CROSSING THE INNOVATION DIVIDE

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While intellectual property has long been perceived as a method for protecting, and ultimately valuing, innovation, it is an imperfect measure. With its traditional bias in favor of innovation as delimited by Western views of individuality and technological progress, intellectual property is not only an imperfect measure, but also one that has contributed to the undervaluing of non-Western innovation and creativity. This undervaluation has denied developing and least-developed countries a right of compensation for local innovation, which has contributed to the continuing imbalance in economic development. Recognizing a broader definition of compensable innovation that includes non-Western concepts, including innovation and creativity based on so-called traditional knowledge, would allow the holders of such knowledge to participate as partners in emerging knowledge-based industries. Ultimately, protection of "generational" innovation could provide a strong tool for wealth transfer that serves to make developing nations active participants in their own sustainable development. More significantly, establishing a rational system of protection for traditional knowledge would bring social justice back into the issue of innovation protection. As we remake innovation systems in response to the changes demanded by the global digital marketplace, rational protection for traditional knowledge must be a part of that change if we are to achieve equitable, sustainable values for innovative activity in the twenty-first century.

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INTRODUCTION

In today's Innovation Era, when labor-based economies are being eschewed in favor of the more robust development base provided by knowledge-based industries,[1] one of the most critical divides between the so-called developed and developing world[2] may be the one regarding the scope, depth, and sustainability

1. *See generally* DIRECTORATE OF SCI., TECH. AND INDUS., ORG. FOR ECON. CO-OPERATION AND DEV., SCIENCE, TECHNOLOGY AND INDUSTRY OUTLOOK 1996, at 229–56 (providing background information on knowledge-based economies); U.N. ECON. COMM'N FOR EUR., TOWARDS A KNOWLEDGE-BASED ECONOMY: COUNTRY READINESS ASSESSMENT REPORT: CONCEPT, OUTLINE, BENCHMARKING AND INDICATORS, U.N. Sales No. E.03.II.E.31 (2002) (discussing characteristics and analysis factors of knowledge-based economies).

2. To a certain extent, the terms "developed" and "developing" are as unsatisfactory as other terms used to describe the divide between industrially and technologically developed countries compared with countries which have achieved a measurably lower level of development, including "First World" and "Third World" and "North" and "South." Admittedly, the terms "developed" and "developing" lack clear definitions and suffer from being both over- and underinclusive. The term "developing" also suffers from having a somewhat pejorative connotation vis a vis its "developed" counterpart. Despite these infirmities, I have chosen to use these terms for two reasons. First, the terms "developed," "developing," and "least-developed" appear in the Agreement on Trade-Related Aspects of Intellectual Property Rights. Agreement on Trade-Related Aspects of Intellectual Property Rights arts. 65–67, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, Legal Instruments—Results of the Uruguay Round, 33 I.L.M. 1197 (1994) [hereinafter TRIPS Agreement]. The term "developing" also appears in Article I of the Appendix to the Berne Convention, where it is defined "in conformity with the established practice of the General Assembly of the United Nations." Berne Convention for the Protection of Literary and Artistic Works app. I(1), Sept. 9, 1886, *as revised at Paris* July 24, 1971, 25 U.S.T. 1341, 1161 U.N.T.S. 3 [hereinafter Berne Convention]. Sam Ricketson described this definition as "disturbingly vague." SAM RICKETSON, THE BERNE CONVENTION FOR THE PROTECTION OF LITERARY AND ARTISTIC WORKS: 1886–1986, at 634 (1987). Therefore, these terms have a certain relevance to the present discussion that is not apparent in the other terms. Second, these terms are no less clear than the other choices, and to a certain extent reflect international attitudes that add to the unequal treatment of innovation based on the sources of innovation. For the purposes of this Article, I am including "least-developed countries" within the term "developing countries" since they share the same general potential for generational innovation

of commercial and industrial development. This divide is the result of a great many historical, political, cultural, and geographic factors whose complexity and causality scholars continue to debate.[3] Yet when seen through the lens of intellectual property law, the relatively slow economic and industrial development of certain parts of the world may well be caused, at least in part, by the reduced *economic value* given to local innovation.

"Innovation" has become the watchword of the twenty-first century.[4] It is

capabilities and the same general lack of economic and industrial growth. See *infra* Parts II and III for a discussion of generational innovation.

3. See *infra* note 62 for a discussion of theories regarding reasons behind the economic and industrial success of some societies. *See generally* JARED DIAMOND, GUNS, GERMS, AND STEEL: THE FATES OF HUMAN SOCIETIES (1999) (analyzing geographic factors in industrial development); DAVID S. LANDES, THE WEALTH AND POVERTY OF NATIONS (1998) (analyzing cultural issues impacting development); AMARTYA SEN, DEVELOPMENT AS FREEDOM (1999) (analyzing impact of civil society and ethics on development).

4. Even the briefest analysis of the extent to which "innovation" has become a new catchphrase for the twenty-first century demonstrates the depth and breadth of its adoption to refer to everything from new inventions to new web pages. A recently conducted Google search of the term "innovation" disclosed approximately 115,000,000 entries in English using the term. Innovation – Google Search, http://www.google.com/search?hl=en&q=innovation&btnG=Google+Search (last visited Feb. 23, 2009). A search for the related term "innovative" disclosed approximately 135,000,000 entries in English. Innovative – Google Search, http://www.google.com/search?hl=en&q=innovative& btnG=Google+Search (last visited Feb. 23, 2009). A Google Book search disclosed approximately 5,440 books containing the term "innovation" in the title. In Title: Innovation – Google Book Search, http://books.google.com (search "Advanced Book Search" for "innovation" in "title" field) (last visited Feb. 23, 2009). The uses disclosed by these searches are almost as varied as the number of references uncovered. See *infra* note 5 for examples of the use of the word "innovation." The Western romance with the concept of innovation is not in itself new. To the contrary, as countless historians have demonstrated, the pursuit of innovation for the sake of innovation, and a belief in the positive impact of such innovations, can be dated at least from the Middle Ages. *See, e.g.*, ROBERT FRIEDEL, A CULTURE OF IMPROVEMENT: TECHNOLOGY AND THE WESTERN MILLENNIUM 155–69 (2007) (discussing culture of innovation during Middle Ages); DAVID S. LANDES, THE UNBOUND PROMETHEUS: TECHNOLOGICAL CHANGE AND INDUSTRIAL DEVELOPMENT IN WESTERN EUROPE FROM 1750 TO THE PRESENT 41 (2d ed. 2003) (describing series of innovations in eighteenth-century England that gave rise to factory system). Yet innovation seems to have gone beyond the status of a simple catchphrase or social fad and has instead become a watchword. Like earlier watchwords, "innovation" has become the password for entrance into the twenty-first century. Not only do books, articles, and web pages address the concept, the idea of innovation has been a driving force in legal issues of the twenty-first century, where it previously had played little or no role. Thus, Lawrence Lessig's seminal book on the impact of copyright in the Digital Age, *The Future of Ideas: The Fate of the Commons in a Connected World*, uses the term "innovation" over eighty-seven times. *See* LAWRENCE LESSIG, THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD *passim* (2001). Courts have similarly adopted the concerns of "innovation" in connection with copyright protection under U.S. law. *See, e.g.*, Digital Commc'ns Assocs., Inc. v. Softklone Distrib. Corp., 659 F. Supp. 449, 462 (N.D. Ga. 1987) (using "innovative" as synonym for expressive originality for first time in reported U.S. copyright cases); *see also* Doris Estelle Long, *When Worlds Collide: The Uneasy Convergence of Creativity and Innovation*, 25 J. MARSHALL J. COMPUTER & INFO. L. (forthcoming 2008) (discussing appearance of term "innovation" in U.S. copyright cases in the latter decades of the twentieth century after computer programs had been granted protection under U.S. copyright laws). Yet the inclusion of innovation concerns in an area of law that previously has largely focused on creativity demonstrates not simply how dedicated the Western world has become to the concept of innovation as a watchword, but how problematic this watchword has proven to be. Not only

used to describe everything from new communication technologies to the latest web postings.[5] Like every good watchword, "innovation" has no precise meaning. It has been defined as everything from "introducing something new"[6] to "a *scientific* approach for finding newer better ideas and solutions to problems, which make life easier and simpler to live."[7] In the arena of economics, Joseph Schumpeter defined innovation as "[t]he introduction of a new good . . . a new method of production . . . [t]he opening of a new market . . . [t]he conquest of a new source of supply . . . [and] [t]he carrying out of the new organisation of any industry."[8] A report by the Task Force on Science, Technology and Innovation of the U.N. Millennium Project[9] similarly emphasizes the entrepreneurial foundations of innovation and its critical role in helping transform countries from reliance on the exploitation of natural resources to technological innovation as a basis for development.[10] This emphasis on technology and entrepreneurship is reflected in the Oslo Manual on Guidelines for Collecting and Interpreting Innovation Data ("Oslo Manual")[11]

is the term being misused in connection with copyright protection, Long, *supra*, it has also begun to lose its meaning. Quite simply, if everything is innovative, then nothing is. One of the premises of this Article is that the concept of innovation must be given a clearer meaning so that true forms of innovation—including generational innovation, *can* be properly protected. In short, the watchword must be redefined.

5. *See, e.g.*, Press Release, Google, Google Closes Acquisition of YouTube (Nov. 13, 2006), *available at* http://www.google.com/press/pressrel/youtube.html (describing services provided by Google and YouTube as "innovative"); Google Monetizes YouTube – Not User Generated Content, http://gawdlevelmarketing.blogspot.com/2007/08/google-monetizes-youtube-not-user.html (Aug. 28, 2007) (discussing Google-YouTube merger in weblog dedicated to "innovative" marketing); *Innovative Blog Hopes to Make YouTube Exciting Again*, WEBWIRE.COM, Feb. 9, 2008, http://www.webwire.com/ViewPressRel.asp?aId=58814 (using "innovative" to describe new product). See *supra* note 4 for further examples.

6. THE AMERICAN HERITAGE COLLEGE DICTIONARY 701 (3d ed. 1993).

7. Posting of Manoj Sterex to http://answers.yahoo.com/question/?qid=1006031602760 (2006) (emphasis added) (responding to "[w]hat is your definition of innovation?").

8. JOSEPH A. SCHUMPETER, THE THEORY OF ECONOMIC DEVELOPMENT: AN INQUIRY INTO PROFITS, CAPITAL, CREDIT, INTEREST, AND THE BUSINESS CYCLE 66 (Redvers Opie trans., Harvard Univ. Press 1955) (1934) (discussing five factors of innovation and development). This definition of innovation was cited with approval by the OECD in the second edition of the Oslo Manual. Org. for Econ. Co-operation and Dev. [OECD] & Eurostat, *Oslo Manual: Proposed Guidelines for Collecting and Interpreting Technological Innovation Data*, at 31–32, OECD Code 921997031E1 (2d ed. Apr. 3, 1997), *available at* http://213.253.134.43/oecd/pdfs/browseit/9297031E.PDF [hereinafter *Oslo Manual Second*]. The Oslo Manual sets forth an internationally recognized standard for measuring innovation. The second edition of the Oslo Manual, produced in 1997, focused primarily on the first two categories of Schumpeter's five-category innovation standard, which it referred to using the term Technological Product and Process ("TPP") Innovations. The most recent edition of the Oslo Manual was published in 2005. OECD & Eurostat, *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*, OECD Code 922005111E1 (3d ed. Nov. 10, 2005), *available at* http://213.253.134.43/oecd/pdfs/browseit/9205111E.PDF [hereinafter *Oslo Manual Third*].

9. UN Millennium Project, Task Force on Sci., Tech., and Innovation, *Innovation: Applying Knowledge in Development* (2005) (*prepared by* Calestous Juma & Lee Yee-Cheong), *available at* http://www.unmillenniumproject.org/documents/Science-complete.pdf [hereinafter *STI Report*].

10. *Id.* at 81.

11. *Oslo Manual Third*, *supra* note 8, at 147.

produced by the Organization for Economic Co-Operation and Development. The Oslo Manual defines innovation as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations."[12] In addition to the concept of newness shared by these varied definitions is a concept of change or evolution. In fact, innovation itself is largely a process of creation and diffusion.[13]

However defined, innovation[14] lies at the heart of economic and industrial development; more precisely, *successful* innovation lies at the heart of such development.[15] The complex interplay of factors that leads to successful innovation is well beyond the scope of this Article. Yet what appears abundantly

12. *Id.* at 46. One of the aspects clarified in this broader definition of innovation is that this broader definition recognizes that innovation includes adoption of products, processes, and methods from others. *Compare id.* (recognizing innovation as either new development or one significantly adapted from previous work), *with Oslo Manual Second*, *supra* note 8, at 16, 31 (giving more narrow definition of innovation).

13. *See, e.g.*, *Oslo Manual Third*, *supra* note 8, at 31–32 (stating that diffusion is central to innovation).

14. In other fora I have challenged the presumed equation of innovation with creativity (and vice versa). For purposes of both encouraging such activities and crafting public policies that provide the appropriate balance between creator's rights and the public, the issues posed by creativity versus innovation in my opinion require different analyses. *See generally* Doris Estelle Long, *Dissonant Harmonization: Limitations on "Cash n' Carry" Creativity*, 70 ALB. L. REV. 1163 (2007) [hereinafter Long, *Dissonant Harmonization*] (distinguishing concept of innovative creativity from aesthetic creativity); Doris Estelle Long, *Innovating New Connections in Intellectual Property Analysis: A Review of William van Caenegem's* Intellectual Property Law and Innovation, 13 MELBOURNE MEDIA ARTS & L. REV. (forthcoming 2008) (book review) (describing how concepts of innovation and creativity have been blurred in policy debate). Such differentiation necessarily means that products of innovation are generally most readily protected, if at all, under patent, industrial design, or trade secret regimes. Given the addition, however, of such "innovative" works as computer software to the copyright arena, the question of the scope of protection provided for innovative (as opposed to creative) works must also include an analysis of copyright doctrines as well. I continue to maintain that such inclusions help explain much of the alleged overbreadth in protection of which copyright law is accused since the latter decades of the twentieth century. However, for purposes of analyzing the undervaluation of indigenous, tradition-based innovation and creativity in connection with its role in the creation of sustainable economic development, the distinction between the two regimes lacks the same significance. For this reason, I am using the terms "innovation" and "generational innovation" to include both innovative and creative products and processes in this Article.

15. The success of a particular innovative act is not capable of easy measurement. Thus, for example, while studies often cite the number of patents owned by nationals as evidence of innovation, patents are an inexact measure since some innovation is not covered by patent protection and other innovation may be covered by multiple patents. *See, e.g.*, OECD, *The Measurement of Scientific and Technological Activities: Using Patent Data as Science and Technology Indicators*, at 15–16, OCDE/GD(94)114 (Jan. 1, 1994), *available at* http://www.oecd.org/dataoecd/33/62/2095942.pdf (discussing methodological shortcomings of using patents as indicators of innovation). In addition, while the invention of a particular product may qualify as an innovative act, if the product is not implemented effectively—such as through successful marketing or diffusion to others in the field—it is difficult to describe such innovation as successful, at least at this particular stage of its evolution. *See, e.g.*, *Oslo Manual Third*, *supra* note 8, at 59 (discussing success of innovation); WILLIAM VAN CAENEGEM, INTELLECTUAL PROPERTY LAW AND INNOVATION 61 (2007) (noting commercial worthlessness of majority of patents).

clear, despite its simplicity, is that successful innovation cannot occur unless, in fact, *innovation* occurs. One of the critical factors in encouraging such innovation is the *potential* for economic return.[16] I do not mean to suggest that economic profit is the sole or even the most significant motivating factor behind all innovation. To the contrary, as the emerging evidence of unpaid-for innovative collaboration in areas such as computer software and medical research demonstrates,[17] innovation may be undertaken for reasons that have little to do with direct economic compensation.[18] However, in areas that require significant capital investments in either research and development or safety and environmental testing (such as in the case of pharmaceuticals), economics continues to play a critical role.

