

Determining optimal levels of intellectual property protection in developing nations: is less really more? is more really less?

Dov Greenbaum

Center for Law and the Bioscience, Stanford Law School, Stanford University, Stanford 94305, USA

Current patent reform efforts are not limited to the West. As globalization marches forward and developing nations trend toward greater roles in the world economy, many developing nations are faced with many difficult decisions in the reformation of their own intellectual property laws. Most current research offers one of two diametrically opposed views and promote simplistic one-size-fits-all solutions. The reality is that there is no one optimal solution – each nation needs to customize their intellectual property regimes to their own particular needs and strengths. To this end, this article describes the general goals for developing countries that need to be taken into account when determining an optimal level of intellectual property rights and notes how either strong or weak levels of intellectual property protection will help a country accomplish those goals. Such goals include: the need to increase domestic science and innovation, the need to avoid trade sanctions; a need to protect domestic industry and local resources and commercialize domestic innovation; attract foreign investment, create a system that allows for access to affordable health care and protect indigenous biodiversity and traditional knowledge. Although limited in scope, this article raises a number of issues that need to be considered by developing nations and proposes that a document that gives developing nations the knowledge and the opportunity to optimize each element of their intellectual property regime is an optimal solution.

Keywords: Biodiversity and traditional knowledge, intellectual property, optimal solution, policy makers.

Introduction

THE patent system encourages economic growth and creates wealth when viewed from a global perspective. And, like the arguments used to justify protectionism in international trade, the arguments used [...] to justify exceptionalism are ultimately self-defeating. They may serve a narrow domestic interest for a period of time, but ultimately, each nation gains from full participation in the global system¹.

e-mail: dov.greenbaum@aya.yale.edu

The above remarks, by the Yale University President and renowned economist Richard Levin, highlight an important issue in the application of intellectual property rights (IPRs) to developing nations which have the potential for significant gains from a globally harmonized intellectual property (IP) regime and possibly even a robust IP regime.

Innovation occurs constantly in developing nations; it is just not captured as efficiently as it is in developed countries. The effects of this innovation will be multiplied to the extent that countries can capture the positive externalities of domestic innovation. As such, many developing countries are seeking to design laws that will expand the application of the already-existing innovation and allow inventors to reap economic rewards through licensing opportunities and other IP related channels.

Historically, scientific innovation has been an integral component in national development and growth²; post-war success stories in Asia and elsewhere are often touted as proof of concept³. Externalities from scientific innovation also extend beyond pure economic development: indigenous science and technology can help create solutions to specific problems that themselves impede innovation, such as health or agricultural issues. Moreover, basic research innovations often have consequences and ramifications beyond their specific and particular goals, becoming part of a feedback loop that fuels the engine of local innovation and productivity⁴.

In the developed world IP laws are seen as important components for incentivizing the science and innovation, providing financial security for firms interested in developing nascent technologies. Further, technological development and economic growth require industry-wide access to the relevant knowledgebase, patent law disclosure requirements are often instrumental in providing this access – or at least signaling new technologies on the horizon.

Notwithstanding arguments both for and against IPRs in developing nations, the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS), administered by the World Trade Organization (WTO), requires that countries create complex IP regimes before they nec-

essarily have the scientific and technological capacity to exploit them⁵.

Given that most developing countries are currently net importers of technology⁶, TRIPS would seemingly benefit principally developed nations – the typical holders of patent rights – at the expense of users in developing countries. And, importantly, not benefit local science and innovation. Some even argue that the poor populations in developing nations, with few resources and little capital, need access to illegitimate, infringing or unpatented products many of which are cheaper to import or engineer locally than the more expensive patented items and that strong IPRs will impede this access.

Even perpetual net importers may want to have relatively robust protection. For example, multinational companies – sources of foreign direct investment and knowledge – may be hesitant to invest or even export to countries that do not offer the minimal levels of protection necessary to make such actions feasible from a business standpoint; with many multinationals now looking to research institutions in developing nations as sources of new and cheap innovations, developing nations will most likely benefit from optimized levels of IPRs⁷. Without a firm belief in the protection of a particular market, large multinationals (responsible for at least one-third of the global transfer of exports) may even ignore the market entirely, opening it up to substandard copies: products and drugs that are rarely as good as the original, or even dangerous. These commodities rarely come with a warranty or technical support. Limiting a market in this fashion could lead to long-term economic harm, an inability to compete in the global market, a stagnation of the local economy and the potential for wasted resources on substandard products. Finally, without local protection, local inventors may themselves have little incentive to create and innovate, perversely incentivizing the most talented scientists and engineers to leave the country and ‘permanently relegate [the country to] the role of net importer of intellectual property’⁸.

Independent of the strength of the IPRs legislated by the developing nations, the nature and degree of their implementation is a non-trivial problem: developing nation policy-makers, and well-intentioned consultants for NGOs, have to carefully balance ‘the diverse, and at times conflicting, interests of all the stakeholders in the system, firmly based on evidence, and less on preconceptions of the value or otherwise of these rules to developing countries’⁹. Setting up IPRs is politically expensive if not often prohibitive: developing nations can expect to incur huge costs in setting up and implementing robust IP systems likely outweighing initial short-term gains. Policy makers are therefore understandably reluctant to promote stronger IPRs.

This article hopes to provide an introduction to some of those competing interests and hopefully begin to paint a good enough picture to justify the costs of implementa-

tion and to counteract the current literature that supports minimal levels. In the course of this discussion, while often referencing IPRs in general, this article will often look to patent laws as an example to provide, succinctly, both the pros and cons to the introduction of stronger IPRs and particularly their potential effects on developing nation science and innovation. While attempting to equitably show both sides of the argument, the article nonetheless falls in favour of generally stronger IP protections for developing nations. The institution of robust laws strengthening current and even sometimes entirely absent IP laws in developing nations will in the long run enhance and promote scientific and technological development, essential components of any growing developing national economy.

To this end, the article first gives a quick review of the underlying theories of IP laws and of the various types of IP laws including patent, copyright, trademark and trade secret. The next section will look to general goals for developing countries that need to be taken into account when determining an optimal level of IPRs. Such issues include: the need to increase domestic science and innovation, the need to avoid trade sanctions; a need to protect domestic industry and local resources and commercialize domestic innovation; attract foreign investment, create a system that allows for access to affordable health care and protect indigenous biodiversity and traditional knowledge (TK). The following two sections will contrast strong and weak levels of IPRs with regard to these issues. As many developing nations point to early weaker levels of IPRs in the United States, the next section will examine the historical accuracy and viability of such an argument. Finally, we conclude with an analysis of the tendency among NGOs to pigeonhole developing nations into IP regimes that may not optimally fit their needs. Concluding that what might be optimal is a document that gives developing nations the knowledge and the opportunity to optimize each element of their IP regime.

What is intellectual property

The WTO divides IPRs into three major groups: (i) copyright and related rights – the main purpose of their protection is to promote and reward creativity, (ii) industrial property which typically includes patents and trade secrets intended to incentivize and protect ‘innovation, design and the creation of technology’¹⁰ and (iii) trademarks and geographical indications – intended to promote fair competition, and to protect the consumer.

