup>174</sup> The focus in this Article is less on appropriability of and commercial returns

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172. Margaret Chon, *Intellectual Property “from Below”: Copyright and Capability for Education*, 40 U.C. DAVIS L. REV. 803 (2007) (arguing for exceptions in copyright for education). In addition to this suggestion, possible creative copyright governance alternatives could promote, among other things: more textbooks and other knowledge media in geographic areas with scarcity; liberal licensing provisions to enable translations into text to speech by the disabled such as the blind; national statutory exceptions for distance education, for rural inhabitants who still are the majority of the world’s population; alternative licensing models such as Creative Commons, in conjunction with open education resources (OER) for digital education; global minimum exceptions, in addition to national exceptions, to encourage cross-border transactions (reducing questions of conflict of laws); multilateral translation exceptions to digital rights; managing the contract/public-law interface through reverse notice and take-down provisions or limits to contractual over-rides to exceptions and limitations.

173. David J. Teece, *Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy*, 15 RES. POL’Y 285 (1986).

174. Randall Stross, *Two Billion Laptops? It May Not Be Enough?*, N.Y. TIMES, Apr. 18, 2010, at BU5; Graciela Rabajoli & Mo´nica Ba´ez, *Uso tecnolog´as y produccio´n contenidos educativos digitales en el Plan CEIBAL [Use of Technologies and Production of Digital Educational Content in the Plan CEIBAL]* (Mar. 2, 2009) (unpublished PowerPoint presentation on file with author) (Uruguayan educators’ report on the use of XO computers, presented at the First Regional Dialogue of Educators on the Implications of Copyright, Mar. 2–3, 2009).



on knowledge than on its potential for positive spillovers and its reliability (or authenticity). Nonetheless Teece's management insight is applicable to educational goals, particularly because education is an area permeated with social relations.

Sticky knowledge may be critical with regard to other areas of intellectual property, such as traditional knowledge,<sup>175</sup> or, for that matter, any aspect of intellectual property law solicitous of folkways and local cultural expressions, history, and context. As the Deep Forest example shows, for instance, traditional cultural expression can be marred by lack of absorptive capacity or perhaps even breaches of trust on the part of the creative communities, intermediaries, and other institutions. A vast range of concerns coincides with sticky knowledge production and distribution, but the focus here is on copyright.

### CONCLUSION

Dimensions of stickiness exist for a wide range of cultural products affected by copyright: foreign language movies without adequate sub-titles for monolingual viewers; avant-garde theater performances without liner notes for uninitiated audiences; high-level math websites by kindly college teaching assistants or professors without explanations for casual Internet users; or—more trivially—text messages without teenagers to decode the new grammar for their clueless parents.

Due to the tremendous cultural, political, and social consequences of different “knowledge societies”<sup>176</sup> contacting each other, identifying sticky knowledge not just as part of a constellation or penumbra or continuum, but rather as an active aspect of knowledge governance—including copyright—will help us encourage the production of more reliable forms of knowledge as well as spillovers of knowledge for

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175. Charles McManis & Yolanda Teran, *Trends and Scenarios in the Legal Production of Traditional Knowledge*, in INTELLECTUAL PROPERTY AND HUMAN DEVELOPMENT: CURRENT TRENDS AND FUTURE SCENARIOS (Tzen Wong & Graham Dutfield eds.) 2010, [http://www.piipa.org/index.php?option=com\\_content&view=article&id=99&Itemid=77](http://www.piipa.org/index.php?option=com_content&view=article&id=99&Itemid=77); Madhavi Sunder, *The Invention of Traditional Knowledge*, 70 L. & CONTEMP. PROBS. 97 (2007).

176. David & Foray, *supra* note 10, at 29, 45; see also MARY LOUISE PRATT, IMPERIAL EYES: TRAVEL WRITING AND TRANSCULTURATION 6 (1st ed. 1992) (“While the imperial metropolis tends to understand itself as determining the periphery (in the emanating glow of the civilizing mission or the cash flow of development, for example), it habitually blinds itself to the ways in which the periphery determines the metropolis—beginning, perhaps, with the latter’s *obsessive need to present and re-present its peripheries and its others continually to itself*. Travel writing, among other institutions, is heavily organized in the service of that imperative.” (emphasis added)).

intergenerational equity. We may be able to tell each other more if we know what we cannot tell, and why we cannot tell it.

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