Even if economics did *not* play a role in incentivizing innovation, the economic *valuation* of innovation plays an undeniable role in creating innovation enterprises. These enterprises lie at the heart of sustainable development.[19]

16. Not even the present day intellectual property system *assures* any particular level of economic return on innovation. To the contrary, any such return is determined in part by the market value accorded the innovation in question. Accordingly, an invention could be extremely beneficial for society as a whole and yet be granted little value in the marketplace. Fortunately, legal protection for the products of innovation is not the only source of funding available for the investments in capital and labor required to support innovation. To the contrary, where innovation is undertaken for socially beneficial purposes, government grants, charitable funding, nongovernmental organizations, and other nonprofit organizations continue to play a significant role in such funding efforts. *See, e.g.*, Andrew A. Toole & Anwar Naseem, *Leveraging Public Investments with Private Sector Partnerships: A Review of the Economics Literature*, *in* STRATEGIES TO LEVERAGE RESEARCH FUNDING: GUIDING DOD'S PEER REVIEWED MEDICAL RESEARCH PROGRAM app. D (Michael McGeary & Kathi E. Hanna eds., 2004) (discussing diverse public and public private research funding combinations). Several authors have proposed alternative methods of compensating innovative activities. *See, e.g.*, JOSEPH E. STIGLITZ, MAKING GLOBALIZATION WORK 124 (2006) (advocating use of medical prizes to fund critical medical research); Michael Abramowicz, *Perfecting Patent Prizes*, 56 VAND. L. REV. 115, 127–70 (2003) (discussing several proposals for establishment of patent prize system).

17. Among the most noteworthy examples are the Open Software Movement and the beginning steps being taken to create an open source network for pharmaceuticals. *See generally* Pharmaceutical Licensing Network, http://www.farmavita.net (last visited Feb. 23, 2009) (facilitating communication and encouraging licensing and technology transfer among pharmaceutical professionals); PhOSCo, http://www.phosco.com (last visited Feb. 23, 2009) (providing network for pharmaceutical licensing and business development that allows for offers and demands to be sought and met for new pharmaceutical technology).

18. Compensation, however, may be achieved in other ways, including the reputational value of being associated with such projects. *See* CRISTINA GACEK, STANDARDS AND OPEN SOURCE SOFTWARE: TWINS, COUSINS, OR JUST NEIGHBOURS? 2 (Sch. Computing Sci., Univ. Newcastle upon Tyne, Tech. Report Series No. CS-TR-867, 2004), *available at* http://rogue.ncl.ac.uk/file_store/trs/867.pdf (suggesting reputational benefit is one reason developers participate in open source projects); Josh Lerner & Jean Tirole, *Some Simple Economics of Open Source*, 50 J. IND. ECON. 197, 218 (2002) (analyzing reputational goals that drive open source contributors).

19. *See, e.g.*, *STI Report*, *supra* note 9, at 81–82 (discussing flex-fuel technologies). *See generally* MARIE-CLAIRE CORDONIER SEGGER & ASHFAQ KHALFAN, SUSTAINABLE DEVELOPMENT LAW: PRINCIPLES, PRACTICES, AND PROSPECTS (2004) (discussing diverse issues implicated in broad area of sustainable development); U.N. Educ., Sci. & Cultural Org. [UNESCO], Open Training Platform: Entrepreneurship, Economy and Sustainable Development, http://opentraining.unesco-ci.org/cgi-bin/page.cgi?g=Categories%2FEntrepreneurship__economy_and_sustainable_development%2Findex

Without some commercial value attaching to the creation, distribution, and use of innovative processes, products, or services, innovation fails as a source of sustainable development. It is only through the development of commerce as a result of the perceived economic value of innovative enterprises that local innovation can serve a critical role in the sustainable development of a country.[20]

The undervaluation of local innovation by devaluing what I refer to as "generational innovation" denies developing and least-developed countries a right of compensation for a large source of local innovation—utilizing the generational knowledge and practices of their inhabitants. "Generational innovation" is quite simply innovation using tradition-based knowledge, works, and practices. On its face, the term generational (meaning across generations) innovation appears an oxymoron. Yet the generational collaboration that tradition-based innovation represents fits within the evolutionary nature of collaboration once the Western concepts of individuated creativity and time-constrained uniqueness are removed.[21] As the Oslo Manual acknowledges, "innovative activities" include novelty determinations that may be based on the knowledge or use of the innovation by a particular "firm."[22] Thus, innovation includes products, knowledge, and services that are "new to the firm."[23] This evolutionary focus on innovation as a measure of novelty along the knowledge diffusion chain supports "generational innovation" as "innovation" shorn of Western concepts of what protectable "innovation" should look like.[24] According to the Oslo Manual,

> There are two main reasons for using "new to the firm" as the minimum requirement of an innovation. First, adoption of innovations is important for the innovation system as a whole. It involves a flow of knowledge to adopting firms. Furthermore, the learning process in adopting an innovation can lead to subsequent improvements in the innovation and to the development of new products, processes and other innovations. Second, the main impact of innovation on economic activity stems from the diffusion of initial innovations to other firms.

.html (last visited Feb. 23, 2009) (compiling diverse articles and resources regarding relationship between sustainable development and entrepreneurship).

20. *See STI Report*, *supra* note 9, at 118 (emphasizing role of entrepreneurship in sustainable development activities); WORLD BUS. COUNCIL FOR SUSTAINABLE DEV. & SNV, PROMOTING SMALL AND MEDIUM ENTERPRISES FOR SUSTAINABLE DEVELOPMENT 2–6 (2007), *available at* http://www.wbcsd.org/web/publications/sme.pdf (illustrating outreach for entrepreneurship and sustainable development); Maureen Liebl & Tirthankar Roy, *Handmade in India: Traditional Craft Skills in a Changing World*, *in* POOR PEOPLE'S KNOWLEDGE: PROMOTING INTELLECTUAL PROPERTY IN DEVELOPING COUNTRIES 53, 57–60 (J. Michael Finger & Philip Schuler eds., 2004) (describing efforts to commercialize traditional craft skills in India); Frank J. Penna, Monique Thormann & J. Michael Finger, *The Africa Music Project, in* POOR PEOPLE'S KNOWLEDGE: PROMOTING INTELLECTUAL PROPERTY IN DEVELOPING COUNTRIES, *supra*, at 95, 104–08 (describing efforts to create sustainable cultural industry based on traditional African music and musicians).

21. See *infra* Part II for a discussion of generational collaboration.

22. *Oslo Manual Third*, *supra* note 8, at 18.

23. *Id.*

24. See *infra* Part II for a discussion of the removal of Western concepts of protection.

> Diffusion is captured by covering innovations that are new to the firm.[25]

Just as expanding concepts of innovation have slowly begun to move innovation analysis away from a single focus on enterprise innovation, so too the concepts of innovation should continue to expand to capture the innovative activities involved in tradition-based innovation. To the extent that such generational innovation does not always create absolutely new products, it nevertheless increasingly plays a role in the diffusion of new products and processes vis a vis much of the developed world.[26]

One technique for correcting the valuation imbalance for generational innovation is to establish a viable system of protection for traditional knowledge.[27] Such a system may ultimately serve as a tool for wealth transfer.[28] As holders of generational innovation receive economic value for their innovations, because they are protected from unauthorized and uncompensated uses, developing nations will become *partners* in their own development. Wealth will be transferred from the developed to the developing world on the basis of innovation diffusion in a partnership system, and not simply as the result of the vagaries of technical training or development aid.[29] Re-evaluating the economic value of generational innovation ultimately has the potential of contributing not only a more socially just balance in economic and technology transfer costs, but also one that may endure beyond changing aid cycles.

In Part I, I examine the adverse impact that the Western-based intellectual property ("IP") system has had on the valuation of generational innovation.

25. *Oslo Manual Third*, *supra* note 8, at 18.

26. See *infra* notes 81 and 144 for discussion of the many forms this diffusion takes, including the basis for patented inventions based on generational innovation and of the products of biopiracy. *See* VANDANA SHIVA, BIOPIRACY: THE PLUNDER OF NATURE AND KNOWLEDGE 1–5 (1997) (describing biopiracy throughout history); Doris Estelle Long, *The Impact of Foreign Investment on Indigenous Culture: An Intellectual Property Perspective*, 23 N.C. J. INT'L L. & COM. REG. 229, 229–40 (1998) (discussing foreign investment and commodified trade items of eco- and cultural tourism).

27. *Cf.* Doris Estelle Long, *Is Fame All There Is?: Beating Global Monopolists at Their Own Marketing Game*, 40 GEO. WASH. INT'L L. REV. (forthcoming 2008) (manuscript at 25–31, on file with author) (advocating development of traditional knowledge protection to create strong local marks).

28. *Cf.* MARTIN KHOR, INTELLECTUAL PROPERTY, BIODIVERSITY AND SUSTAINABLE DEVELOPMENT 16–18 (2002) (containing background analysis of relationship between traditional knowledge and sustainable development); Namulauulu G.V. Tavana, *Traditional Knowledge Is the Key to Sustainable Development in Samoa: Examples of Ecological, Botanical and Taxonomical Knowledge*, *in* 3 SAMOAN ENV'T F. 19, 19–26 (2002), www.mnre.gov.ws/documents/forum/2002/4-Tavana.pdf (contending Samoan traditional knowledge plays critical role in sustainable development of natural resources). *See generally* INDIGENOUS HERITAGE AND INTELLECTUAL PROPERTY: GENETIC RESOURCES, TRADITIONAL KNOWLEDGE AND FOLKLORE (Silke von Lewinski ed., 2004) [hereinafter INDIGENOUS HERITAGE] (describing how intellectual property law can protect rights of indigenous people to their genetic resources, traditional knowledge, and folklore).

29. *See*, *e.g.*, Doris Estelle Long, *Small States and the Challenge of Intellectual Property Protection*, INT'L L. NEWS, Summer 2004, at 1, 7–8 (noting Article 8 of TRIPS mandates developed countries provide other nations with technical assistance to facilitate development, but details of assistance are largely left to discretion of developed countries, and advocating small states develop training policies based on what would best facilitate their development).

Focusing on the uniqueness requirements imposed by present IP systems, I contend that such systems continue to devalue indigenous innovation and deny it even the ephemeral promise of economic benefits granted innovation that complies with Western concepts of technological progress and individuated creativity.

In Part II, I examine the critical roles of generational collaboration and change on generational innovation. I contrast such elements with Western concepts of protectable innovation that place indigenous innovation outside present legal protection regimes.

In Part III, I explore the relationship between generational innovation and traditional knowledge and examine critical issues that must be addressed in crafting a traditional knowledge regime that provides useful support for effective valuation of generational innovation. I provide a list of critical questions that must be answered and suggest some possible solutions to the current limbo of domestic and international protection for traditional knowledge.

In Part IV, I examine the impact of the failure to appropriately value generational innovation. I contend that the devaluation of generational innovation by present regimes is not only harmful to sustainable development efforts, but actually reverses the flow of technology transfers from developing countries to developed ones with no concomitant wealth transfer.

In Part V, I suggest that the uniqueness of generational innovation must be protected through a system that corrects present misconceptions regarding traditional knowledge. These misconceptions include devaluation of generational collaboration, misplaced reliance on authentication systems to resolve such devaluations, and a failure to address the needs of the diaspora.

I conclude by contending that in our efforts to remake innovation systems in response to the changes demanded by the global digital marketplace, rational protection for traditional knowledge must be a part of that change if we are to achieve equitable, sustainable values for innovative activity in the twenty-first century.

I. THE ECONOMIC REWARDS OF INNOVATION

A report by the Task Force on Science, Technology and Innovation of the U.N. Millennium Project emphasizes the progressive nature of innovation and its critical role in helping developing countries move from their traditional status as providers of labor and natural resources to a new status as a source of technology- and knowledge-based goods and services.[30] Yet the current intellectual property system, with its Western-based concepts of protectable innovation and creativity, may serve as a significant stumbling block to the creation of local knowledge-based economies, because it fails to value non-Western innovative activities.

30. *STI Report*, *supra* note 9, at 24.

Whether or not intellectual property laws may be justified domestically under theories of natural law,[31] labor protection,[32] or personality defense,[33] on an international basis, post-TRIPS,[34] the philosophy behind such protection seems clear. Quite simply, intellectual property is about protecting the products of innovation *as items of commerce*.[35] It is in this guise as a regime for protecting innovation *perceived* to have value *on a commercial basis* that intellectual property has become a de facto measure for valuing local innovation. Yet this measure remains seriously flawed because of its historic failure to accord value to innovation outside the narrow confines of Western views of technological progress and individual ingenuity.

The Agreement on Trade Related Aspects of Intellectual Property Rights ("TRIPS") is the premier multinational agreement governing the protection of intellectual property rights of the twenty-first century. Administered by the World Trade Organization, it has been acceded to by 152 countries.[36] Although frequently criticized for its strong IP protectionist stance,[37] TRIPS today remains the single most significant focus regarding the standard for the international protection of intellectual property rights, including, significantly for this Article,

31. *See, e.g.*, Adam D. Moore, *A Lockean Theory of Intellectual Property*, 21 HAMLINE L. REV. 65, 77–92 (1997) (discussing allocation of intellectual property rights from Lockean rather than rule-based perspective); A. Samuel Oddi, *TRIPS—Natural Rights and a "Polite Form of Economic Imperialism,"* 29 VAND. J. TRANSNAT'L L. 415, 417 (1996) (pointing out natural law has been leading theory for jurisprudence regarding intellectual property law); Alfred C. Yen, *Restoring the Natural Law: Copyright as Labor and Possession*, 51 OHIO ST. L.J. 517, 529–39 (1990) (contending modern copyright law is based in natural law). *See generally* Anthony D'Amato & Doris Estelle Long, *Natural Law and Intellectual Property*, *in* INTERNATIONAL INTELLECTUAL PROPERTY LAW 39–40 (Anthony D'Amato & Doris Estelle Long eds., 1997) (discussing natural law theory with respect to intellectual property).

32. *See* Peter Jaszi, *Beyond Economics: The Protection of Authorship as a Cultural Value*, *in* INTERNATIONAL INTELLECTUAL PROPERTY LAW, *supra* note 31, at 127 (recognizing decision to protect intellectual property stems from value placed on creative acts required to transform ideas into products).

33. *Id.* at 132–34 (discussing protection of author personality).

34. TRIPS, *supra* note 2. Established in 1994 and administered by the WTO, TRIPS remains one of the most significant multilateral intellectual property treaties of the twenty-first century. *Id.*; INTELLECTUAL PROPERTY AND INTERNATIONAL TRADE: THE TRIPS AGREEMENT xvii (Carlos M. Correa & Abdulqawi A. Yusuf eds., 1998).