These rights are not affirmative rights, but rather rights to exclude others from some sort of activity: a right to limit others from exploiting their innovation without permission. It is important to recognize the territorial nature of many IP regimes: patent protection, for example is limited to those countries wherein the owner of the

patent has a valid patent. In countries where there is no patent on the invention, others are free to use that invention as they please. Copyright, while still often referred to as territorial in nature¹¹, is practically an international right given the national treatment clauses in copyright treaties, that requires treaty member nations to treat foreign national's copyrighted work no worse than they treat a national's copyrighted work¹².

There are four theories of IP, none of which stand on their own, yet together contribute to many of the judicial decisions both in the United States and in the European Union regarding IP: utilitarianism, labor theory, personality theory and social planning theory¹³. (1) Utilitarianism: the most popular in the United States, states that rights ought to be calibrated to provide the greatest amount of utility to the greatest number of people – an inherently consumer-oriented policy¹⁴. (2) The European view incorporating the Lockean concept of natural rights (i.e. the romantic author notion) for the creative fruits of one's labour – a producer-oriented policy¹⁵. (3) Kant and Hegel's views that property rights are an inherent component for the satisfaction of human needs¹⁶. (4) The theory that IPRs – 'can and should be shaped so as to help foster the achievement of a just and attractive culture'. This differs somewhat from the first theory in 'its willingness to deploy visions of a desirable society richer than the conceptions of "social welfare" '.

A quick review of the basic and most common forms of IP protection:

Copyright

Copyright refers to the monopoly granted to authors of expressive works, typically required to be fixed in some sort of medium, although not necessarily published. These works include music, audio recordings, plays, choreographed works, literature, movies, works of art, software and in some instances, databases. Current international treaties do not require that any registration actually be done to gain copyright – rather copyright is an opt-out system: Copyright is granted to any expressive work the instant it is recorded on or in some fixed medium. TRIPS requires that all signatories grant copyrights protection, although only to the creator's expression but not to 'ideas, procedures, methods of operation or mathematical concepts as such'¹⁹, i.e. the building blocks for future creativity that belong to the public domain²⁰.

Copyright provides the author or the current owner of the copyrighted work, the right to prevent others from copying, distributing, displaying or creating a derivative work. In some countries, additional rights relating to the author's moral rights to limit others' abilities to alter the work, even after that work is sold, are also granted. The copyright monopoly typically extends through the life of the author and an additional time period–designed

such that the author's succeeding generations can also benefit from the work²¹.

Patents

Patents provide protection for novel non-obvious inventions, granting the right to prevent others from making, using, offering for sale or importing a locally protected invention. The scope of patent law protection is often a point of contention between and even within countries; there are those who think that in addition to the prototypical engineering style invention, other inventions comprising scientific research tools, business methods, software, algorithms, genes, other biological material and even living organisms ought to be covered by patents, and there are those who disagree²². Some countries further limit the scope of patentability by allowing the patenting office the ability to reject patent applications on works that are considered immoral, e.g. a gambling invention²³.

In return for the benefits conferred by patents, patentees are expected to 'disclose the invention in a manner sufficiently clear and complete for the invention to be carried out by a person skilled in the art and may require the applicant to indicate the best mode for carrying out the invention known to the inventor'. This is the quid pro quo bargain of a patent: useful information for society in exchange for limited control of that information/invention.

Patents have gained additional importance in emerging knowledge economies: 'Patents are a cement to a more densely connected economy'²⁵. They protect startups innovative companies that have no other value outside of their innovations and technology, they create new markets for emerging innovations through licensing and they are becoming an increasingly important asset for raising capital from investors and venture capitalists²⁶. In implementing their patent acts, some countries require only that the inventor or owner of the patent simply register their invention with the patent office, other countries have long and complex examination systems designed to prevent inventions deemed to be either non-novel or non-useful from being patented.

Under TRIPS signatory countries have to grant patents a protection period of 20 years from the filing date for that patent²⁷.

Trademark

Trademark protection is somewhat inelegantly lumped in with other basic IPRs. According to TRIPS: 'The owner of a registered trademark shall have the exclusive right to prevent all third parties not having the owner's consent from using in the course of trade identical or similar signs for goods or services which are identical or similar to

those in respect of which the trademark is registered where such use would result in a likelihood of confusion'. Designed primarily to protect consumers from being misled as to the nature and origin of a good, and with a secondary purpose in promoting consistent quality in the manufacturing and service industries, trademarks provide the right to prevent others from using the mark in commerce²⁹. Trademark laws cover 'any sign, or any combination of signs, capable of distinguishing the goods or services of one undertaking from those of other undertakings, . . . in particular words including personal names, letters, numerals, figurative elements and combinations of colours as well as any combination of such signs, shall be eligible for registration as trademarks'³⁰.

Trademarks are typically granted to their owners either because the owner has registered their mark with the relevant office, or in some instances/jurisdictions, the owner of the mark has used the mark in commerce. Most trademarks are limited in their applicability to a defined territory, although some trademarks may be national or international in scope. And unlike patents or copyrights, trademarks are intrinsically tied to commerce.

Trade secrets

Trade secrets provide protection to any piece of information so long as care is taken to maintain secrecy of that information. 'Trade secret means information, including a formula, pattern, compilation, program, device, method, technique, or process, that: (i) derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use, and (ii) is the subject of efforts that are reasonable under the circumstances to maintain its secrecy'³¹.

TRIPS requires that trade secrets be protected: 'In the course of ensuring effective protection against unfair competition as provided in Article 10bis of the Paris Convention (1967), Members shall protect undisclosed information in accordance with paragraph 2 and data submitted to governments or governmental agencies in accordance with paragraph 3'³².

Other forms of protection for IP and similar works include contract, misappropriation, fair competition laws and self-help methods, all of which vary greatly depending on the jurisdiction.

General goals for developing countries

Whatever their level of development, countries should consider embarking on a knowledge- and innovation-based development process. In these times of accelerated globalization, 'grey matter' is a country's main durable resource. Its exploitation for economic and social well-

being is increasingly at the centre of development strategies. The central role of knowledge and innovation in economic growth is widely acknowledged in advanced countries ... However, this notion is less widely accepted among developing countries, and the elaboration of appropriate and efficient policies for knowledge-based development processes is particularly challenging in view of the more difficult political and economic environment in many of these countries³³.

The vast majority of countries seek to increase scientific innovation and progress for society as a whole, and particularly within that country's borders, of which IPRs are an integral component. In drafting IP legislation, every country must balance a variety of complex and potentially contradictory goals in working towards an optimal level of rights. This is particularly challenging and difficult for developing countries in an increasingly global economy where economics and politics require that they sign onto treaties and agreements often developed without their input or their best interests in mind.

Increase domestic science and innovation

Many countries see increasing their science footprint as an important component in their trek toward developed nation status³⁴. 'Central to (Africa's economic development) will be the role of science, technology and innovation, both as a driver of economic growth within the developing countries and as a core element in nurturing managerial and governance competencies'³⁵.

Much of the innovation occurring in developed countries focuses on problems particular to developed nations, providing little if any value to developing nations; an oft-used example is drug developments aimed primarily at the so-called diseases of affluence³⁶. It seems logical that developing nations would be interested in promoting local innovation to solve local problems. Still, the issue of how to promote that innovation through national IP laws remains a contentious debate: fundamental to this debate is the issue of whether IPRs over-incentivize innovation at the expense of the public domain; i.e. the sum total of publicly and/or freely available knowledge and innovation.

Also important is the realization that independent of the specifics of the particular IP regime, IPRs is far from the entire solution to inadequate innovation in developing countries. Policy makers have to consider greater overall economic, infrastructural and cultural hurdles to increased science and innovation³⁷.

Avoid trade sanctions

Many developing nations have limited negotiating power in their relationships with developed trading partners or within the international community as a whole³⁸. None-

theless, many developing nations become signatories to bilateral and international IP treaties in the hope of promoting further international trade, often without fully considering the full ramifications of these commitments. Trade is often seen as a key to growth and sustainable development. This leaves many developing nations unprepared or unwilling to live up to their IP obligations.

But, non-compliance can be accompanied by trade sanctions, both through the international community and also from the United States Trade Representative (USTR); a significant stick wielded by the staunchly pro IP United States. Membership on the USTR watch list of offending nations is a serious concern and often plays a principal role in the drive to reform IP laws³⁹. Placement on this list creates a perception of surveillance by the USTR, and portends future US bilateral trade sanctions⁴⁰. The USTR has gone so far to state that a country ‘can be found to deny adequate and effective IP protection even if it is in compliance with its obligations under the TRIPS Agreement’⁴¹, a standard that many feel to be unfair or immoral. Countries on the watch list also risk losing access to US foreign aid.

Protect domestic industry and local resources and commercialize domestic innovation

Independent of external pressures to reform IP laws, developing nations must also consider the needs of their own research institutions, industries, indigenous environmental resources and TK in creating an IP regime. Thus the IP regime needs to balance the protection of local flora and fauna, and TK and culture with regulations that attempt to balance out the inequalities between foreign multinational competitors and local industry. Note however that such goals need not only be accomplished through the implementation of a specific IP regime; fair competition and antitrust laws may all come into play here. Additionally, developing nations need not implement traditional IPRs to promote domestic industry, sui generis, para-IPR regimes and agency regulations may also promote innovation.

Attract foreign investment

Foreign investment is critical for the economic development of many developing nations. Additionally, foreign investment can bring in much needed technologies, know-how, and capital investments into the local economy. Often foreign investment hinges on the perceived risks and costs involved in the venture. Part of the risk calculation by foreign investors is a determination of the protection granted to proprietary technology and products of the inventing party.

To minimize risk and to attract further investment, many countries feel compelled to harmonize their IP laws with

those of its largest investors. Harmonization is non-trivial: it requires not only the rewriting of discordant laws, but often creating a competent regulatory system that can adequately monitor and police local infringement.

Access to affordable pharmaceuticals and health care

One common aim of developing countries is to improve access to medicines and medical technologies for their citizens. Many of the health problems that exist in developed countries, such as HIV/AIDS, cancer and diabetes, also exist in developing countries. In addition though, developing countries may have greater incidences of tropical diseases such as malaria and tuberculosis. While treating these diseases can be expensive in any part of the world, the marginal cost of treatment is particularly great in developing countries. This is true generally, but is also particularly true in the context of public health emergencies, in which case governments will want to have the tools necessary to quickly address the emergency before it spreads. It is thought that an IP system can either help by promoting local innovation, or impede by preventing the importation or local production of pirated generic drugs.

Protect traditional knowledge

TK encompasses an extremely broad spectrum of information and innovation. According to the World Intellectual Property Organization (WIPO), TK is⁴²:

‘the content or substance of knowledge resulting from intellectual activity in a traditional context, and includes the know-how, skills, innovations, practices and learning that form part of traditional knowledge systems, and knowledge embodying traditional lifestyles of indigenous and local communities, or contained in codified knowledge systems passed between generations. It is not limited to any specific technical field, and may include agricultural, environmental and medicinal knowledge, and knowledge associated with genetic resources.’

The treatment of TK – and particularly the potentially lucrative areas of traditional medicines – is an increasingly important subject in IP law as it relates to developing nations. Of particular concern are the historic and potential future relationship to modern medicine and pharmaceutical products, the uncertainty as to the ownership of TK and, the ease with which it can misappropriated by foreign nationals⁴⁴.

Many poor countries may have a potentially broad and valuable cache of TK; there are legitimate fears that robust IPRs may ‘lay open indigenous and community-

based innovation in private sector claims...claiming, using, and defending patents is easier for private industry than for public institutes and innovative communities⁴⁵. In addition to risking a shift of TK to private owners, a robust IP protection system could increase incentives for members of indigenous and local communities to exploit TK through alienation that may run contrary to indigenous norms and traditions.

Identifying the optimal level of IP protection for developing countries

Ultimately, the test of a patent system is whether it enhances social welfare – not only by encouraging invention and the dissemination of useful technical information, but also by providing incentives for investment in the commercialization of new technologies that promote economic growth, create jobs and advance other social goals, such as good public health⁴⁶.

There is significant and contentious debate as to whether developing nations will gain from implementing and enforcing an IPRs system similar in strength to those that exist in developed nations. Although there is no simple answer, common sense would dictate at least that there is no one-size-fits-all solution; every country should tailor its IPR to its own unique situation, goals and long-term needs. Designing IPRs that are either too strong or too weak will harm the country's well-being⁴⁷. Factors that need to be calibrated include: (i) the ease of obtaining IP protection – contrast a rubber stamp registration system with an exhaustive examination system; (ii) enforcement – contrast a dedicated IP judiciary with a system that accommodates piracy; (iii) breadth of property rights granted, and (iv) ease of challenging IPRs. Empirical studies on the issue have come to significantly diverse conclusions^{48,49}, offering support for both theories promoting relatively strong IPRs⁵⁰, and theories promoting weaker levels of protection^{51,52}. The optimal fine-tuning and mixing of factors will vary for each country, and will be different at different time points in each country's development, and possibly for different types of technologies. Each nation must factor in its goals, infrastructure, international relationships and industry to determine what ought to be their optimal level of protection⁵³.

It is the thesis of this article that the arguments both for and against strong IPRs in developing nations are non-trivial and cannot easily be simplified into a single statement. There are too many variables too simply contrast the two positions to provide a simple-minded conclusory distinction between the two camps. The next two sections will, attempt, nevertheless to distill these complicated disputes into a couple of paragraphs looking at many developing nations concerns. Note that each developing nations will prioritize these concerns differently depending on their particular situation.

Arguments in favour of consistently weak IPRs in developing nations

Risks common to all countries

Many scholars have voiced concerns in the recent patent reform debates in the United States and abroad that the current broad scope of patentability, relatively low bars to patentability, and ease in obtaining patents in many industrialized countries, including the United States, negatively impacts both the degree of innovation and the public's access to that innovation⁵⁴. To this end there have been efforts among developing nations in particular to back away from mimicking the US's seeming rampant commodification of everything.

Ironically, in contradistinction to the general feeling about strong patent laws, there is the belief, particularly among developing nations that strong copyright protections are good for developing nations many of whom benefit financially from the export of native music, literary works and art works. Exporting of copyrighted works is typically easier for a developing nation⁵⁵. Nonetheless, providing overly broad copyright protection, potentially including the protection of ideas in addition to expression, could prevent access to TK and other basic building blocks required for further scientific development and export.