35. Works protected by intellectual property have a long historical relationship with economic (trade) issues. One of the earliest reported trademarks was found on pottery in Mesopotamia—an undoubted article of commerce. *See generally* Doris Estelle Long, *"Globalization": A Future Trend or a Satisfying Mirage?*, 49 J. COPYRIGHT SOC'Y U.S.A. 313, 324 (2001). The Berne Convention itself arose from the concerns of Victor Hugo and others over the lack of sufficient international protection for their creative endeavors. *Id.*

36. Understanding the WTO – members, http://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm (last visited Feb. 24, 2009).

37. *See, e.g.*, SUSAN K. SELL, PRIVATE POWER, PUBLIC LAW: THE GLOBALIZATION OF INTELLECTUAL PROPERTY RIGHTS 165 (2003) (noting developing countries were reluctant to agree to TRIPS due to its inclusion of IP protections); Marci A. Hamilton, *The TRIPS Agreement: Imperialistic, Outdated, and Overprotective*, 29 VAND. J. TRANSNAT'L L. 613, 616 (1996) (denouncing TRIPS' imposition of "Western intellectual property system").

copyright and patents. The preamble to TRIPS plainly recognizes that the philosophy behind the protection of intellectual property on an international scale is trade utilitarianism. It stresses that the reason behind the treaty was member countries' "desir[e] to reduce distortions and impediments to international *trade.*"[38] The treaty itself contains numerous provisions directed expressly to the market impact of intellectual property protection, including compulsory licensing provisions for patents to meet domestic market needs,[39] and provisions that permit exceptions to intellectual property protection to combat *market* abuses.[40]

In reality, while the negotiation of TRIPS under the auspices of the General Agreement on Tariffs and Trade,[41] and its subsequent inclusion among the umbrella agreements under which members of the World Trade Organization operate,[42] are strong evidence of the commercial roots of intellectual property protection, it is not the first instance of such an intimate relationship between intellectual property and market economics. To the contrary, the Berne Convention,[43] which is the foundational international treaty for the protection of copyrights,[44] was the result of an Authors Union formed by such luminaries as

38. TRIPS, *supra* note 2, pmbl. (emphasis added).

39. TRIPS, *supra* note 2, art. 31.

40. TRIPS, *supra* note 2, art. 40(2) (permitting members to prohibit licensing conditions or practices that "constitute an abuse of intellectual property rights having an adverse effect on competition in the relevant market").

41. General Agreement on Tariffs and Trade, Oct. 30, 1947, 61 Stat. A-11, 55 U.N.T.S. 194 [hereinafter GATT]. In fact, TRIPS was originally negotiated as part of the Uruguay Round under the auspices of GATT. *See generally* Amy S. Dwyer, *Trade-Related Aspects of Intellectual Property Rights*, *in* 4 THE GATT URUGUAY ROUND: A NEGOTIATING HISTORY (1986–1994) 465, 465–576 (Terence P. Stewart ed., 1999).

42. These umbrella agreements cover a wide range of topics, including Sanitary and Phytosanitary measures; Trade in Services, Agriculture, and Textiles; and Technical Barriers to Trade as well as Trade Related Aspects of Intellectual Property Rights. *See generally* Marrakesh Agreement Establishing the World Trade Organization, Apr. 14, 1994, 108 Stat. 4809, 1867 U.N.T.S. 154 (providing Uruguay Round agreements).

43. Berne Convention, *supra* note 2.

44. The other significant copyright treaties include TRIPS, the World Intellectual Property Organization ("WIPO") Copyright Treaty, and the Universal Copyright Convention ("UCC"). *See* TRIPS, *supra* note 2, art. 9(1) (incorporating by reference all substantive articles of Berne Convention with exception of Article 6*bis*, dealing with moral rights); WIPO Copyright Treaty art. 7, Dec. 20, 1996, S. TREATY DOC. NO. 105–17 (1997), 36 I.L.M. 65 (clarifying right of authors to control use of their works in digital environment); Universal Copyright Convention, July 24, 1971, 25 U.S.T. 1341, 943 U.N.T.S. 178 (serving largely as counterpoint to Berne Convention for those countries like, United States, that wanted to retain statutory formalities, such as notice and registration, for copyright protection, and that wanted to eliminate obligations to protect moral rights under copyright). Since the accession to the Berne Convention in 1989 by the United States, which was perceived as one of the strongest supporters of the UCC, the UCC has generally been losing significance internationally. *See* Silke von Lewinski, *The Role and Future of the Universal Copyright Convention*, UNESCO E-COPYRIGHT BULLETIN Oct.–Dec. 2006, at 1–13, *available at* http://unesdoc.unesco.org/images/0015/001578/157846e.pdf (noting that although nearly 100 states are contracting parties to the UCC, its importance has decreased due to adherence to the Berne Convention by the United States and former Union of Socialist Soviet Republics).

Victor Hugo in part to combat the increasing economic harm to authors from the pirating of their works in foreign countries.[45]

This economic overlay gives both TRIPS and intellectual property more generally a significant role in the economic development of a country. This role is not limited to the critical and contested question of the extent to which intellectual property protection may promote foreign direct investment in a growing economy.[46] To the contrary, regardless of which side of this debate you are on, there is no question that, as the premier legal regime for both encouraging and protecting creative and innovative works,[47] the IP system has become the default means for measuring the economic *value* of such works.[48] Yet the innovative and creative activity that is valued under this system is of a very precise type. It is innovation and creativity as valued by the Western European countries that first crafted such protection regimes[49] and were at the forefront of international efforts in the middle to late nineteenth century to harmonize such regimes on an international basis.[50]

45. *See* RICKETSON, *supra* note 2, at 14, 46–49 (outlining different IP laws in eighteenth-century European countries that led to necessity of Berne Convention); Doris Estelle Long, What if Dickens Had Succeeded? International Copyright, 'Creative Adaptations' and Ebenezer Scrooge (unpublished work in progress, on file with author) (describing efforts of Charles Dickens to encourage United States to provide copyright protection to foreign authors).

46. *See generally* KAMIL IDRIS, INTELLECTUAL PROPERTY: A POWER TOOL FOR ECONOMIC GROWTH 33–46 (2003) (describing positive economic impact of strong intellectual property protection); Keith E. Maskus, *The Role of Intellectual Property Rights in Encouraging Foreign Direct Investment and Technology Transfer*, *in* INTELLECTUAL PROPERTY AND DEVELOPMENT: LESSONS FROM RECENT ECONOMIC RESEARCH 41, 41–74 (Carsten Fink & Keith E. Maskus eds., 2005) (describing technology transfer and foreign direct investment).

47. Despite the numerous challenges and various other fora in which diverse alterations to the TRIPS model of protection are being developed, these challenges still use as their initial point of departure the TRIPS Agreement. While scholars may discuss "regime shifts," see Laurence R. Helfer, *Regime Shifting: The TRIPs Agreement and New Dynamics of International Intellectual Property Lawmaking*, 29 YALE J. INT'L L. 1, 13–18, 53–81 (2004) (describing progression of regime shifts in developed countries from WIPO to GATT to TRIPS), or question the viability of TRIPS as a continuing basis for regulating intellectual property in the area of biotechnology, see Amy Kapczynski, *The Access to Knowledge Mobilization and the New Politics of Intellectual Property*, 117 YALE L.J. 804, 835–37 (2008) (noting emergence of group coalitions successfully advocating for changes in intellectual property laws in many areas, including software and medicine), the reality is that TRIPS remains a jumping off point for discussion because it has become the de facto standard for comparison for international IP protection.

48. See *infra* notes 67–79 and accompanying text for a discussion regarding the economic rights granted creators and innovators under the present intellectual property system.

49. The first reported copyright law was enacted in England in 1709. *See* Peter Jaszi, *Toward a Theory of Copyright: The Metamorphoses of "Authorship*," 1991 DUKE L.J. 455, 455 (referencing Statute of Anne as foundation for literary IP rights). The first reported trademark type regulation may have been enacted in Venice in the Middle Ages. *See* STEPHEN P. LADAS, THE INTERNATIONAL PROTECTION OF INDUSTRIAL PROPERTY 8–9 (1930) (describing regime of monopolies and executive privileges in Hanseatic cities during Middle Ages).

50. Multinational treaties governing intellectual property rights were first established in Europe, including, most notably, the Berne Convention for the Protection of Literary and Artistic Works in 1886 and the Paris Convention for the Protection of Industrial Designs in 1883. *See* Daniel J. Gervais, *The Internationalization of Intellectual Property: New Challenges from the Very Old and the Very New*,

Law is part culture, part politics, and part history. And the history of intellectual property protection is a history of romantic notions of authorship and ingenuity.[51] The identifiable single author, painting alone in the garret, has become the symbolic vision behind present copyright protection systems in which protection is grounded in the "individual rights"[52] of a single, identifiable author[53] to control his or her works. Even if patent law is not quite so romantically premised, except perhaps in the obligation to identify the inventor[54] and in the U.S. practice of granting patent rights to the first to invent (as opposed to the first to file),[55] it is still based on the Western notion of progress

12 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 929, 941 (2002) (noting "Paris and Berne Conventions were negotiated on a trans-Atlantic basis with limited input from other parts of the world").

51. *See, e.g.*, JAMES BOYLE, SHAMANS, SOFTWARE, & SPLEENS: LAW AND THE CONSTRUCTION OF THE INFORMATION SOCIETY 54–55 (1996) (describing basic literary property rights via author originality in Elizabethan England); Jaszi, *supra* note 49, at 455–63 (discussing evolution of "authorship" concept over time and its negative impact on copyright law); Martha Woodmansee, *On the Author Effect: Recovering Collectivity*, *in* THE CONSTRUCTION OF AUTHORSHIP: TEXTUAL APPROPRIATION IN LAW AND LITERATURE 15, 27–28 (Martha Woodmansee & Peter Jaszi eds., 1994) (describing legal protection of unique literature to Romantic and Renaissance periods).

52. TRIPS itself recognizes that intellectual property rights are "private rights." TRIPS, *supra* note 2, pmbl., cl. 4. Moreover, in incorporating the substantive provisions of the Berne Convention, *id.* art. 9(1), TRIPS similarly adopts the reliance on an identifiable copyright author for purposes of measuring copyright. Not only are all rights granted to the "author" of the work, *see, e.g.*, Berne Convention, *supra* note 2, art. 5 (granting authors of literary and artistic works rights bestowed by their respective domestic legal systems); *id.* art. 9 (granting authors of literary and artistic works exclusive rights in authorizing reproduction), but the term of protection granted under both the Berne Convention and TRIPS are generally measured by the life of the author, *see, e.g.*, *id.* art. 7(1) (granting term of protection for author's life plus fifty years after death); TRIPS, *supra* note 2, art. 9(1) (incorporating Berne Convention Article 7). *But cf.* Berne Convention, *supra* note 2, art. 7(3) (granting protection to anonymous works for fifty-year term once work is available to public unless author voluntarily discloses his identity during that time).

53. Joint authorship is possible under both international and U.S. law. *See* 17 U.S.C. §201(a) (2006) (providing authors of joint work are "co-owners of copyright in the work"); TRIPS, *supra* note 2, art. 9(1) (incorporating Article 7*bis* of Berne Convention); Berne Convention, *supra* note 2, art. 7*bis* (extending term of protection for joint authorships determined by death of last surviving author). However, even though creative collaboration is encouraged, its protection is still narrowly circumscribed, requiring that any such collaborative effort fit within the context of individuated authorship. See *infra* Part II for an analysis of the limits on indigenous innovation.

54. *See, e.g.*, Paris Convention for the Protection of Industrial Property art. 4*ter*, Mar. 20, 1883, *as revised at Stockholm* July 14, 1967, 24 U.S.T. 2140, 828 U.N.T.S. 305. This provision was subsequently incorporated into TRIPS. TRIPS, *supra* note 2, art. 2(1) (requiring compliance with numerous articles of Paris Convention, including article 4*ter*).

55. *See, e.g.*, 35 U.S.C. § 102(g)(1) (2006) (establishing priority of inventorship to first inventor); *id.* § 115 (requiring "original and first inventor" to attest to that status in patent application). This obligation is under increasing attack since the United States is the only country currently to utilize this system. *See, e.g.*, Patent Reform Act of 2007, H.R. 1908, 110th Cong. § 2(b) (as passed by House, Sept. 7, 2007) (replacing first-to-invent system with first-to-file system). Part of the reason for this system was the narrative of individuality behind significant inventive achievements in early U.S. history. *See, e.g.*, CLARE PETTITT, PATENT INVENTIONS—INTELLECTUAL PROPERTY AND THE VICTORIAN NOVEL 2 (2004) (recognizing shared romantic notions of individuated genius in patent and copyright regimes); SUSAN SCAFIDI, WHO OWNS CULTURE?: APPROPRIATION AND AUTHENTICITY IN AMERICAN LAW 11

through science and technology. While this Western faith in progress through science is largely perceived to date from the seventeenth century,[56] technological innovation has been valued since at least the Middle Ages in Western Europe,[57] and has ultimately led to a culture of innovation that has often been cited as one of the reasons for the present advanced status in the economic development of the West.[58] I do not mean to suggest that non-Western cultures did not also value innovation, including scientific innovation. To the contrary, countries such as China and India were the sources of numerous scientific advances through the ages.[59] But, unlike the West, neither India nor China established an innovation valuation system that granted economic exploitation rights to the creators of such innovations.[60] Nor did either country succeed in establishing until recently the culture of innovation that lies at the heart of the history of the economic development of the West. As Robert Friedel acknowledges in his work *A Culture of Improvement: Technology and the Western Millennium*,

> Over the past thousand years there has developed in the West a "culture of improvement," an environment in which significant, widely shared value has come to be attached to technical improvement and conditions have been cultivated to encourage and sustain the pursuit of improvement. Related to the value attached to improvement is the

(2005) (tracing romantic origins of inventor genius). If copyright is filled with the romance of the artist in the garret, then arguably, at least in the United States in its early days, patent is filled with the romance of the single inventor working in a makeshift lab in the garage. *See, e.g.*, JOHN H. LIENHARD, HOW INVENTION BEGINS: ECHOES OF OLD VOICES IN THE RISE OF NEW MACHINES 8 (2006) (discussing our "seemingly atavistic need to credit one individual for the work of many"). In today's global, digital environment of high tech collaboration, neither image may be realistic, if they ever were.

56. *See, e.g.*, RICHARD G. LIPSEY, KENNETH I. CARLAW & CLIFFORD T. BEKAR, ECONOMIC TRANSFORMATIONS: GENERAL PURPOSE TECHNOLOGIES AND LONG-TERM ECONOMIC GROWTH 232–38 (2005) (suggesting science that developed in fifteenth to seventeenth centuries replaced earlier intellectual domination of Aristotelian theories and Christianity). This "faith" is largely derived from the Scientific Revolutions of the seventeenth and eighteenth centuries. *See generally* 2 DONALD KAGAN ET AL., THE WESTERN HERITAGE 496–503 (4th ed. 1991) (describing scientific innovations that occurred in seventeenth century).

57. *See, e.g.*, FRIEDEL, *supra* note 4, at 8 (pointing out rising societal value of innovation via technological advancement during Middle Ages); LANDES, *supra* note 4, at 15–22 (discussing developments during Middle Ages leading to increased economic enterprise).

58. *See, e.g.*, WILLIAM H. MCNEILL, THE RISE OF THE WEST: A HISTORY OF THE HUMAN COMMUNITY 654 (2d ed. 1991) (stating new technologies began to transform West as other cultures fell behind); NATHAN ROSENBERG & L.E. BIRDZELL, JR., HOW THE WEST GREW RICH: THE ECONOMIC TRANSFORMATION OF THE INDUSTRIAL WORLD 3 (1986) (stating past two hundred years has been unprecedentedly long period of prosperity and examining reasons behind such prosperity).

59. *See, e.g.*, IDRIS, *supra* note 46, at 11 tbl.1.1 (describing scientific advances achieved in India during the Moghul Empire when no patent protection existed); ROBERT TEMPLE, THE GENIUS OF CHINA: 3,000 YEARS OF SCIENCE, DISCOVERY, AND INVENTION 9–10 (1986) (describing diverse scientific advances in China before Chinese established patent laws).

60. *See* TEMPLE, *supra* note 59, at 9–10 (positing that neither Chinese innovators nor their inheritors effectively claimed their inventions).

> widespread expectation that improvement will indeed occur in most realms of technology.[61]

Whether or not a property-based rights system such as the one represented by current intellectual property regimes is *necessary* to encourage the creation of innovative works, such a system has undoubtedly played a role in the historical development of a culture of innovation in the West. By serving as a basis for valuing such works on an economic basis, intellectual property law has been a means for encouraging their creation and use.[62]

While scholars may debate the utility of the property-based nature of rights granted under current IP regimes,[63] or the scope of exceptions for intellectual property protection in today's digital environment,[64] the basic notion of individuated creativity remains at the core of Western intellectual property

61. FRIEDEL, *supra* note 4, at 6.

62. *See, e.g.*, LIPSEY *supra* note 56, at 261 (including improved intellectual property laws as reason for Western economic advances); *see also* HISAMITSU ARAI, WIPO, INTELLECTUAL PROPERTY POLICIES FOR THE TWENTY-FIRST CENTURY: THE JAPANESE EXPERIENCE IN WEALTH CREATION 15, 73–78 (1999) (describing use by Japan of strong patent law protection to create its own technology industry); PAT CHOATE, HOT PROPERTY: THE STEALING OF IDEAS IN AN AGE OF GLOBALIZATION 105 (2005) (describing Germany's use of patent laws to maintain global monopoly in chemical industry during early decades of twentieth century). The promise of an economic return for innovative acts may be even more critical for inventions that impact health, safety, or the environment. The high cost of much innovative activity, particularly in the critical areas of health, safety, and agriculture, where innovations must be tested for safety and environmental harm, means that some form of economic support for such research must be provided. While government grants, nonprofit institutions, nongovernmental organizations, and other public and private charitable sources may exist to support such research, the patent laws were developed to provide an alternative to these sources. *See, e.g.*, VAN CAENEGEM, *supra* note 15, at 4 (stating intellectual property rights help protect against market risk). Patent laws do not require that the only sources for funding for research that results in patentable inventions are derived from the economic benefits secured by such laws. Similarly, their existence does not *prevent* other funding sources beyond those secured by the exploitation of the patent grant. In an age where global pandemics such as AIDS, tuberculosis, and malaria continue to kill millions, removing the alternative sources of funding provided by the economic exploitation rights granted under patent laws seems a foolhardy approach at best. I do not mean to suggest that these exploitation rights should not be balanced against the needs of developing and least-developed countries in providing essential medicines, such as the potential solution provided under Article 31*bis* of the Annex to the Protocol Amending the TRIPS Agreement. Amendment of the TRIPS Agreement, Annex to the Protocol Amending the TRIPS Agreement art. 31*bis*, WT/L/641 (Dec. 6, 2005). However, efforts to eliminate completely the potential research funding benefits of patents are ill founded. To meet many of the critical health and safety challenges we need both "open source" funding equivalents as well as patents to assure adequate sources of funding. See *supra* note 17 for examples of "open source" funding equivalents.

63. *See, e.g.*, J. H. Reichman, *Of Green Tulips and Legal Kudzu: Repackaging Rights in Subpatentable Innovation*, 53 VAND. L. REV. 1743, 1797 (2000) (describing negative effects of property-rights-based system); Jerome H. Reichman & Tracy Lewis, *Using Liability Rules to Stimulate Local Innovation in Developing Countries: Application to Traditional Knowledge*, *in* INTERNATIONAL PUBLIC GOODS AND TRANSFER OF TECHNOLOGY UNDER A GLOBALIZED INTELLECTUAL PROPERTY REGIME 337, 365 (Keith E. Maskus & Jerome H. Reichman eds., 2005) [hereinafter INTERNATIONAL PUBLIC GOODS] (suggesting compensatory liability principles could resolve problems of property-rights based system).

64. *See* LESSIG, *supra* note 4, at 180–82 (comparing exceptions to copyrights in physical world in relation to cyberspace counterparts).

systems.[65] Even those who suggest a reduction in the scope or type of protection afforded intellectual property rights in the Digital Age do not suggest a complete eradication of such protections.[66] But consider what this Western focus on individuality and technology-based progress says about creative and innovative activities that do not readily fit within this model. Are works that are the product of collaboration less valuable than single-authored works? Is only innovation based on the latest scientific and technological advances worthy of compensation or does economic value also reside in innovation based on practices that have been perfected through generations of use?

Under present intellectual property regimes, generational knowledge and practices cannot generally be protected. Copyright requires "originality." Whether such originality is demonstrated through a "modicum of creativity,"[67] through evidence of "intellectual creations,"[68] or by "skill, labour and judgment,"[69] Morning Star Poles, weavings, and other works of generational creativity generally lack such "originality" because they reproduce the patterns and expressions that other generations have created. At best, works of generational creativity may be granted a "thin copyright," sufficient only to protect modifications to tradition-based expressions against unauthorized identical duplications.[70]

65. I do not mean to suggest that recognition of individual authorship is a Western construct. To the contrary, numerous cultures value the identification of authorship. Thus, for example, while copyright protection did not exist in India when the *Bhagavad Gita* or the *Mahabharata* were being written, the authors of such works were credited. *See, e.g.*, KRISHNA DHARMA, MAHABHARATA: THE GREATEST SPIRITUAL EPIC OF ALL TIME 15 (1999) (crediting *Mahabharata* to Vyasadeva); *see also* SIVA VAIDHYANATHAN, COPYRIGHTS AND COPYWRONGS: THE RISE OF INTELLECTUAL PROPERTY AND HOW IT THREATENS CREATIVITY 193 n.11 (2001) (noting that authorial credit was given in India, even in absence of copyright). Similarly, while no copyright existed in China, the writings of Confucius were still accredited to Confucius. *See* Burton Watson, *Introduction* to THE ANALECTS OF CONFUCIUS 6 (Burton Watson trans., 2007) (attributing up to twenty ancient sections or "Books" to Confucius in Chinese literary tradition). More recently, during the opening months of the National Museum of the American Indian in Washington, D.C. I observed that each exhibit contains information regarding the "authors" (my term, not theirs) of the exhibits in question.

66. Thus, for example, Lawrence Lessig, who has routinely criticized the scope of protection for copyright in the Digital Age, insists that he does not support the eradication of all such protection. *See, e.g.*, LESSIG, *supra* note 4, at 107–08 (commenting on benefits of copyright in creative process). Similarly, those who criticize the extension of patent protection to software innovations do not suggest that the patent system itself should be abolished. *See, e.g.*, James Gleick, *Patently Absurd*, N.Y. TIMES MAG., March 12, 2000, at 44 (arguing much of patent system's value lies in disclosure of technologies that might otherwise be hoarded as trade secrets). Even Jerome Reichman, who suggests that a property-based system should be eschewed in favor of one based on product liability rules, does not advocate the elimination of some form of economic reward for creators, merely a change in the basis on which such rewards are enforced. *See* Reichman & Lewis, *supra* note 63, at 345 (acknowledging property-rights-based system has benefits).

67. Feist Publ'ns, Inc. v. Rural Tel. Serv. Co., Inc., 499 U.S. 340, 346 (1991) (providing U.S. standard for originality under domestic copyright law).

68. TRIPS, *supra* note 2, art. 10(2) (providing TRIPS originality standard for databases).

69. Interlego A.G. v. Tyco Industries Inc., (1988) 3 All E.R. 949, 971 (P.C.) (appeal taken from H.K.) (promulgating test of originality under British law).

70. *See, e.g.*, Trek Leasing, Inc. v. United States, 66 Fed. Cl. 8, 11 n.4, 12–13, 19 (2005) (stating

Indigenous inventions fare no better. Protection for inventions under patent law requires "novelty" and "nonobviousness."[71] While technology-based advances generally meet the high standard of uniqueness required under patents, tradition-based innovations automatically fail because they have been in use too long to be novel. Thus, generational innovations such as the use of Neem seed as a fertilizer or of turmeric to clean wounds cannot be protected under patent, while the application of technology to such innovations, in the form of extraction processes to obtain the active ingredient, and the results of such extractions, generally demonstrate sufficient novelty for protection.[72]

Ultimately, the uniqueness[73] requirements under copyright and patent law serve to place the products of tradition-based innovation beyond legal protection.[74] Instead, such innovation is placed into the public domain, where

that buildings based on Pueblo Revival style granted thin copyright requiring "supersubstantial similarity"—or nearly verbatim copying—for protection); *accord* Yumbulul v. Reserve Bank of Australia (1991) 21 I.P.R. 481, ¶¶ 19–21 (recognizing Morning Star Pole as subject to copyright protection, ironically for purposes of denying artist right to control use of his work in accordance with tribal customs).

71. *See* TRIPS, *supra* note 2, art. 27(1) (permitting patent protection for inventions "in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application"). The tripartite test under Article 27 of TRIPS is met by the U.S. standards for patentability of novelty, nonobviousness, and utility. *See* 35 U.S.C. §§ 101–103 (2006) (establishing U.S. patentability standard); TRIPS, *supra* note 2, art. 27 n.5 (providing "terms 'inventive step' and 'capable of industrial application' may be deemed . . . to be synonymous with . . . 'non-obvious' and 'useful' respectively" for purposes of patentability under Article 27 of TRIPS).

72. *See* U.S. Patent No. 5,405,612 (filed Dec. 2, 1993) (issued Apr. 11, 1995) (covering applications of Neem seed as insecticide); U.S. Patent No. 5,401,504 (filed Dec. 28, 1993) (issued Mar. 28, 1995) (revoked Apr. 21, 1998) (covering use of turmeric for wound treatment). Interestingly, the patent granted by the United States Patent and Trademark Office for turmeric was ultimately revoked on the basis of a re-examination request filed by the Indian Center for Scientific and Industrial Research due in part to prior art in Sanskrit texts concerning such uses. *See* Reexamination Request No. 90/004.433, Reexamination Certificate B1 (3500th), (filed Oct. 28, 1996) (issued Apr. 21, 1998) (canceling all claims in original patent). For a discussion of the Neem seed and turmeric controversies, among others, regarding patents and traditional knowledge, see Philip Schuler, *Biopiracy and Commercialization of Ethnobotanical Knowledge*, *in* POOR PEOPLE'S KNOWLEDGE, *supra* note 20, at 159, 161–69.

73. I do not mean to suggest that the standard of uniqueness for patents and copyrights should be the same. To the contrary, because the goals of patent and copyright law are distinctly different—the first to encourage innovation, the second to encourage creativity, *see, e.g.*, Long, *Dissonant Harmonization*, *supra* note 14, at 1205 (urging investigation into aesthetic and innovative creativity to better tailor copyright and patent laws to serve their distinctive goals)—the uniqueness standards should appropriately differ. However, as compared to tradition-based works, this uniqueness requirement has been used to impose a standard that virtually assures that generational innovation will remain unprotected.

74. *See, e.g.*, WIPO International Forum on "Intellectual Property and Traditional Knowledge: Our Identity, Our Future," Jan. 21–22, 2002, *The Attempts to Protect Expressions of Folklore and Traditional Knowledge*, ¶ 17, WIPO/IPTK/MCT/02/INF.5 (Nov. 2001) [hereinafter WIPO Forum] (detailing differences between idea of author as it relates to traditional folklore and modern notion of artistic work); Anupam Chander & Madhavi Sunder, *The Romance of the Public Domain*, 92 CAL. L. REV. 1331, 1350–51 (2004) (asserting TRIPS has left traditional knowledge in global commons while protecting intellectual products of developed world); Graham Dutfield, *TRIPS-Related Aspects of*

innovators lose any right of control over their works.[75] This loss of control is critical to the economic valuation of innovative activities. Without the legal right to control the use of one's creative or innovative work,[76] or at a minimum to be compensated for such uses under a liability rule,[77] tradition-based innovation cannot be used to generate wealth by their holders. At its core, intellectual property protection values innovation by granting the producers of innovative and creative works the economic benefits of their efforts. Through the grant of exclusive rights to control the use of the patented invention[78] or the copyrighted work,[79] the law grants innovators the ability to seek compensation for the exploitation of their works. Such a system does not assure that socially useful innovation will always achieve an economic reward. To the contrary, only those works that are perceived as having value in the marketplace, either through

Traditional Knowledge, 33 CASE W. RES. J. INT'L L. 233, 238 (2001) (recognizing mistaken belief that knowledge of traditional peoples is in public domain and therefore can be used freely).

75. Dutfield, *supra* note 74, at 238; *see also* Doris Estelle Long, Curtailing the Imperialism of the Public Domain or Changing the Rules of the Great Game for the Intellectual Property Empire 20 (May 2008) (unpublished manuscript, on file with the author) [hereinafter Long, Curtailing Imperialism] (contending, despite apparent agreement to place traditional knowledge in public domain, such domain is not monolithic state requiring such heavy-handed measures to assure adequate access to information). For a comprehensive overview of the literature regarding the public domain, see Pamela Samuelson, *Enriching Discourse on Public Domains*, 55 DUKE L.J. 783, 786–813 (2006).

76. It is possible that the ability to control the use of one's work might be achieved through other means, including contractual agreements. Schuler, *supra* note 72, at 177–78. Where, however, an innovation falls outside the scope of patent protection, it is highly unlikely that a third party would agree by contract to pay for an invention it could use without compensation if it so chooses. The only significant exception might be for those inventions where secret knowledge regarding the innovation, such as know-how or show-how, is sought to enhance the use of public domain innovations.

77. *See* Reichman, *supra* note 63, at 1777 (suggesting liability principles should be basis for innovation law). I am not suggesting that product liability rules should be used to protect generational innovation. I believe such rules might prove useful in areas where the holder of the generational innovation is willing to license third party use and where the only issue is the amount of compensation for such use. Where, however, there are concerns over deculturizing uses or other uses beyond compensation, liability rules are problematic. *See* Long, *Dissonant Harmonization*, *supra* note 14, at 1184 (recognizing possibility of multiple motivations, including economic gain, for aesthetic creativity).

78. *See* TRIPS, *supra* note 2, art. 28(1)(a) (stating exclusive rights include right to prohibit third parties from making, using, importing, or selling patented invention without authorization of patent holder).