In terms of patents, there are some concerns that without the ability to provide a proper patent office infrastructure to investigate each and every patent, patents are often easy to obtain allowing poor quality or non-novel patents to be issued in developing nations⁵⁶; such patents can limit access to important components of the scientific process and as such hamper innovation. Even when patent quality is high, the sheer quantity of patents can deter research and add-on innovation in that field because second-comers may fear unintentionally infringing on a patent. In this instance parties are granted monopoly power over patents and potential innovation that they do not even have a patent on. Scholars are also loathe to provide costly patent protection to technologies when monopoly power has been shown to be an unnecessary inducement of adequate innovation; as may arguably be the case in open-source software.

Pervasive patenting can also lead to expensive economic waste and a dearth of innovation: In some instances a company would rather pay to license a patent instead of challenging it or working around it. This has been shown to be true even in international arena where developing nations would rather pay to license rather than to infringe and then challenge the infringement claim through the WTO⁵⁷.

Additionally, extensive patenting in many industries can lead to a patent thicket, where one has to license from numerous overlapping patent owners in order to produce anything in the particular field – take an airplane and its

myriad parts and technologies as an example – leading to a situation where transaction costs become too burdensome to properly innovate or advance science.

Finally, some patent holders may rightfully refuse to license their technology or agree to a license only under onerous conditions. The increased ease in obtaining a patent or the strengthening of patent rights raises the likelihood that something like this could happen⁵⁸; this potential abuse of monopoly power could limit access to important research tools or procedures that are integral to scientific research.

Risks unique to developing countries

Many policy-makers, commentators and activists argue that the optimal level of IP protection in developing countries is lower than that of developed countries, in part because the risks and potential harms of a robust IPR system are greater for developing countries and they seem to have less to gain. The following is a short list of some of these risks.

Exacerbation of general risks: It is likely that developing nations will tend to grant a relatively greater number of low quality patents than more developed nations because developing countries typically lack the necessary administrative infrastructure to conduct either a thorough patent examination or a later judicial/administrative action. With foreign multinationals holding most of the patents in developing nations, one can imagine how the lack of infrastructure could lead those corporations to abuse the system, protecting (and limiting access to) works and inventions that might otherwise not merit protection. And, the greater the level of protection granted to a patented invention, the more harm can be caused in these situations.

Economic harms: Just the costs of implementing and maintaining a relatively robust patent system may be overwhelming for a developing nation. A patent examination system requires qualified patent examiners, administrative personnel and educated judges that can competently adjudicate patent cases⁵⁹, and opportunity costs as these funds could have gone towards more pressing and/or humanitarian needs⁶⁰. Additionally, strong patent laws will result in a greater commodification of ideas and other basic building blocks of science and innovation, increasing the costs associated with further and follow-on innovation and production. As more ideas and inventions become tied up in patents, held principally by wealthier foreign entities, barriers to entry for local firms will climb, limiting the degree of local competition and eventually creating the potential for monopoly or near monopoly pricing for many goods further exacerbating the current transfer of wealth from developing to developed

nations. Citizens are unlikely to receive the majority of at least the early commercial benefits resulting from the increased patent protections⁶¹.

Foreign direct investment (FDI) and access to products: Often proponents of strong patent laws will note that foreign corporations are more likely to invest in production and technology transfer where they know that their IP will be secure. But stronger patent laws are only a component of the bundle of inducements that developing nations often need to offer in order to attract investment⁶²; other issues – legal, cultural and economic⁶³ – need to be factored into most foreign direct investment decision, and may limit FDI independent of the whatever IP protection is provided⁶⁴. And, even if a product is brought to market in a developing country as a result of a foreign direct investment in local infrastructure, prices may still be prohibitive for many citizens⁶⁵.

Innovation: Patents are supposed to promote innovation. Unfortunately, many developing nations do not have the research capacity to take full advantage of strong patent laws, independent of the degree of incentives provided by a strong patent act. It might seem disingenuous to claim that stronger domestic protections will incentivize any substantial further innovation over and above the current level. Most of the markets for innovation are abroad in countries that often have stronger levels of patent protection. And, increased local incentives may just further research and development aimed at more profitable markets, not issues that concern the indigenous population.

Further, like even developed nations, there are concerns that increased incentives can change the scientific culture refocusing innovators on monopolizing markets that provide the greatest return, not those that provide greater social benefits to the local country. Providing greater protection to early innovation may end up impeding downstream or parallel innovations, stunting, not promoting development⁶⁶. Finally, a more robust patent protection system may actually inhibit the kind of innovation in which many developing countries excel: adaptive and imitative of technological developments⁶⁷.

Traditional knowledge: ‘Existing patent systems lay open indigenous and community-based innovation in private sector claims . . . claiming, using, and defending patents is easier for private industry than for public institutes and innovative communities’⁶⁸. By providing greater patent rights to those who exploit knowledge, developing nations are providing perverse incentives for both foreigners as well as indigenous and local communities to commodify and privatize national TK, often to the detriment of the nation and the potential scientific innovation that could result from the mining of such information.

Other effects on the basic science research process: Innovation, particularly in rapidly advancing industries, often requires access to basic research, typically conducted by government funded research institutions and universities. The increasing propensity of research scientists to patent their work has led to some concerns suggesting that a shift toward a culture of patenting will destroy the Mertonian ideals⁶⁹, introducing secrecy, limiting follow on innovations, and hindering access to basic research tools and reagents through protracted licensing negotiation practices adopted from industry⁷⁰. Overall, impairing the ability of researchers to conduct their work; thus hampering the local advancement of science and innovation.

Of particular concern is that of delays in publication owing to the need to patent discoveries first and the potential for the creation of an anticommons; a balkanization of ownership of important components of the scientific endeavour, particularly research tools, so severe as to make it impossible for any person to conduct research due to the number and nature of the transaction costs⁷¹.

Arguments in favour of providing a patent protection system that is comparable to patent protection systems in developed countries⁷²

New areas of knowledge, rendered explorable with the aid of new technologies . . . are opening up in areas such as the biological sciences. Many of these opportunities could be realized and problems solved with the advent of a favourable IP regime, which the international private sector depends on to recoup its investments in research and development⁷³.

‘No countries can be shown to have been harmed by the introduction of patent protection’⁷⁴.

Greater innovation

Inadequate IPRs can stifle technical change even at low levels of economic development. Most innovations in developing countries involve small adaptations of existing technologies. These investments benefit from local patent or utility model protection. For example, utility models have been shown to improve productivity in farm-implement markets in Brazil and the Philippines⁷⁵.

While developing nations vary greatly in terms of their ability to innovate and sustain scientific innovation and research institutions, one can assume that the progressively lowering of the barriers to entry, particularly in biotechnology and high technology will make it more likely that a greater number of developing nations will be involved in these industries⁷⁶. Many commentators argue that it has been empirically shown that higher levels of IPRs⁷⁷ correlate with greater innovation⁷⁸. While innova-

tion does occur at all levels and degrees of IP protection, at relatively low levels of IP protection, those commentators suggest (and note empirical evidence supporting the proposition), that innovation in these instances is usually sporadic and random⁷⁹. Economists further point to historical proofs, noting that when countries have abolished or weakened their patent regimes they have consistently met with negative economic results⁸⁰.