79. In reality, copyright owners are not granted the right to control the use of their works. Unlike patents, where holders are granted the right to prohibit the unauthorized *use* of their invention, *id.*, copyright owners can only control the public *distribution* of their works (whether by reproduction, performance, transmission, or communication), *see, e.g.*, WIPO Copyright Treaty, *supra* note 44, art. 6(1) (granting authors exclusive right to distribute works to public through sale or otherwise); Berne Convention, *supra* note 2, arts. 9, 11, 12 (granting rights of reproduction, performance, and adaptation). Once a work has been made publicly accessible, the copyright holder cannot control a third party's ability to actually use the work, including reading text or listening to music in private. Whether such permitted uses can be controlled through the application of technological protection measures remains one of the most critical issues in the development of copyright standards in the Digital Age. *See, e.g.*, Chamberlain Group, Inc. v. Skylink Techs., Inc., 381 F.3d 1178, 1182–84 (Fed. Cir. 2004) (denying protection for universal garage door openers under Digital Millennium Copyright Act for failure to prove unauthorized use of copyrighted software).

popularity (for copyrighted works) or industrial adoption (for patents), will generally attract investment capital. Nevertheless, lacking the *value* of uniqueness defined by Western concepts of legal protection for innovation, most generational innovation cannot even count on this ephemeral promise of economic return.

II. INNOVATION THROUGH NON-WESTERN EYES

Western innovation systems impose burdens on legal protection that exclude the innovative acts of those who do not share the same views regarding individuated, technologically based progress as the sole source of economically valuable innovation. As the WIPO report on The Attempts to Protect Expressions of Folklore and Traditional Knowledge so succinctly stated,

> It seems that copyright law may not be the right, or certainly the only, means for protecting expressions of folklore. This is because, whereas an expression of folklore is the result of an impersonal, continuous and slow process of creative activity exercised in a given community by consecutive imitation, works protected by copyright must, traditionally, bear a mark of individual originality.[80]

It is this value for the generational passage of knowledge and practices that lies at the heart of non-Western, indigenous creativity and innovation. Thus, for example, the Kuna Yala of the San Blas Islands in Panama use elaborate embroidery designs consisting of a reverse appliqué pattern historically used on their dresses and blouses.[81] These designs, generically referred to as "molas," traditionally are based on geometric patterns that may represent characters in traditional stories or myths.[82] Yet within the transmission of this tradition-based practice is room for the change that affects all traditions and culture. Thus, for purposes of commercialization, the Kuna Yala have begun to create new patterns to meet the market desires of consumers who seek bolder colors or more recognizable pattern designs such as fish and other shapes.[83] This change in the face of collisions with other cultures demonstrates an often-forgotten aspect of generational innovation: it is *not* static.[84] It is not a reification of culture for

80. WIPO Forum, *supra* note 74, ¶ 17.

81. *See generally* Mari Lyn Salvador, *Kuna Women's Arts: Molas, Meaning, and Markets*, *in* CRAFTING GENDER: WOMEN AND FOLK ART IN LATIN AMERICA AND THE CARIBBEAN 47 (Eli Bartra ed., 2003) (discussing Kuna Yala clothing designs and techniques). For pictures of traditional and nontraditional mola patterns, see MARICEL E. PRESILLA, MOLA: CUNA LIFE STORIES AND ART 1–35 (1996).

82. Salvador, *supra* note 81, at 54.

83. *Id.* I was told by some of the Kuna Yala that they chose to make mola patterns in bright blue and depicting fairly realistic, but stylized, versions of fish because these designs were very popular with American tourists. Yet despite the use of new designs, they insisted that the new style molas be created using the same hand-stitched reversed-appliqué techniques that they had used historically for the more traditional designs that they wore on their clothing. These women also told me they would never wear one of these new designs themselves because they did not consider them "authentic" patterns.

84. To the contrary, much generational innovation encapsulates the steady evolution resulting from contact with other cultures, including those of the external consumer marketplace. *See, e.g.*,

reification's sake. At the World Forum on the Protection of Folklore in 1997, Terri Janke described folklore as a "living and continually evolving tradition. . . . Its continued practice is vital to the identity and survival of [its holders]."[85] This same description could be used to describe all generational innovation. Such innovation represents a distinctly non-Western focus on social collaboration and perfection of information through controlled transmission across generations. These values appear to be in direct opposition to the individuated, technologically based constructs of progress contained within present intellectual property system.

Under present copyright and patent regimes, protected creative and innovative works must not only bear the necessary hallmarks of uniqueness,[86] they must also be the product of individuated creatorship.[87] While copyright recognizes the concept of joint authorship arising from collaborative efforts,[88] the terms of such collaboration are often narrowly constrained by time and activity requirements. Thus, for example, under U.S. copyright law, to qualify as a joint author, the authors in question must have *intended* at the beginning to work together to create a single work.[89] Such intentional collaboration

ROSEMARY J. COOMBE, THE CULTURAL LIFE OF INTELLECTUAL PROPERTIES: AUTHORSHIP, APPROPRIATION, AND THE LAW 208–47 (1998) (examining interactions between consumer culture and indigenous and other groups); CROSS-CULTURAL CONSUMPTION: GLOBAL MARKETS, LOCAL REALITIES 19–194 (David Howes ed., 1996) (containing diverse articles regarding cross-cultural impacts); JAN NEDERVEEN PIETERSE, GLOBALIZATION AND CULTURE: GLOBAL MÉLANGE 41–58 (2004) (discussing impact of globalization on culture, including hybridity).

85. Terri Janke, *UNESCO-WIPO World Forum on the Protection of Folklore: Lessons for Protecting Indigenous Australian Cultural and Intellectual Property*, 2 ART ANTIQUITY & L. 405, 407 (1997), *quoted with approval in* Agnès Lucas-Schloetter, *Folklore*, *in* INDIGENOUS HERITAGE, *supra* note 28, at 259, 263.

86. See *supra* notes 67–73 for sources that discuss the various hallmarks of uniqueness.

87. Such individuated creatorship obligations are contained in the need for an identifiable author under copyright and an identifiable inventor under patent, *see, e.g.*, 17 U.S.C. § 302(c) (2006) (reducing period of copyright protection to maximum of 95 years from date of first publication or 120 years from date of creation unless author is identified during her lifetime); 35 U.S.C. §§ 111, 115 (2006) (requiring identification of author as part of oath to support valid patent application), in the specification of intellectual property rights as "private rights," TRIPS, *supra* note 2, pmbl., cl. 4, and in the narrow definition of who may share authorial and inventive rights, see *infra* notes 89–92 and accompanying text for a discussion regarding collaborative ownership rights.

88. *See* 17 U.S.C. § 201(a) (establishing that "[t]he authors of a joint work are co[-]owners of copyright in the work"); Berne Convention, *supra* note 2, art. 7*bis* (dealing with calculation of terms of protection for "work of joint authorship").

89. *See* 17 U.S.C. § 101 (defining "joint work" as one "prepared by two or more authors *with the intention* that their contributions be merged into inseparable or interdependent parts of a unitary whole" (emphasis added)); Copyright, Designs and Patents Act, 1988, c. 48, § 10(1) (U.K.) (defining "work of joint authorship" as "a work produced by the collaboration of two or more authors in which the contribution of each author is not distinct from that of the other author or authors"). The application of domestic copyright law to the question of joint authorship (versus the role of helpful but unrecognized collaborator, without copyright protection privileges) is extremely complex. Under U.S. law, for example, there are conflicting opinions regarding the need for each author to make a copyrightable contribution to the work as a whole. *Compare* Aalmuhammed v. Lee, 202 F.3d 1227, 1231–32 (9th Cir. 2000) (concluding, in addition to requiring copyrightable contributions, that collaborator must have been author as well), *with* Gaiman v. McFarlane, 360 F.3d 644, 660–61 (7th Cir.

necessarily imposes a time constraint on protectable collaborative efforts. Once a work has been created, "collaboration" becomes "adaptation," which requires the approval of the original creator.[90] Thus, if two individuals work together to create computer code for a video game, they might qualify as joint authors. If, however, one person creates the code, and a second individual revises that code, the second individual is no longer a joint author. To the contrary, he has now become the creator of a derivative work and must receive the permission of the first author to create his revision, unless such adaptation qualifies as permissible fair use.[91] Worse, under present U.S. law, if such time-separated collaborator does not receive permission, and his collaborative activities are not otherwise privileged, even if the second putative author has a separate copyright in his own original contributions to the adapted work,[92] he would be unable to defend his copyrighted adaptations against others' infringing uses.[93]

Collaborative activities under present patent regimes are less constrained than under copyright. There is no requirement that joint inventors under U.S. law work together to create a new invention. To the contrary, joint inventorship under U.S. law exists even if the two do not physically work together or even make equivalent contributions to the conception of the patented invention, or to the subject matter of its claims.[94] Even if an individual only contributes to a

2004) (granting joint authorship despite absence of separately copyrightable contribution). Under U.K. law, not only must the author "'contribute to the production of the work and create something protected by copyright which finds its way into the finished work,'" their contribution must also be "significant," and must not be "distinct" from that of the other authors. Thorsten Lauterbach, *Joint Authorship in a Copyright Work Revisited*, 27 EUR. INTELL. PROP. REV. 119, 119–20 (2005) (internal quotation marks omitted) (quoting Ray v. Classic FM, (1998) F.S.R. 622, 636 (U.K.)).

90. Even the Berne Convention distinguishes between initial collaboration—which leads to a work that can be protected—and adaptation. Berne Convention, *supra* note 2, arts. 7*bis*, 12. While initial collaboration may lead to a work of joint authorship, *see id.* at 7*bis* (discussing term of protection for "works of joint authorship"), once such initial collaboration ends, the second-stage collaborator—the one who collaborates at a time after the creation of the initial "work"—must obtain the permission of the first author(s) for "adaptations, arrangements and other alterations of their works," *id.* art. 12. Translations similarly require the consent of the first-stage collaborator. *Id.* art. 11*ter*(2); *see also* 17 U.S.C. § 106(2) (granting authors exclusive right "to prepare derivative works based upon the copyrighted work").

91. *See* 17 U.S.C. §106(2) (granting exclusive right to prepare derivative works to owner of copyright); Berne Convention, *supra* note 2, art. 12 (granting to first author exclusive right of adaptation, arrangement, and alterations). The only exception to this general rule requiring authorization of second-stage collaborators is if the creation of the derived work is permitted under fair use doctrines, such as in the creation of a parody. *See, e.g.*, Campbell v. Acuff-Rose Music, Inc., 510 U.S. 569, 574–94 (1994) (finding unauthorized parody of copyrighted song to be permissible fair use).

92. 17 U.S.C. § 103(b) (recognizing copyright in "derivative work extends only to the material contributed by the author of such work").

93. *Id.* § 103(a) (stating protection for works using pre-existing materials "does not extend to any part of the work in which such [pre-existing] material has been used unlawfully").

94. 35 U.S.C. § 116 (2006) (requiring joint inventors to apply for patent jointly and recognizing joint inventorship even if "(1) they did not physically work together or at the same time, (2) each did not make the same type or amount of contribution, or (3) each did not make a contribution to the subject matter of every claim").

single claim, by conceiving of the patentable element in the claim, she qualifies as full joint inventor.[95] Like copyrights, patents impose a time constraint on collaboration. Inventive collaboration must take place before the invention is conceived of in its totality[96] or enters the public domain through prior public activities such as use or publication.[97]

Protected creative and innovative works under Western views of value-added innovation are not only the product of individuated creation, but their economic value to such creators is also time-constrained. While authors are granted rights to the economic exploitation of their works,[98] subject to critical fair use exceptions,[99] such rights end after a specified period of time.[100] Under

95. *See, e.g.*, Ethicon, Inc. v. U.S. Surgical Corp., 135 F.3d 1456, 1460–64 (Fed. Cir. 1998) (recognizing joint inventorship status for researcher who only contributed to two claims in a fifty-five claim patent); Fina Oil & Chem. Co. v. Ewen, 123 F.3d 1466, 1473 (Fed. Cir. 1997) (holding joint inventor need not have contributed to each element of invention or have conceived of entire invention).

96. *See, e.g.*, Fina Oil, 123 F.3d at 1473–74 (finding joint inventorship requires each inventor contribute in a significant manner to clear conception of invention).

97. 35 U.S.C. §§ 102–103 (listing public acts which cause invention to lose necessary attributes of novelty or nonobviousness). If an invention lacks patentability due to the absence of novelty or nonobviousness, then the "collaborator" is free to use it under patent law, but would no longer qualify as a joint inventor. To the contrary, the rights to any "derivative" invention that she creates would belong exclusively to her since the creator of the underlying invention would have no rights under patent to assert an interest in her derivative invention. *See* Diamond v. Diehr, 450 U.S. 175, 191–92 (1981) (recognizing that although mathematical formula in itself is not patentable, process using mathematical formulas may be patentable when viewed as whole).

98. See *supra* note 79 and accompanying text for examples and discussion of how these economic rights are bounded by the rights to control the distribution, reproduction, performance, and adaptation of the works. In the Digital Age, such economic exploitation rights extend to *use* of the work on the Internet, even though the ability to enforce those rights has proven problematic in the era of peer-to-peer file trading and other uses unauthorized by the economic rights holder. *See, e.g.*, WIPO Copyright Treaty, *supra* note 44, art. 6 (granting authors exclusive right to make their work available to public); Fred von Lohmann, *Measuring the Digital Millennium Copyright Act Against the Darknet: Implications for the Regulation of Technological Protection Measures*, 24 LOY. L.A. ENT. L. REV. 635, 637–48 (2004) (discussing diverse problems in protecting copyright on Internet, including darknets and failure of Digital Millennium Copyright Act to solve such problems). Losses due to digital piracy on the Internet are virtually incalculable given the untraceable nature of such end-user-based activities. It is impossible to determine how much loss is caused by online pirate activities because it is impossible to measure accurately the *failure to buy* a given work. *Cf.* OECD, *The Economic Impact of Counterfeiting and Piracy*, at 15–16, 21–25, DSTI/IND(2007)9/PART4/REV1 (2007), *available at* http://www.oecd.org/dataoecd/13/12/38707619.pdf (describing difficulty in determining actual piracy and counterfeiting figures, and proposing new econometric model). Current estimates by the Motion Picture Association of America, for example, place losses due to Internet piracy at approximately $2.3 billion for 2006 alone, which can only be a guess at best. L.E.K., THE COST OF MOVIE PIRACY (2006), www.mpaa.org/leksummaryMPA%20revised.pdf; *see also Copy Culture*, N.Y. TIMES, Mar. 28, 2005, at C8 (reporting widespread sentiment that government is powerless to regulate steadily increasing amount of bandwidth and users on file-sharing websites).