Economic growth through greater innovation

Many noted economists argue that advances in technology are integral to economic growth; some have suggested that up to one-half of the economic growth in the United States between 1909 and 1949 was a result of the injection of new technology into the industrial base⁸¹. In addition to its importance for economic growth, Edwin Mansfield further showed that this same technology has a significant social-welfare benefit⁸². And, to the extent that weak IP systems do not incentivize innovation by resourceful and/or creative individuals, the resulting inefficiency may be significant, impeding future economic growth⁸³.

Effects on trade

Weak IPRs are a strong barrier to trade with developing nations. Developed and even developing nations may wisely stay away from a country where their product can be easily and legally pirated. Such copies undercut profits, and manufacturing facilities that gain the expertise and know-how from pirating become safe havens to compete not only on a national front, but internationally as well⁸⁴. ‘The strength of national patent laws exerted a statistically significant and positive effect on bilateral imports in many product categories . . . weak patents in large developing economies are barriers to manufacturing exports from the OECD countries. The impacts were positive but weaker in the group of small developing countries, suggesting that net market-expansion effects largely operated in these nations as well’⁸⁵.

While Keith Maskus suggests that smaller developing nations without the infrastructure to even copy may not benefit from increased IPRs as incentives for local technological manufacturing by multinationals; Maskus’s inference needs to be qualified by the fact that a greater portion of valuable patented goods are becoming easier to fabricate, requiring less infrastructure, and making even developing nations with medium levels of infrastructure, places for manufacture.

It has also been suggested that effective enforcement of trademarks are integral to growth of local firms in developing nations; without protection trademarks are often abused and copied – disincentivizing local firms to grow and expand and hurting their reputation⁸⁶.

Economic growth through greater foreign direct investment⁸⁷

IPRs are associated with greater trade and FDI⁸⁸. Economists have shown that when trade and FDI increase, there is a correspondingly faster rate of economic growth⁸⁹. Not surprisingly, while difficult to measure precisely, evidence suggests that enforcement of strong IPRs will have a positive net impact on this growth⁹⁰. Developing nations might be able to attract more international trade, foreign direct investment and licenses for technologies⁹¹, through implementation of robust IPRs⁹². Further, several empirical studies have shown significant and potentially substantial long-term correlations between import volumes in developing countries and changes in IPRs⁹³.

Nevertheless, studies have thus far been unclear⁹⁴ as to the exact nature of the correlation between foreign direct investment and relatively high IP protection⁹⁵. Additional studies have shown, however, that FDI is negatively affected by weaker levels of IP protections^{96,97}. But, independent of the empirical results, there exists an independent qualitative component to the strengthening of IPRs; they signal and indicate to foreign investors that their private property rights will be safe and that their IPRs will be well enforced. Stronger IPRs also signal that the particular developing nation is more favourably inclined towards interacting with private business and is willing to reform its legislation to support those private businesses⁹⁸.

There are many key areas where a strong patent regime can increase FDI. Specifically, a stronger IP regime is helpful in attracting foreign investment in sectors and industries characterized by increased returns through patenting and decreased likelihood of copying, such as pharmaceuticals⁹⁹.

In addition, firms may be more willing to invest if they are in an environment that provides for an enforceable process patent. Such protections are important to foreign corporations that are investing in a nation that is 'sophisticated enough technologically that copying and imitation are possible'¹⁰⁰. Thus, in developing countries with significant scientific and technological ability, a robust patent protection system may also assist in the negotiation of cases in which a foreign firm is considering licensing technology to a domestic firm¹⁰¹.

Traditional knowledge

Many medicinal and herbal products used internationally can be traced back to local TK. TK is also an important input into pharmaceuticals, toiletries and pesticides. In essence, TK parallels technological advancement; in each case a group or country is privy to information and know-how that other, potential competitors do not have, and both fear that without protection of that knowledge, these competitors will misappropriate what is rightfully theirs¹⁰².

Thus, just as developed nations can use IPRs to protect their innovation and technology, 'intellectual property rights can be used as an effective tool to help stimulate the economic development of least developed countries (LDCs), if properly tailored to the particular needs of such poor countries', such as protecting TK¹⁰³.

IPRs in the context of other factors necessary for innovation

Given the lack of reliable empirical data, predictions about the likely economic effects of the patent provisions tend to vary with the general outlook of the investigators. On balance, it seems fair to say that, at least from the medium- and long-term perspective, the economic effects of the patent provisions depend largely on the levels of development of countries and sectors concerned, the speed, nature and cost of innovation, as well as on the measures developing countries may take in adopting the new framework¹⁰⁴.

While it is nearly universally accepted that TRIPS will primarily benefit developed nations in the short term¹⁰⁵, there are many scholars who believe that developing nations will acquire significant near-to-long-term benefits from enhancing their IP regimes. Importantly, though, stronger IPRs must coincide with broad developmental modernizations¹⁰⁶, open trade policies and market liberalization to achieve any significant growth¹⁰⁷.

And, as Keith Maskus notes, a country's ability to benefit from TRIPS, particularly in the nearer terms, depends on its state of development within the continuum of developing to developed nations. Specifically, he argues that while large industrialized countries are in a position to gain rather immediately from strong IPRs and the least developed countries are somewhat distant from such a position, nations such as those defined by the World Bank and middle income developing nations fall somewhere in between¹⁰⁸ are also likely to gain in the middle to long run from increasing IPRs¹⁰⁹. For example, robust IPRs rights might increase access to technologies from developed nations, an important component in spurring innovation for development¹¹⁰.

Some other principal economic factors that are important for innovation are also correlated with higher levels of IPRs: typically, countries that have a high level of research and development relative to their GDP tend to have higher levels of IPR. Countries with high innovative capabilities and countries that are more open to trade also tend to have higher levels of IPR¹¹¹.

Effect of IP on basic science research

With the patenting of university innovations comes the potential to then license out those patents to both local and multinational firms, providing more funding for basic

science research. As opposed to many industrialized nations that have large government programmes to support their research endeavours, developing nations often cannot afford to funnel scarce government resources into research. As such many universities might seek out industry funding; this funding is much more likely to happen if research institutions can provide some degree of protection – through IPRs – for the resulting innovations. Without the ability to support basic science research institutions developing nations are likely to continue to see a brain drain to developed nations.

There has not been a lack of effort to prove the existence of an anticommons or the degradation of Mertonian ideals; nonetheless much of the data suggests that science does not seem to be affected by the existence of IP in the realm of basic science research. In fact, some data has shown that those scientists who patent more, i.e. who are immersed in the patent culture will actually tend to publish more than the average scientist in their field¹¹².

Historical comparisons

I have noted arguments that a weaker patent system is advantageous for innovation in developing countries, particularly those that rely on copying of foreign technologies in their innovative process. Some studies point to the success of now-developed countries like Switzerland and the United States, which allowed for some level of free copying of IP in their early and developing years¹¹³. It would seem then that countries have benefited from less robust patent systems during periods of development and then more robust patent systems after becoming industrialized¹¹⁴. Is it fair then to hold current developing nations to a higher standard¹¹⁵?