99. Both the Berne Convention and TRIPS recognize limitations and exceptions to the exclusive rights granted to copyright authors. *See* TRIPS, *supra* note 2, art. 13 (establishing three-part test for acceptable limitations and exceptions to copyright); Berne Convention, *supra* note 2, arts. 9–10*bis* (recognizing limited exceptions for reproduction, quotations, teaching, and reporting). In the United States, exceptions and limitations to rights under copyright are referred to under the general rubric of

TRIPS this period of time must be at least for the life of the author plus an additional fifty years.[101] Inventors are granted similarly time-constrained rights to the economic exploitation of their works. Patent protection must last for at least twenty years from the date of application.[102] Once this period ends, an inventor's ability to exercise any form of economic control over the work similarly ends. Time-sensitive innovation is therefore encouraged, while innovation grounded in traditions and practices handed down through generations receives *no* economic exploitation rights.[103]

The failure to value tradition-based innovation by granting generational innovators economic exploitation rights automatically devalues innovative acts that fall outside Western precepts. While Western precepts of innovation focus

"fair use." *See* 17 U.S.C. § 107 (2006) (establishing four statutory factors for determining fair use of copyrighted work); Campbell v. Acuff-Rose Music, Inc., 510 U.S. 569, 584–85 (1994) (noting that commercial character of song parody did not create presumption against fair use). Other countries use the term "fair dealing" to refer to such exceptions. *See* Copyright, Designs and Patents Act, 1988, c. 48, §§ 29–30, 32–34 (U.K.) (establishing limitations of "fair dealing" for research, criticism, news reporting, and education). The tests for the two are not the same. *See, e.g.*, Jonathan Band, *Google and Fair Use*, 3 J. BUS. & TECH. L. 1, 26–28 (2008) (comparing U.S. fair use and British fair dealing provisions within context of Google Library Project); *see also* KIMBERLEE WEATHERALL, INTELL. PROP. RES. INST. AUSTL., FAIR USE, FAIR DEALING: THE COPYRIGHT EXCEPTIONS REVIEW AND THE FUTURE OF COPYRIGHT EXCEPTIONS IN AUSTRALIA 4–9 (2005), http://www.ipria.net/publications/Occasional%20Papers/Occasional%20Paper%203.05.pdf (detailing differences between "fair dealing" under Australian law and "fair use" under U.S. law). For the most extensive list of potential fair use exceptions I am aware of, see Council Directive 2001/29/EC, art. 5(3), 2001 O.J. (L 167) 10, 17–18, which lists fifteen categorical exceptions that European Union members may adopt to the exclusive right to authorize the reproduction of protected works.

100. Internationally, such rights end fifty years after the author's death. *See* TRIPS, *supra* note 2, art. 12 (providing protection for minimum period of fifty years from creation or authorized publication of work where protection of work is not calculated according to life of person and work is not photographic or work of applied art). However, many countries including the United States currently extend the period of protection to life plus an additional seventy years. *See, e.g.*, 17 U.S.C. § 302 (stating that under U.S. law term of copyright endures for life of author plus seventy years); Council Directive 2006/116/EC, art. 1(1), 2006 O.J. (L 372) 12, 13 (directing that EU member states harmonize protection laws to accord protection for duration of author's life plus seventy years).

101. TRIPS, *supra* note 2, art. 12.

102. *Id.* art. 33. Interestingly, unlike copyright protection, even countries that are perceived to favor relatively strong patent protection, such as the United States, have not extended the period of protection beyond the minimum required twenty year term, excluding extensions for patent pendency during agency approvals for medical and other health and safety patents. *See generally* JOHN P. SINNOTT, WILLIAM JOSEPH COTREAU & JESSICA M. SINNOTT, 2B-2P WORLD PATENT LAW AND PRACTICE (1997) (providing detailed information about patent laws in United States and abroad).

103. The absence of such rights may not only adversely impact sustainable development, it may deprive the world of the benefits of indigenous knowledge in the critical areas of health, biodiversity, and environmental conservation. While the process of generational innovation may be the initial result of noneconomic impulses, including spiritual and communal "gifting," *see, e.g.*, DAVID BOLLIER, SILENT THEFT: THE PRIVATE PLUNDER OF OUR COMMON WEALTH 27–41, 81–82 (2002) (discussing workings of indigenous gift economies and Western understandings of these economies), as generational innovators begin to diffuse their innovations through authorized commodification, economic rights may provide needed funds to involve a larger, presently untapped source for innovations in this area—indigenous peoples.

on technology, time constraints, and individuated creatorship,[104] non-Western innovation contains no such limitations.[105] To the contrary, local or tradition-based innovations do not require the addition of technology, have value across generations, and are not only the result of *collective* creation, but are also held collectively by members of the relevant tribe.[106] These differences have led to devaluation of innovative knowledge "painstakingly generated by distinct communities over the course of centuries"[107] to such an extent that such knowledge is often considered "free"[108] or "a happy accident—naturally occurring wealth that is free for the taking."[109] Despite its critical role in indigenous innovation, so-called traditional knowledge[110] remains largely unprotected and, hence, undervalued.

III. TRADITIONAL KNOWLEDGE AND GENERATIONAL INNOVATION

There is no agreed upon definition for the concepts of "traditional knowledge" or its recently developed subset "traditional cultural expressions."[111] "Traditional knowledge" at its broadest meaning covers a potentially large body of knowledge and practices, handed down through generations. This includes a wide variety of spiritual and cultural beliefs and practices, tangible works, folklore, folk art, folk remedies, and information and techniques regarding the use and conservation of the surrounding biota (flora and fauna).[112] Recognizing

104. See *supra* notes 68–72, 103 and accompanying text for a discussion of the legal and cultural definitions of innovation.

105. See *supra* notes 80–85 and accompanying text for a discussion of non-Western concepts of innovation.

106. See *infra* Part III for a detailed discussion of traditional knowledge protection, including the protection of generational innovation. *See* RONALD V. BETTIG, COPYRIGHTING CULTURE: THE POLITICAL ECONOMY OF INTELLECTUAL PROPERTY 12–13 (1996) (discussing communitarian view of property and culture in Indian and Balinese traditions); Christopher S. Byrne, Chilkat Indian Tribe v. Johnson *and NAGPRA: Have We Finally Recognized Communal Property Rights in Cultural Objects?*, 8 J. ENVTL. L. & LITIG. 109, 110–11 (1993) (discussing communitarian view of property in Native American traditions).

107. BOLLIER, *supra* note 103, at 81 (describing arguments made by RAFI, Global Trade Watch, and others who support protection of what Bollier refers to as "cultural knowledge").

108. *Id.*

109. *Id.* (referring specifically to Western perceptions of indigenous innovations in agriculture and medicine).

110. See *infra* Part III for a discussion of traditional knowledge and the issues surrounding the scope of its protection as intellectual property.

111. In fact, the necessity for any clear definition is one of the issues still under debate before the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore ("IGC") of the World Intellectual Property Organization. *See* WIPO Intergovernmental Comm. Intell. Prop. and Genetic Res., Traditional Knowledge and Folklore [IGC], *The Protection of Traditional Cultural Expressions/Expressions of Folklore: Factual Extraction*, Annex 7–26, WIPO/GRTKF/IC/12/4(b) (Jan. 31, 2008) (detailing comments by members and observers on traditional cultural expressions of folklore and including suggested categories of inclusion).

112. *See generally* WIPO, *Intellectual Property Needs and Expectation of Traditional Knowledge Holders: WIPO Report on Fact-Finding Missions on Intellectual Property and Traditional Knowledge (1998–1999)*, at 25 (Apr. 2001) [hereinafter WIPO, *Fact-Finding*] (discussing items contained in broad

that separate treatment may be required for works that represent indigenous expression, such as folklore, folk art, and folk rituals, a subcategory of traditional knowledge has gradually developed over time using the term "traditional cultural expressions" ("TCEs").[113] The present division between traditional knowledge and TCEs is roughly equivalent to the division between patent-protected inventions and copyright-protected works under intellectual property regimes.[114]

No current multilateral treaty establishes a protection regime for traditional knowledge.[115] To the contrary, to the extent that international organizations

WIPO definition of traditional knowledge); MICHAEL F. BROWN, WHO OWNS NATIVE CULTURE? (2003) (discussing conflicts over native culture ranging from ethnobotany to use of images of sacred animals); CARLOS M. CORREA, TRADITIONAL KNOWLEDGE AND INTELLECTUAL PROPERTY: ISSUES AND OPTIONS SURROUNDING THE PROTECTION OF TRADITIONAL KNOWLEDGE, A DISCUSSION PAPER 3 (2001) (discussing traditional and indigenous knowledge as related to medicine and farming); Paul Kuruk, *Protecting Folklore Under Modern Intellectual Property Regimes: A Reappraisal of the Tensions Between Individual and Communal Rights in Africa and the United States*, 48 AM. U. L. REV. 769, 779 (1999) (noting folklore, including poetry and dance, is part of traditional knowledge); Doris Estelle Long, *Traditional Knowledge and the Fight for the Public Domain*, 5 J. MARSHALL REV. INTELL. PROP. L. 317, 318 (2006) (discussing potentially broad definition of "traditional knowledge" includes religious beliefs and practices, cultural practices, and folk art, lore, and remedies).

113. *See, e.g.*, WIPO IGC, *The Protection of Traditional Cultural Expressions/Expressions of Folklore: Overview of Policy Objectives and Core Principles*, 11, WIPO/GRTKF/IC/7/3 (Aug. 20, 2004) [hereinafter TCE 2004 *Core Principles*] (stating that terms "traditional cultural expressions" and "expressions of folklore" are used synonymously); Rosemary J. Coombe, *Protecting Cultural Industries to Promote Cultural Diversity: Dilemmas for International Policymaking Posed by the Recognition of Traditional Knowledge*, *in* INTERNATIONAL PUBLIC GOODS, *supra* note 63, at 599, 600 (noting WIPO use of "traditional cultural expressions" in conjunction with "expressions of folklore" in response to concerns of negative connotation of latter).

114. Traditional knowledge is often used synonymously with the concept of biodiversity to cover the practices and traditions involving agriculture, flora, fauna, and other biogenetic resources, as covered by the Convention on Biological Diversity. *See* Convention on Biological Diversity art. 8(j), *done* June 5, 1992, S. TREATY DOC. NO. 103-20 (1993), 1760 U.N.T.S. 79 (requiring member countries to "respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity"); Coombe, *supra* note 113, at 599–600 (noting term traditional knowledge may include biological fields). By contrast, the term "traditional cultural expressions" is often used synonymously with the concepts of folklore and other generational expressive endeavors. *See* TCE 2004 *Core Principles*, *supra* note 113, at 11 (noting use of term "traditional cultural expressions" synonymously with expressions of folklore). In a relatively recent development, some have begun to differentiate between "traditional cultural expressions" and "expressions of folklore" ("EOF"). Agnés Lucas-Schloetter suggests that narrower terms such as folklore may allow for more focused, and ultimately more successful, protection for various aspects of what she refers to as "traditional culture." Lucas-Schloetter, *supra* note 85, at 264. For purposes of this Article, I will use the term "traditional cultural expressions" to include folklore as well as other forms of expressive creativity. I will also use the term "traditional knowledge" to include TCEs unless specified to the contrary.

115. Article 8(j) of the Convention on Biological Diversity comes the closest to recognizing the need to protect traditional knowledge by requiring Contracting Parties "as far as possible and as appropriate" and "[s]ubject to [their] national legislation" to

> [r]espect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage

have considered the issue, they have often decried protection for traditional knowledge on the grounds that such protection would harm public access to information.[116] Part of the difficulty in crafting an acceptable protection regime for traditional knowledge is the definitional problems posed by such a concept. Since by its very nature most traditional knowledge does not readily fit within the contours of existing legal regimes for the protection of innovation,[117] either those legal regimes must be changed—a daunting task—or a sui generis system of protection must be created.[118] This system may borrow from intellectual property precepts.[119] But the special nature of traditional knowledge necessarily requires protection that is uniquely crafted to meet the special needs and challenges of traditional knowledge holders. While a complete analysis of the issues and challenges faced in crafting such a scheme is beyond the scope of this Article, among the critical issues that need to be resolved in creating an effective, rational traditional knowledge system useful in the effective valuation of generational innovation are the following:

> the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices.

Convention on Biological Diversity, *supra* note 114, art. 8(j). The Convention on Biological Diversity, however, does not establish any standards for such protection or answer any of the critical questions regarding the scope of protection to be afforded traditional knowledge. See *infra* notes 117–143 for a discussion of issues raised in establishing this scope of protection.

116. *See, e.g.*, Long, Curtailing Imperialism, *supra* note 75 (manuscript at 20–29) (describing conflict between protection of traditional knowledge and biodiversity); Long, *supra* note 112, at 319 (describing conflict between Draft A2K Treaty and protection of traditional knowledge); *accord* IAN F. FERGUSSON, CONG. RESEARCH SERV., THE WTO, INTELLECTUAL PROPERTY RIGHTS, AND THE ACCESS TO MEDICINES CONTROVERSY 1–2 (Nov. 5, 2003) (discussing conflict between intellectual property and access to essential medicines); Laurence R. Helfer, *Human Rights and Intellectual Property: Conflict or Coexistence?*, 5 MINN. INTELL. PROP. REV. 47, 47–49 (2003) (discussing two approaches to viewing intersection of intellectual property and human rights); Peter K. Yu, *Reconceptualizing Intellectual Property Interests in a Human Rights Framework*, 40 U.C. DAVIS L. REV. 1039, 1077 (2007) (noting conflicts between human rights of public access with rights of creators).

117. See *supra* Part II for a discussion of the traditional limits of intellectual property protection.

118. This does not mean, however, that such sui generis systems must necessarily be domestic law systems. To the contrary, while domestic systems serve as a useful testing ground for future international standards, unless traditional knowledge is granted the equivalent *international* protection for its innovative value as that granted to innovation under traditional intellectual property regimes, then generational innovation will remain undervalued. *See generally* Lucas-Schloetter, *supra* note 85 (discussing existing protections as well as need for additional protections of folklore).

119. For example, some of the precepts for the protection of TCEs in tangible form, such as the right to authorize public reproduction, distribution, or adaptation, might be based on copyright authorization principles. These principles, however, would have to be modified to take into consideration the special issues that arise from the use of protected TCEs, including the concern over deculturized modifications. *See, e.g.*, David Howes, *Cultural Appropriation and Resistance in the American Southwest: Decommodifying "Indianness," in* CROSS-CULTURAL CONSUMPTION: GLOBAL MARKETS, LOCAL REALITIES 138, 142–144 (David Howes ed., 1992) (examining adverse impact on Hopi culture and religion of inappropriate use of Kachina imagery in Marvel comic book); Doris Estelle Long, *The Impact of Foreign Investment on Indigenous Culture: An Intellectual Property Perspective*, 23 N.C. J. INT'L L. & COM. REG. 229, 243–46 (1998) (discussing problem of deculturizing uses of traditional knowledge).

1. What is the definition of the scope of practices, traditions, and works for which protection may be sought? Should protection be limited to tangible works (similar to the protection provided for copyrightable expression)? Or should intangible practices and beliefs be capable of some form of exclusive appropriation?[120] Should protected knowledge be limited to knowledge held by indigenous groups, or should it include all types of culturally attributable knowledge, including that held by immigrant groups within a country? Most groups that have examined the issue have focused on indigenous groups as the source of traditional knowledge,[121] yet culturally attributable knowledge is not necessarily limited to such groups.[122]

2. What rights should be granted to the holders of protected traditional knowledge? Should property-based rights be granted or should equitable compensation for the authorized use of such knowledge be sufficient?[123] The Tunis Model Law on Copyright for Developing Countries, one of the earliest international models for the protection of traditional knowledge,[124] suggested the use of a "domaine public" system requiring compensation for use of "works of national folklore."[125] Many countries that have adopted domestic laws

120. Establishing the scope of "traditional knowledge" can involve some complexity. S*ee, e.g.*, WIPO, *Fact-Finding*, *supra* note 112, at 25 (containing wide-ranging descriptions of traditional knowledge including spiritual beliefs); BROWN, *supra* note 112, at 2 (describing indigenous groups' claims to kangaroo as sacred animal).