In particular, countries and organizations will often point to the United States' earlier experiences with weak IPRs shortly after its founding as a justification for current weak IPRs¹¹⁶. Scholars like Doron Ben Atar point to particular historical events to show the pro-pirate nature of the United States: e.g. the granting of 100 pounds by the Pennsylvania Legislature to John Hague for bringing patented British cotton technology to the US illegally¹¹⁷. Others quote Jefferson to support the historical idea of an anti-patent, pro pirate United States:

'It would be curious then, if an idea, the fugitive fermentation of an individual brain, could, of natural right, be claimed in exclusive and stable property. If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea Inventions then cannot in nature, be a subject of property'¹¹⁸.

Recent scholarship by Justin Hughes however suggests that the United States had actually been strongly pro IPR

from the outset¹¹⁹. And, as Hughes notes, not only were Thomas Jefferson's views on IP more nuanced than those quotes make them out to be, Jefferson was not an actual framer of the United States Constitution¹²⁰; his thoughts while arguably persuasive, matter less than those framers who supported stronger IPRs – rights that were included within the actual Constitution: 'To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries'¹²¹.

The Continental Congress, the precursor to the modern United States government, even appointed a committee in 1783 'to consider the most proper means of cherishing genius and useful arts . . . by securing to the authors or publishers of new books their property in such works'¹²². During this period, scholars such as Thomas Paine advocated that 'the works of an author are his legal property (and that the United States would require) sufficient laws . . . to prevent depredation on literary property'¹²³. Others such as Samuel Stanhope Smith (Princeton), advocated that inventors and authors 'have a right to the property of their productions; and it encourages invention and improvement to secure it to them by certain laws, as has been practiced in European countries with advantage'¹²⁴. This pro-protection view was not only held by the Federal Government; the individual states' legislation as well reflected these views noting, for example, that: 'no property [is] more peculiarly a man's own than that which is produced by the labour of his mind'¹²⁵.

Even Jefferson, later as President openly agreed that: 'ingenuity should receive liberal encouragement' and described the 'utility that society derives from an invention . . . Certainly an inventor ought to be allowed a right to the benefit of his invention for a certain time Nobody wishes more than I do that ingenuity should receive a liberal encouragement'¹²⁶.

Further, in those instances where the United States 'illegally' captured British and other continental technology, there is a distinction between the actions of the United States and that of current instances of government supported piracy. IP by its nature is territorial. A country cannot enforce its patent or copyright on another country. Something patented in the United Kingdom, if not patented in the United States can legally be copied and exploited in the US. The United States, independent of what detractors may say, has always supported national patent laws: Inventors are the *only* professionals to be enshrined in the Constitution with their own protections. A patent act was brought to the floor of the First Congress¹²⁷. And, against the wishes of Secretary of the Treasury, Alexander Hamilton, the Senate's bill required that a patent be granted only for inventions that were internationally novel – thus expressly not allowing for patents on pirated European technology; pioneering 'a new standard of Intellectual Property that set the highest possible standards for patent protection, of worldwide originality and novelty'¹²⁸.

Nevertheless, Ben-Aton notes that while the United States may have seemed above board on IPRs, it was in effect a regime that promoted piracy. In particular he points to the fact that the United States limited the availability of patents for foreign nationals.

What Ben-Aton does not reveal is that this was typical in IP regimes of the time¹²⁹; ‘Every major European state engaged in technology piracy and industrial espionage in the 18th century. The United States could not afford to behave differently’¹³⁰. Most countries refused to extend unilateral protection to foreign nationals as they could not count on the same deference given to their nationals.

And this discrimination even continues to some degree to this day. The Paris Convention for the Protection of Industrial Property (March 1883), itself motivated by the need to create a system where patent reciprocity was extended to other nations, established a national treatment clause, which still does not require that equal treatment regarding patent laws be given to nationals of countries whose parent countries have not signed onto the treaty¹³¹. The European Union protects databases owned by nationals of the European Union, but will not extend the same degree of protection (if any) to nationals of countries outside of the EU¹³². Under the Berne Copyright Convention, countries can discriminate against non-member nationals even when they have copyrighted their work in a member nation¹³³.

Thus, while a simple minded analysis of the actions of the United States may seem to justify current low levels of IPRs in developing nations, those interested in using this argument need to understand that (i) times were different and US policy was in line with international policies, and that (ii) the US was much more pro-IP than it is given credit and much of the documented anti-patent rhetoric focused on Jeffersonian philosophy that was not reflected in the Constitution.

Recommending an optimal level of IP protection

Given the lack of any consistent conclusive results in the empirical literature and the wide variety of recommendations that exist in the literature, it is nearly impossible at this stage to provide general recommendations for even a subset of developing nations. One of the potential pitfalls in providing any future recommendations in a more general fashion lies in the lack of any optimal characterization schemes for dividing developing nations.

Interestingly, the terms developing and developed nations within the WTO are self applied, that is: ‘Members announce for themselves whether they are “developed” or “developing” countries’¹³⁴. And in fact there may be particular incentives for a country to announce themselves as one or the other, independent of their perceived status.

Potential schemas include the World Bank’s differentiation into low, lower middle, upper middle and highly developed nations based mostly on economic indicators.

Other schemas include the distinction of newly industrialized nations, currently typically referencing those countries from the former Soviet Union (as distinct from first generation NIC that tended to be the so-called Asian Tigers), but more generally, countries whose economies have not yet reached a ‘developed’ status but nevertheless are doing better than other developing nations; distinctions based on the UN Human Development Index; or distinctions based on the colonial heritage of the developing nation.

A potential path for future development may be the creation of a well-thought out schema for dividing developing nations that would create usable distinctions vis-à-vis IP based on numerous factors and metrics such as current and projected levels of innovation.

Alternatively there may not be anything approximating a real and relevant characterization system; it may be more informative and helpful to create a comprehensive document that explains and examines the pertinent subject matter for each and every major IPRs issue; instead of suggesting a level of IP protection based on where the country falls along some developing nation spectrum, each country can make educated and independent decisions for each IP issue, and set of national needs that comes before it – creating its own unique and potentially optimal IPRs regime made up of optimally fitting components of an IP system.

Conclusions

Currently many developing nations are typically served by (sometimes rabid) anti-IP protection public interest groups; such groups may seem on the surface to be much better partners in developing IP laws than other pro-patent organizations that may have stronger ties to multinational corporations. It may be the case that developing nations will lean toward the rhetoric of their seemingly natural allies in determining an optimal IP regime. And often these groups will suggest the best policies for a particular developing nation. Nonetheless, there may be other developing nations for which a different track is better for their particular infrastructure and innovation and development goals, but unfortunately, given their limited resources, that nation is unable to access the literature and scholarship to make an accurate assessment of their options; such a nation may find it easier to default to the mostly anti-IPR groups. A comprehensive document may provide an equally easy alternative.

One potential problem with such a system is that it bucks the current trend toward global harmonization of IP protections; harmonization is a key component of both US and EU patent policies. Both global and regional harmonization efforts would be impeded by such a system.

Further, there are concerns that this document would be abused by local and foreign special interest groups. A

document that provides resources and analysis of IP issues could be used to justify positions contrary to the general public's best interest. Without concrete suggestions provided by often expensive outside consultants, countries may find themselves being pulled in one direction or another by special interest groups.