121. *See, e.g.*, WIPO *Fact-Finding*, *supra* note 112, at 23 (noting that traditional knowledge includes but is not limited to knowledge held by indigenous peoples); BROWN, *supra* note 112, at 9–10 (noting protection efforts focus on indigenous cultures); Long, *supra* note 112, at 318 (defining traditional knowledge as broadly covering "knowledge and practices . . . handed down through generations," including spiritual and cultural beliefs and folklore).

122. *See, e.g.*, WIPO International Forum on "Intellectual Property and Traditional Knowledge: Our Identity, Our Future," Jan. 21–22, 2002, *The Protection of Traditional Knowledge, Including Expressions of Folklore*, ¶ 12, WIPO/IPTK/MCT/02/INF.4 (Nov. 2001) (describing indigenous knowledge as "subset of traditional knowledge"); Olufunmilayo B. Arewa, *TRIPS and Traditional Knowledge: Local Communities, Local Knowledge, and Global Intellectual Property Frameworks*, 10 MARQ. INTELL. PROP. L. REV. 155, 162–63 (2006) (describing lack of protection for "local knowledge," which includes indigenous knowledge).

123. See *supra* note 78–79 and accompanying text for a discussion of author's control and compensation for patented and copyrighted works. Many sui generis regimes that provide protection for the use of traditional knowledge relating to biodiversity concerns require that "equitable benefits" be provided to the relevant group. *See, e.g.*, Biodiversity Law, No. 7788, art. 63 (Republic of Costa Rica) (requiring "equitable distribution of benefits" for access to biogenetic resources); WIPO IGC, *Genetic Resources: Draft Intellectual Property Guidelines for Access and Equitable Benefit-Sharing*, ¶ 15, WIPO/GRTKF/IC/7/9 (July 30, 2004) (discussing inclusion of benefit-sharing provisions in international agreements); Secretariat of the Convention on Biological Diversity, *Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of Their Utilization*, ¶¶ 46–48 (2002) (discussing type, timing, and distribution of monetary and nonmonetary benefits).

124. The Tunis Model Law was adopted in 1976, and created with the joint assistance of WIPO and UNESCO. Lucas-Schloetter, *supra* note 85, at 340.

125. UNESCO & WIPO, *Tunis Model Law on Copyright for Developing Countries*, § 6 (1976) (describing protection of "works of national folklore") [hereinafter *Tunis Model Law*]; *see also id.* § 17 (requiring payment to appropriate authority based on percentage of receipts from use of work,

governing the use of traditional knowledge (as opposed to TCEs) have similarly imposed compensation obligations, often in the form of equitable benefit sharing for the commercial uses of indigenous knowledge.[126] By contrast, domestic laws have often subjected TCEs to property-type protection under domestic laws, including protection under domestic copyright laws.[127]

3. Who should be defined as the holder of protected traditional knowledge? Many indigenous groups consider traditional knowledge, including TCEs, to belong to the group as a collective whole.[128] Who speaks for the group when there is no organized governance structure to hold such rights? Many early suggestions for the treatment of traditional knowledge granted such rights to the government as a default authority.[129] Yet such authorities may lack both suitable knowledge of tribal practices to determine authorization issues and a sufficient desire to assure that compensation for authorized uses is provided to the holders of the knowledge.[130] Due to history, politics, or even tribal expulsion, members of an indigenous group may be divided to such an extent that they may inhabit different countries.[131] Thus, for example the Iroquois now occupy both the

including national folklore works). For a brief discussion of the history and effect of the Tunis Model Law, see Lucas-Schloetter, *supra* note 85, at 340–42.

126. *See generally* WIPO IGC, *Consolidated Survey of Intellectual Property Protection of Traditional Knowledge*, WIPO/GRTKF/IC/5/7 (Apr. 4, 2003) (detailing diverse protection regimes); Greg Young-Ing, Intellectual Property Rights, Legislated Protection, Sui Generis Models and Ethical Access in the Transformation of Indigenous Traditional Knowledge (Oct. 2006) (unpublished Ph.D thesis, University of British Columbia), *available at* http://eprints.rclis.org/archive/00009591 (detailing diverse domestic regimes which require sharing of equitable benefits).

127. *See, e.g.*, Lucas-Schloetter, *supra* note 85, at 266–340 (detailing diverse countries that protect folklore, including those that do so by granting copyright protection).

128. *See, e.g.*, Yumbulul v. Reserve Bank of Australia (1991) 21 I.P.R. 481, ¶ 4 (noting clan is traditional owner and manager of rights of Morning Star Pole); *see also* Matthias Leistner, *Traditional Knowledge*, *in* INDIGENOUS HERITAGE AND INTELLECTUAL PROPERTY, *supra* note 28, at 49, 57 (noting traditional knowledge is owned collectively); Long, *supra* note 112, at 324 (noting traditional knowledge belongs to group as whole); Silke von Lewinski, *Introduction* to INDIGENOUS HERITAGE AND INTELLECTUAL PROPERTY, *supra* note 28, at 1, 3 (noting concept of individual property is alien to indigenous peoples).

129. *See, e.g.*, *Tunis Model Law*, *supra* note 125, commentary to § 6 (providing economic and moral rights in "works of national folklore" shall be exercised "by the competent *national* authority empowered to represent the people that originated them" (emphasis added)); Lucas-Schloetter, *supra* note 85, at 288 (listing countries that grant authorizing authority for use of folklore to national copyright bureaus).

130. Among the critical issues that require the intimate knowledge that only members of the relevant group possess are considerations of sacredness and deculturizing uses. *See, e.g.*, BOLLIER, *supra* note 103, at 81–82 (discussing view of many communities that land and life are sacred and not to be individually owned); *see also* Angela R. Riley, "*Straight Stealing": Towards an Indigenous System of Cultural Property Protection*, 80 WASH. L. REV. 69, 90 (2005) (detailing critical role of indigenous peoples in crafting appropriate protection regimes for their traditional knowledge).

131. *See, e.g.*, UNESCO, *Literacy for Special Target Groups: Indigenous Peoples*, at 3, U.N. Doc. 2006/ED/EFA/MRT/PI/40 (Apr. 2005) (*prepared by* Ulrike Hanemann), *available at* http://unesdoc.unesco.org/images/0014/001460/146004e.pdf (noting existence of numerous indigenous groups across national boundaries).

United States and Canada.[132] Which group should have the right to authorize use of shared knowledge or receive compensation for its authorized use? What happens if there is a conflict between two previously associated groups? How should such a conflict be resolved?[133] Given the critical nature that traditional knowledge plays in the identity and even cultural survival of a particular indigenous group,[134] subjecting conflict resolutions to simple court actions seems in direct contrast to the sensitive cultural issues underlying any such conflict.

4. What rights should those who have left the tribe be allowed to exercise in connection with traditional knowledge? The diaspora may exist by choice, as with those who chose to leave the tribal group to emigrate elsewhere, or by expulsion, as when one has violated tribal laws and subsequently been denied the benefits of tribal membership.[135] Should the reason for removal impact the rights permitted to the diaspora? Article 27 of the Universal Declaration of Human Rights recognizes that "[e]veryone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits."[136] Whether this right represents a fundamental human right, and is therefore governed by such norms, remains unclear.[137] Even more difficult is the problem of the extent to which someone has a right to participate in one's culture *regardless of one's physical location on tribal lands*. The question of the relationship between traditional knowledge, human rights, and an individual's continuing right to use tradition-based practices and works when such individual becomes a member of the diaspora remains unsettled.[138]

132. The Iroquois Today, http://www.iroquoismuseum.org/iroquois.htm (last visited Feb. 27, 2009).

133. Such conflicts may even arise where tribes no longer have a single organized governing structure, or where the group in question has not yet authorized any particular organization to deal with requests to utilize traditional knowledge. *See, e.g.*, BROWN, *supra* note 112, at 119–25 (detailing difficulties that arose when conflicting organizations claimed exclusive rights to authorize ethnobotanical studies of Maya).

134. TCE 2004 *Core Principles*, *supra* note 113, at Annex II, 3. While the focus of this Article is the role of traditional knowledge protection as a method for valuing generational innovation, such protection also serves a valuable role in helping indigenous peoples to maintain their culture in the face of modernity. *See* BROWN, *supra* note 112, at 234–42 (discussing distinction between goals of providing wider intellectual property protection and protecting indigenous culture); Rosemary J. Coombe, *The Recognition of Indigenous Peoples' and Community Traditional Knowledge in International Law*, 14 ST. THOMAS L. REV. 275, 279 (2001) (stating that supporting and encouraging traditional knowledge leads to "revitalization of local languages" and greater biodiversity).

135. Thus, for example, in *Yumbulul v. Reserve Bank of Australia*, the creator of the Morning Star Pole at issue in that case was subjected to "considerable criticism" for violating tribal rules governing the commercial use of such poles. (1991) 21 I.P.R. 481, ¶ 21.

136. Universal Declaration of Human Rights, G.A. Res. 217A, art. 27(1), U.N. GAOR, 3d Sess., 1st plen. mtg., U.N. Doc. A/810 (Dec. 10, 1948).

137. *See, e.g.*, Helfer, *supra* note 116, at 49 (stating intellectual property protections under second clause of Declaration's Article 27 are fundamental); Yu, *supra* note 116, at 1071–73 (discussing conflicting views about and internal tensions of rights included in Article 27).

138. *See, e.g.*, Long, *supra* note 112, at 326 (raising several unanswered questions regarding relationship between various types of knowledge); *see also* Doris Estelle Long, Address at the Association for the Study of Law, Culture and Humanities 9th Annual Conference in Syracuse: Cultural Rights and the Diaspora: A Proposal (Mar. 17, 2006) (transcript on file with the author)

5. Given the diverse potential claimants to the "ownership"[139] of traditional knowledge, what processes should resolve disputes over authorization or compensation? While TRIPS requires enforcement of intellectual property rights through civil processes,[140] the cultural and spiritual issues raised by traditional knowledge disputes may require mediation or some process of conciliation to resolve them. Professor Danielle Conway-Jones has observed,

> Western property ownership confers three basic rights: to possess and enjoy, to alienate, and to destroy. Those rights assume private, individual ownership, and the result of such ownership notions is a view of land and personal property as subject to private, individual control. The Western property model does not accommodate the concept of a reciprocal relationship with the land or other property or a concept of communal ownership of goods and resources.[141]

The communal, spiritual nature of this relationship requires dispute resolution processes that honor this unique relationship. As opposed to traditional litigation-based processes for intellectual property rights,[142] we may need to integrate human-rights-based processes that more accurately reflect the nature of the rights at issue.[143]

(discussing whether individual who is no longer subject to minority or indigenous group's control is entitled to practice that group's cultural traditions).

139. *See* Long, *supra* note 112, at 324 (contrasting individualistic and group ownership). I use the term "ownership" advisedly. As Erica-Irene Daes recognized,

> [I]ndigenous peoples do not view their heritage in terms of property at all – that is, something which has an owner and is used for the purpose of extracting economic benefits – but in terms of community and individual responsibility. Possessing a song, story or other medicinal knowledge carries with it certain responsibilities to show respect to and maintain a reciprocal relationship with the human beings, animals, plants and places with which the song, story or medicine is connected. For indigenous peoples, heritage is a bundle of relationships, rather than a bundle of economic rights. . . . To sell it is necessarily to bring the relationship to an end.

U.N. Econ. & Soc. Council [ECOSOC], Sub-Comm'n on Prevention of Discrimination & Prot. of Minorities, Working Group on Indigenous Populations, *Discrimination Against Indigenous Peoples: Study on the Protection of the Cultural and Intellectual Property of Indigenous Peoples*, ¶ 26, U.N. Doc. E/CN.4/Sub.2/1993/28 (July 28, 1993) (*prepared by* Erica-Irene Daes) [hereinafter *Study Indigenous Cult. Intell. Prop.*].

140. *See* TRIPS, *supra* note 2, arts. 41–61 (detailing enforcement procedures).

141. Danielle Conway-Jones, *Safeguarding Hawaiian Traditional Knowledge and Cultural Heritage: Supporting the Right to Self-Determination and Preventing the Co-modification of Culture*, 48 HOW. L.J. 737, 746 n.19 (2005).

142. *See, e.g.*, TRIPS, *supra* note 2, arts. 41–61 (establishing minimum procedural protections for intellectual property, including availability of civil and criminal processes).

143. This human-rights-based process would necessarily include within it consideration of indigenous dispute resolution processes. *See, e.g.*, Riley, *supra* note 130, at 86–91 (noting problem with use of Western legal systems and encouraging use of tribal law instead). The use of such processes is supported by the human rights overlay for the protection of traditional knowledge. Article 27 of the Universal Declaration of Human Rights recognizes that "[e]veryone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits." Universal Declaration of Human Rights, *supra* note 136, art. 27(1); *see also* International Covenant on Civil and Political Rights, G.A. Res. 2200A (XXI), art. 27, U.N. Doc. A/6316 (Dec. 16, 1966), *available at* http://www2.ohchr.org/English/law/ccpr.htm (protecting right of religious and

There is no doubt that the issues surrounding the scope of protection to be granted traditional knowledge are daunting. But these issues are no more problematic than the question of the protection of "traditional" intellectual property in today's global digital environment. They are also no less significant, in light of the relationship between protection for traditional knowledge and economic valuation for generational innovation.

For those who question the economic value of generational innovation, consider the burgeoning market in counterfeit indigenous works,[144] or the role that biopiracy plays in pharmacochemical innovations.[145] Yet without a legal protection system, the generational innovation of indigenous cultures remains economically undervalued.

I do not mean to suggest that the protection of traditional knowledge is only about the extent of compensation owed to indigenous holders for the exploitation of their knowledge and works. To the contrary, there are significant portions of traditional knowledge, and particularly TCEs, where the holders of such cultural expressions are seeking protection against *any* form of exploitation. This excluded knowledge relates to sacred works.[146] Its protection bears no relationship to the encouragement or valuation of innovation, nor are the works covered by this excluded category created in response to the same impulses that

linguistic minorities to participate in their culture, practice their religion, and speak their language); International Covenant on Economic, Social and Cultural Rights, G.A. Res. 2200A (XXI), arts. 1, 15, U.N. Doc. A/6316 (Dec. 16, 1966), *available at* http://www.unhchr.ch/html/menu3/b/a_cesc r.htm (recognizing all people have right to self-determination, to take part in cultural life, and to enjoy benefits of scientific progress); Ninth International Conference of American States, *American Declaration of the Rights and Duties of Man*, art. 13 (May 1948), *available at* http://www.cidh.org/Basicos/English/Basic2.American%20Declaration.htm (recognizing every person has right to participate in cultural life and community). Without entering into the debate over whether this cultural participation right qualifies as a fundamental human right, *see* Helfer, *supra* note 116, at 57–61 (discussing different approaches to intersection of human rights and intellectual property rights); Yu, *supra* note 116, at 1075–78 (discussing relationship between human rights and intellectual property rights), the focus on self-determination, mediation, and collectivity that are at the heart of dispute resolution mechanisms for human rights violations appear better suited to meeting the twin goals of dispute resolution and respect for indigenous peoples at the heart of traditional knowledge protection, *see, e.g.*, Long, *supra* note 112, at 324–25 (discussing self-determination, self-management, and mediation as methods to protect traditional knowledge of indigenous peoples).

144. *See, e.g.*, Betsy J. Fowler, *Preventing Counterfeit Craft Designs*, *in* POOR PEOPLE'S KNOWLEDGE, *supra* note 20, at 113, 113–14 (noting global competition to provide low price products has caused increase in counterfeiting of artisan crafts); Riley, *supra* note 130, at 72–73 (noting theft of traditional knowledge and appropriation of culture have been more widely acknowledged in recent decades).