Another concern lies in the possibility that a developing nation may overestimate or underestimate its infrastructure, level of innovation and potential. In these instances, and without outside consultation that is capable of providing an unbiased view of the current and future innovation within the developing nation, such a nation may use the document to implement policies that are just wrong for them. Often, countries will produce long-term and short-term plans that may have a large propaganda aspect to them; basing IP policies on the ideas and understanding professed in these documents may be misguided, and produce results that might not be in the best interest of a developing nation.

Finally, by providing a document that can justify many potential positions in the development of an IPRs regime, we run the risk of some politicians focusing on short-term rather than long-term issues. Given the nature of the political cycle, it may be difficult for a politician to sell a policy that may be difficult in the short-term but may payout in the long-term; if justifications can be provided for either position, it may be very enticing for a politician to go with a choice that provides short-term benefits at the expense of the long-term benefits. Thus, a politician may create extra strong IPRs to get-off of the 301 watch list, although those IPRs may end up impeding innovation in the future. Alternatively, a politician may suggest very lax IPR to allow for cheap access to medications in the short term.

Note

The Branco Weiss Fellowship in particular was instrumental in giving me the financial and intellectual freedom to pursue my academic goals at my own pace. Without the fellowship I could not have taken the time to pursue this research, visit developing nations and interact with world renowned academics in this field. I am forever grateful and truly indebted to the fellowship for allowing me to research this subject and to complete other related academic goals.

1. Levin, R. C., Yale University and India: Patents in global perspective, Sir Purshotamdas Thakurdas Memorial Lecture, Indian Institute of Banking and Finance, Mumbai, India, 7 January 2005.
2. 'Effective policies and strategies for building Science, Technology and Innovation (STI) capacity in developing countries are vital for poverty alleviation, balanced socio-economic growth and equitable integration into the global knowledge-based economy. [...] cannot be achieved without knowledge and innovation. A country cannot compete in the globalized economy without the

acquisition, development and application of science and technology.' Statement by his Excellency Ambassador Munir Akram, Permanent Representative of Pakistan to The United Nations and Chairman of the Group of 77, at the Global Forum on Building Science, Technology and Innovation Capacity for Sustainable Growth and Poverty Reduction, World Bank, Washington DC, 13 February 2007; 'We commend the emerging role of the developing countries in striving towards a strengthened international intellectual property system that would meet the needs of developing countries, as well as the recognition of the need to rectify present imbalances in the international IP system. . . . we request member countries to continue to work towards reflecting the interests and priorities of the developing countries, especially on bio-piracy, theft of genetic resources and traditional knowledge'. Final Communiqué adopted by the 34th Meeting of Chairmen/Coordinators of the Chapters of the Group of 77 Geneva, 26–27 June 2003.

3. Wade, R., Review: East Asia's economic success: conflicting perspectives, partial insights, shaky evidence. *World Politics*, January 1992, **44**, 270–320; Holzer, B., Miracles with a system: the economic rise of East Asia and the role of sociocultural patterns. *Int. Soc.*, 2000, **15**, 455.
4. See, e.g. Dickson, D., Turning the brain drain from a threat to opportunity, SciDev.net, 5 November 2007 (discussing how a recurring brain drain may induce developing nations to limit their investment in science education and noting that developing countries need to provide their scientists with the proper incentives to continue their research in developing nations).
5. Nearly 140 countries are members of the World Trade Organization which requires that their members be signatories to the TRIPS.
6. Commission on Intellectual Property Rights, Integrating Intellectual Property Rights and Development Policy, 2002.
7. White Paper: Intellectual Property: Universities, Corporations and Finding a Common Ground, the American Society for Engineering Education, 13 February 2006; Available at www.asee.org/activities/organizations/councils/edc/2006-IP-White-Paper/IPWhitePaper-WEB.doc
8. Zavin, J. and Martin, S. M., The Value of Intellectual Property Rights Enforcement in Developing Countries, Economic Perspectives, 1997. But see the presentation made by John Barton for the Keynote at the OECD-DRC-SIPO High-level Workshop on IPR in Beijing, China, 20–21 April 2004 stating that in some of the poorest developing nations the 'absence of scientific community to encourage, the fairness of allocation of cost of research and a history of development through imitation' may make IPRs in those countries somewhat less useful.
9. Yu, P. K., The trust and distrust of intellectual property rights, MSU Legal Studies Research Paper No. 02-04; <http://ssrn.com/abstract=578563>
10. World Trade Organization website.
11. Patry, W., Choice of law and international copyright. *Am. J. Comp. L.*, 2000, **48**, 383.
12. E.g. National treatment under the Berne Convention: International Union for the Protection of Literary and Artistic Works.
13. Fisher, W., Theories of intellectual property. In *New Essays in the Legal and Political Theory of Property* (ed. Munzer, S.), Cambridge University Press, 2001; <http://www.law.harvard.edu/AcademicAffairs/coursepages/tfisher/iptheory.html>. William Fisher Theories of Intellectual Property (Providing an extensive discussion of each of these theories).
14. See e.g. Landes, W. and Posner, R., An economic analysis of copyright law. *J. Legal Stud.*, 1989, **18**, 325.
15. See e.g. Nozick, R., *Anarchy, State, and Utopia*, New York, Basic Books, 1974, pp. 178–182; discussing patent law in particular.