145. *See, e.g.*, BOLLIER, *supra* note 103, at 79–84 (discussing "bioprospecting" of developing countries by Western entities); VANDANA SHIVA, PROTECT OR PLUNDER?: UNDERSTANDING INTELLECTUAL PROPERTY RIGHTS 49–61 (2001) (defining and analyzing examples of biopiracy); Schuler, *supra* note 72, at 161–76 (providing examples of biopiracy).

146. *See, e.g.*, BROWN, *supra* note 112, at 11–16 (detailing conflicts arising from publishing photographs and details of sacred Hopi ceremonies); TERRI JANKE, OUR CULTURE, OUR FUTURE: REPORT ON AUSTRALIAN INDIGENOUS CULTURAL AND INTELLECTUAL PROPERTY RIGHTS 19 (1998) (describing various deculturizing uses of sacred works).

underlay much innovative activity.[147] In addition, there are other forms of traditional knowledge for which exploitation may be acceptable, but limitations may be placed on the types of uses in order to maintain the cultural integrity of the work. Thus, for example, third parties may create weavings using traditional patterns so long as the patterns are not changed in a manner that alters their cultural meaning.[148]

One of the positive developments in the years of international debate over traditional knowledge protection is that individual countries have begun to provide sui generis protection for domestic traditional knowledge. Countries such as New Zealand, Panama, and Peru, among others, have recognized that individual groups should define which aspects of their traditional knowledge require protection.[149] Some countries have actually established a registration system for traditional knowledge, in which group holders are requested to indicate the items, practices, and processes they are either willing to license for use or are *not* willing to license for any use at all.[150] This identification process is critical since it may provide the initial grounds of agreement on the terms under which others may use certain selected aspects of traditional knowledge. In effect, indigenous identification of willingly exploitable knowledge and works—the core of generational innovation—is a critical first step in crafting a regime that appropriately values local innovation.[151]

147. I have assumed that the creation of sacred works is largely encouraged through religious impulses that are not generally driven by economic valuation issues. That does not mean that the sale of sacred works might not form a potential local enterprise that could form part of a program for sustainable development. It simply means that noneconomic issues will control the creation and sale of such works.

148. *See, e.g.*, Fowler, *supra* note 144, at 117–18 (citing Australian case law that recognizes collective ownership by community and individual custodians within community who must act in best interests of community); Eric C. Kansa, Jason Schultz & Ahrash N. Bissell, *Protecting Traditional Knowledge and Expanding Access to Scientific Data: Juxtaposing Intellectual Property Agendas via a "Some Rights Reserved" Model*, 12 INT'L J. CULTURAL PROP. 285, 299–301 (2005) (discussing options for customizing licenses to accommodate cultural heritage). For example, the Maori have created three categories of authentication marks: one for those goods which are created by Maori artists; one for works created through Maori collaboration with third parties; and a third for those works created by non-Maori, but in a manner in keeping with Maori traditions. Toi Iho, http//www.toiiho.com/Default.aspx?tabid=249 (last visited Feb. 27, 2009).

149. *See, e.g.*, Trade Marks Act, 2002, pt. 2, § 17(1) (N.Z.) (prohibiting trademark registration which would likely offend "a significant portion of the community," including indigenous cultures); On the Special Intellectual Property Regime upon Collective Rights of Indigenous Communities, for the Protection of Their Cultural Identities and Traditional Knowledge, and Whereby Set Forth Other Provisions, No. 20, art. 1 (2000) (Pan.) (protecting traditional knowledge and culture of indigenous peoples); Law Introducing a Protection Regime for the Collective Knowledge of Indigenous Peoples Derived from Biological Resources, No. 27811, art. 1 (2002) (Peru) (recognizing right and power of indigenous peoples to define their collective knowledge).

150. No. 20, art. 1, 7–9; No. 27811, art. 20; *see also* Leistner, *supra* note 128, at 92–102 (discussing specific regulations established in Peru, Panama, Portugal, and Philippines).

151. *See, e.g.*, Riley, *supra* note 130, at 131 (suggesting groups begin self-identification process for protection under sui generis regimes). While this self-identification process is critical, registration requirements should serve a notification purpose. Lack of registration should not presumptively prohibit the protection of a practice or work of generational innovation.

Registration procedures admittedly present their own problems. One of the obvious difficulties is the honest concern that if indigenous groups register the practices, works, and knowledge that they do *not* want the public to use, those are precisely the items that end up being the first ones that third parties commercialize (with or without the indigenous holders' permission).[152] Furthermore, such registration procedures, while in accordance with the general practice of requiring registration for patents,[153] impose a burden on traditional cultural expressions (such as folk art) that copyright law *prohibits*.[154]

Despite these obvious limitations, at least a registration system, adequately funded and supported so as to avoid any undue burden on indigenous groups, should help begin the critical identification process. Whether traditional knowledge holders ultimately decide to register those works for which no third party use would be granted, such as in the case of sacred works, is less critical at this stage than that they begin the process of deciding what precise works and practices, if any, for which they would permit or absolutely deny exploitation rights. Such identification obviously must be undertaken in good faith[155] and can *only* be crafted by traditional knowledge holders or those they have designated to participate in the process. Understandably, some groups will refuse to participate in such a designation system, in part because such a system does not adequately reflect their beliefs or their concept of knowledge,[156] or because everything is a part of their heritage and culture and therefore deserves protection against third party uses.[157]

Participation in the process must be voluntary. The point is to *properly* value generational innovation for purposes of supporting its use as part of the effort to support sustainable development.[158] No intellectual property system *forces* a creator to protect his work.[159] Neither should a traditional knowledge

152. *See, e.g.*, BROWN, *supra* note 112, at 13–15 (detailing Hopi concerns about unauthorized publication of photographs of their sacred ceremonies).

153. Only inventions for which applications have been filed with the relevant domestic authority are protectable under patent regimes. *See* TRIPS, *supra* note 2, art. 29 (setting conditions for patent applications).

154. *See* Berne Convention, *supra* note 2, art. 5(2) (specifying that no formalities can be imposed on "enjoyment" and "exercise" of rights under copyright).

155. Long, *supra* note 112, at 327 (warning that if laws deem everything sacred or otherwise incapable of commercial use then workable system for traditional knowledge protection may not be possible).

156. *See Study Indigenous Cult. Intell. Prop.*, *supra* note 139, ¶ 26 (noting that indigenous peoples do not define heritage as property); BROWN, *supra* note 112, at 53–54 (describing lack of understanding of meanings of aboriginal art in Bulun Bulun case).

157. *See* Kaitlin Mara, *Indigenous Groups Express Concerns on IP Protection of Their Knowledge*, INTELLECTUAL PROPERTY WATCH, Mar. 3, 2008, http://www.ip-watch.org/weblog/2008/03/03/indigenous-groups-express-concerns-on-ip-protection-of-their-knowledge (detailing comments of Seneca Nation member that Western law should not protect knowledge because West does not have right to that knowledge).

158. *See, e.g.*, Tavana, *supra* note 28, at 19–20, 25 (recommending traditional knowledge and modern scientific knowledge be integrated to advance sustainable development). See *supra* notes 19–20 and accompanying text for a discussion of valuation, innovation, and substantial development.

159. In fact, the choice not to apply for protection effectively dedicates patented inventions and

regime. The issue is compensation for generational innovative and creative works that the holders of the knowledge themselves *want* to exploit. A voluntary system of protection most clearly meets these needs.

IV. THE IMPACT OF THE FAILURE TO VALUE GENERATIONAL INNOVATION

For those steeped in the history and philosophy of intellectual property regimes, the first reaction to the demand for protection of traditional knowledge (including works containing or reflecting TCEs) is often a rejection of any possible protection for generational innovation. Without the creation of something unique enough to be considered "valuable" under the present intellectual property system, no legal protection should exist. Yet despite Western precepts, there *is* value in the generational passage of knowledge and in the perfection of that knowledge by such controlled transmission; otherwise biopiracy and commodification of cultural intangible cultural heritage would not be such critical issues.[160] Others contend that no protection for generational innovation should occur because it would remove valuable information from the public domain.[161] Labeling protection a denial of access to information, however, simply continues a historic tradition of Western devaluation of generational innovation. This devaluation is not merely a reflection of Western values of individuated creativity.[162] It is a continuing exclusion from innovation protection regimes of previously excluded voices. At the time that intellectual property regimes were being developed and perfected in the West, the twin forces of colonialism and racism excluded the holders of traditional knowledge from such deliberations.[163] In a time when traditional legal regimes for innovation are changing in response to the new demands of technology and globalization,[164]

copyrighted works to the public. The clarity of the dedication of copyrighted works to the public was arguably greater under the 1909 Copyright Act in the United States, which limited copyright protection to works that had been federally registered. *See* Copyright Act of 1909, ch. 320, § 7, 35 Stat. 1075, 1077 (codified as amended at 17 U.S.C. § 102 (2006)) (excluding from protection works of public domain, works published before act took effect and not already copyrighted in the United States, and works published by United States government). Thus, the affirmative choice not to seek federal registration for a copyrighted work arguably demonstrated a clearer intent to dedicate the work to the public. Today, since no registration is required for copyright protection to attach, *see* 17 U.S.C. § 408(a) (indicating that obtaining registration of copyright claim is not condition of copyright protection), lack of such registration does not contain the same clear intent to forgo legal protection for the work in question.

160. See *supra* notes 62–65 and accompanying text for a discussion of the Western culture of innovation.

161. *See* Long, *supra* note 112, at 621 (suggesting protection of traditional knowledge may limit people's access to that knowledge).

162. See *supra* Part II for an analysis of Western precepts of innovation.

163. *See* Long, Curtailing Imperialism, *supra* note 75, at 20 (noting developed nations have set boundaries of public domain); Bellagio Declaration (1993), *reprinted in* DORIS ESTELLE LONG & ANTHONY D'AMATO, A COURSEBOOK IN INTERNATIONAL INTELLECTUAL PROPERTY 1025, 1026 (2000) (contending contemporary intellectual property law protects individual creators and excludes custodians of tribal culture, medicine, art, music, and valuable seeds).

164. *See, e.g.*, WIPO Copyright Treaty, *supra* note 44, arts. 11, 12 (requiring protection against unauthorized use of copyrighted works and digital rights management information).

there is no defensible reason for the continuing failure to protect previously excluded voices or their creative and innovative efforts.

One of the critical issues facing developing countries today is the need for transfer of technology from the developed countries. Article 7 of TRIPS expressly recognizes that

> [t]he protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations.[165]

Yet one of the results of TRIPS appears to be a continuation of an uneven playing field in connection with wealth or technology transfer. While the developed world continues to insist on the protection of its innovations—through the minimum required enforcement procedures established under TRIPS[166]—it provides no similar protection for generational innovation. Where the developed countries have "valuable" innovation (technology), the generational innovation of the developing world only qualifies as freely accessible works in the public domain. There is in fact a type of technology transfer occurring. But it is a technology transfer that flows in the wrong direction.

Even more problematically, the continuing refusal to value the generational innovation of developing countries in fact makes it nearly impossible for this unequal flow of technology to be reversed. If the technology (generational innovation) of the developing countries is free, then none of the wealth created from its exploitation is ever transferred to them in exchange for the valuable traditional knowledge their citizens may possess.

V. HONORING THE UNIQUENESS OF GENERATIONAL INNOVATION

In crafting a traditional knowledge regime that effectively protects generational innovation, there are three critical misconceptions that must be avoided. The first is the misguided notion that traditional knowledge is static.[167] Generational innovation is worthy of protection because of the value in preserving traditions and in transmitting those traditions across generations so that "collaboration" occurs across time. But it is not static. No tradition based on a living culture can be static because such traditions do not exist in a static environment. Culture has always changed in response to a variety of factors, including history, ecology, politics, and culture. Generational innovation, with its

165. TRIPS, *supra* note 2, art. 7.

166. *See id.* arts. 41–61 (establishing minimum procedural requirements for "effective" enforcement of intellectual property rights).

167. *See* U.N. Econ. Comm'n for Africa, *Why Industrial Revolution Missed Africa: A "Traditional Knowledge" Perspective*, 12, U.N. Doc. ECA/ESPD/WPS/O1/02 (2002) (*prepared by* Hilary Nwokeabia) (noting traditional knowledge is sometimes interpreted as being static).

anchor in cultural identifiability,[168] necessarily relies upon knowledge, works, and practices that may (and most likely will) change over time. Consequently, traditional knowledge protection should not reify tradition for the sake of reification. To the contrary, the benefit of a traditional knowledge regime is the grant to holders of the right to control and exploit those changes that they desire to exploit.

The second critical misconception is that authentication systems fulfill the needs of indigenous innovators for protection. While authentication undoubtedly plays a role in the commercial exploitation of some traditions,[169] the goal of generational innovation is not merely to assure that only identifiably *authentic* knowledge was used in the creation of the good or service in question. While authentication can serve a useful purpose, enhancing the value of brands used on truly unique goods,[170] such authentication limits do not adequately address the valuation goals of protecting generational innovation. Such innovation should not be protected simply because it is authenticated as having been based on the traditions of a particular tribe. It should be protected for the same reason that patented inventions are protected—because *as a whole* they represent valuable innovation.

Finally, when crafting a rational traditional knowledge regime designed to recognize the value of generational innovation, the unique nature of the holders of such knowledge must be acknowledged. If traditional knowledge is collective and cultural in nature, then the rights of the diaspora must be considered in crafting any such regime. Failure to do so will only lead to future, and potentially unnecessary, conflict.

CONCLUSION

Protection of "generational" innovation could provide a strong tool for wealth transfer, making developing nations active participants in their own sustainable development. Such generational innovation, however, remains undervalued since it falls outside the Western norms for protectable innovation represented by the imperfect measure of intellectual property regimes. This undervaluation has denied developing and least-developed countries a right of compensation for local innovation, contributing to the continuing imbalance in economic development. Worse, it has actually contributed to a *backwards* flow of technology transfer as developed countries use the generational innovation of their developing neighbors without compensation. Recognizing a broader

168. Only works attributable to a particular culture qualify for the heightened protection of a traditional knowledge regime. *See*, *e.g.*, Michael Hassemer, *Genetic Resources*, *in* INDIGENOUS HERITAGE AND INTELLECTUAL PROPERTY, *supra* note 28, at 151, 164 (noting that current legal protection applies in limited circumstances because much traditional knowledge lacks requisite novelty).

169. *See* SCAFIDI, *supra* note 55, at 63–66 (describing importance of authentication in different societies as means to identify source).

170. *See* Long, *Is Fame All There Is?*, *supra* note 27 (manuscript at 28–29) (noting global value of authentication marks on unique goods cannot be challenged).

definition of compensable innovation that covers non-Western innovative norms—including recognition of the economic value of intergenerational collaboration, collective "ownership," and the perfection of information through controlled transmission across generations—would allow generational innovators the ability to participate as equal partners in emerging knowledge-based industries. More significantly, establishing a rational system of protection for traditional knowledge that supports generational innovation, while honoring the unique relationship of traditional knowledge to its holders, would bring social justice back into the issue of innovation protection. As we remake innovation systems in response to the changes demanded by the global digital marketplace, rational protection for traditional knowledge must be a part of that change if we are to achieve equitable, sustainable values for innovative activity in the twenty-first century.