16. See e.g. Hughes, J., The philosophy of intellectual property. *Georgetown Law J.*, 1988, 77, 287, at 230–350. This view, which incorporates the concept of moral rights for authors of works is also of a more European slant although recently it has been creeping more into American doctrine. See e.g. Cotter, T. F., *Pragmatism, Economics and the Droit Moral* 76 N.C.L. Rev. 1 1997 at 96.
17. Fisher *Supra* note.
18. Id.
19. Agreement on Trade-related Aspects on Intellectual Property Rights (TRIPS) §9.
20. TRIPS §9.2.
21. While TRIPS requires only 50 years after the death of the author, both the EU and the US confer copyrights for 70 years after the death of the author.
22. TRIPS §27.3: 'Members may also exclude from patentability: (a) diagnostic, therapeutic and surgical methods for the treatment of humans or animals; (b) plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes. However, Members shall provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any combination thereof'.
23. TRIPS §27.2: 'Members may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect *ordre public* or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the environment, provided that such exclusion is not made merely because the exploitation is prohibited by their law'.
24. TRIPS §29.1.
25. Patents in the Knowledge Economy: A European Perspective Dominique Guellec Chief economist, European Patent Office. World Bank Conference, Paris, 20 June 2005.
26. Id.
27. WTO and the TRIPS Agreement available at http://www.who.int/medicines/areas/policy/wto_trips/en/index.html
28. TRIPS art. 16.
29. TRIPS §16.1.
30. TRIPS §15.1.
31. Unif. Trade Secrets Act 1(4), 14 ULA, 438, 1985.
32. TRIPS art 39.
33. World Bank, Book Overview: Building Knowledge Economies: Advanced Strategies for Development available at <http://web.worldbank.org/WBSITE/EXTERNAL/WBI/WBIPROGRAMS/KFDLP/0,,contentMDK:21437029~menuPK:1727232~pagePK:64156158~piPK:64152884~theSitePK:461198,00.html>
34. 'There is widespread awareness of rapid scientific advancement and the availability of scientific and technical knowledge world-wide. . . The growth in knowledge is also making it possible to find low-cost, high-technology solutions to persistent problems.' Calestous, J., The New Culture of Innovation: Africa in the Age of Technological Opportunities. African Union, 8th Summit, Addis Ababa, Ethiopia. Conference Paper, Cambridge, Mass.: Science, Technology, and Globalization Project, Belfer Center for Science and International Affairs, January 2007.
35. http://bscia.ksg.harvard.edu/publication.cfm?program=STPP&ctype=book&item_id=456&gma=27
36. WHO report on Chronic Disease and Health Promotion, 2005; available at <http://www.who.int/chp/en/>. (Noting however that many of these diseases of affluence, e.g. hypertension, diabetes, cardiovascular disease and cancer, are also becoming pervasive in developing nations.)
37. See Kuan, E. N. S., *The Impact of the International Patent System on Developing Countries*, presented at the Assemblies of the Member States of WIPO Thirty-Ninth Series of Meetings, Geneva, 22 September to 1 October 2003 ('The links between intellectual property rights, innovation, foreign direct investments (FDI) and long-term economic growth are poorly understood, and remain controversial').
38. Personal communications with relevant parties consistently note how whereas developed nations send teams of highly trained lawyers to international treaty negotiations, many developing countries often have a hard time sending enough people to even attend all the negotiations.
39. Nijar, K. and Page, C., America's Use of Section 301 in Influencing International Intellectual Property Rights, available at kent.ac.uk
40. Available at <http://www.usinfo.state.gov>
41. 2005 Special 301 Report.
42. WIPO Draft Provisions on Traditional Knowledge, WIPO Secretariat, Draft Technical Study on Disclosure Requirements Related to Genetic Resources and Traditional Knowledge (2 May 2003), at 26 available at http://www.wipo.int/documents/en/meetings/2003/igc/pdf/grtkf_ic_5_10.pdf
43. The World Health Organization defines traditional medicine as 'the sum total of knowledge, skills and practices on holistic health care, which is recognized and accepted by the community for its role in the maintenance of health and the treatment of diseases'. WHO, WHO/WPRO Traditional Medicine Overview, <http://www.wpro.who.int/sites/trm/overview.htm>
44. Twenty-five percent of modern medicines are made from plants first used traditionally. World Health Organization, *Traditional Medicine Fact Sheet*, No. 134, May 2003; <http://www.who.int/mediacentre/factsheets/fs134/en/>. See also Mengistie, G., *The Impact of the International Patent System on Developing Countries*, Presented at the Assemblies of the Member States of WIPO Thirty-Ninth Series of Meetings, Geneva, 22 September to 1 October 2003; <http://www.wipo.int/patentscope/en/developments/economic.html> at 28 (noting that there are estimates that 74% of drugs discovered from plants have been derived from TK; a global market of US\$ 43 billion in 1995).
45. United Nations Development Programme, *Human Development Report 2001: Making New Technologies Work for Human Development*, Oxford University Press, 2001, at 9 (hereinafter UNDP 2001); <http://hdr.undp.org/reports/global/2001/en/>
46. Press release of the United States National Academies of Science, citing Mark B. Myers, co-chair of the National Academies' National Research Council; <http://www4.nationalacademies.org/news.nsf/isbn/0309089107?OpenDocument>
47. How the Inventive Step in Patents Can Maximize Innovation – UK Patent Office, ag-IP-news, 2 April 2006; available at http://www.ag-ip-news.com/getArticle.asp?Art_ID=2632&lang=en
48. See Kamal Saggi, Trade, Foreign Direct Investment and Technology Transfer, World Bank Policy Research Paper, 2349; http://www-wds.worldbank.org/servlet/WDSContentServer?WDSBIB/2000/06/17/000094946_00061706080972/Rendered/PDF/multi_page.pdf
49. See, e.g. Smarzynska, B., Javorcik Report on Foreign Direct Investment, Technology Transfer, and Protection of Intellectual Property Rights at The World Bank; http://www.wipo.org/documents/en/meetings/2003/wipo_wto/presentations/ppt/smarzynka.ppt; See also Braga, Carlos. Fink, Carsten, How Stronger Protection of Intellectual Property Rights Affect International Trade Flows, World Bank, February 1999; <http://www.worldbank.org/html/dec/Publications/Workpapers/wps2000series/wps2051/wps2051.pdf>
50. See Glass, A. J. and Saggi, K., Intellectual property rights and foreign direct investment, <http://economics.sbs.ohio-state.edu/pdf/glass/IPR.pdf>. See also, Sherwood, R. M., Intellectual Property: A Chip Withheld in Error, 74, who argues that at lower levels of IP, the 'investments that a country will attract come swiftly and can leave as swiftly.' See also Trigueros, L. M. and Hidalgo, R. R., The Role of Property Rights Protection on the Effect of Free

- Trade Agreements on Foreign Direct Investment, IPR, FDI, and Free Trade, Global Development Network, 2003; <http://www.eldis.org/cf/search/disp/DocDisplay.cfm?Doc=doc20269&Resource=f1IPR> (noting empirical evidence pointing to the fact that weak IPRs inhibit FDI). See also, Kanwar, S. and Evenson, R., Does Intellectual Property Protection Spur Technological Change? IPRs And Technological Change, Oxford Economic Papers, 235, 2003; <http://www.eldis.org/cf/search/disp/DocDisplay.cfm?Doc=doc20264&Resource=f1IPR> (evidence unambiguously indicates the significance of intellectual property rights as incentives for spurring innovation). See also Yang, G. and Maskus, K., Intellectual property rights, licensing in an endogenous product-cycle model, working paper University of Colorado, Boulder, 1999 (noting that both licensing of foreign technology and local innovation increase as IPRs increase).
51. See Lai, E. L. C. and Qiu, L. D., *Northern Intellectual Property Rights Standard for the South?*, 1999 (finding that lower levels of IPR, relative to those of the 'North' are appropriate for the 'South' and that global welfare will be enhanced through this).
 52. See GRAIN infra note 96; See also McCalman, P., *Foreign Direct Investment and Intellectual Property Rights: Evidence from Hollywood's Global Distribution of Movies and Videos*, 2002; <http://econ.ucsc.edu/faculty/mccalman/Publications/JIE2004.pdf>
 53. See Lall infra note 91 for an analysis of numerous countries and their optimal levels of IP protection. See also Martinez, C. and Guellec, D., *Overview of Recent Changes and comparison of Patent Regimes in the United States Japan and Europe*, Patents, Innovation, and Economic Performance, OECD Conference Proceedings, 2004.
 54. See e.g. Shapiro, C., *Patent System Reform: Economic Analysis and Critique*, *Berkeley Technology Law Journal*, 2004.
 55. See, e.g. Andersen, B., Kozul-Wright, Z. and Kozul-Wright, R., Copyrights, Competition and Development: The Case Of The Music Industry; available at http://www.unctad.org/en/docs/dp_145.en.pdf
 56. See, generally To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy: A Report by the Federal Trade Commission [hereinafter FTC Report], at 204, October 2003, available at <http://www.ftc.gov/opa/2003/10/cpreport.htm>
 57. UNDP 2001, at 11.
 58. Martin Kohr, *Intellectual Property, Competition and Development* (Third World Network 2005) at 15 (hereinafter Kohr 2005); <http://www.twinside.org.sg/title2/par/mk002.doc>
 59. Vissar, Poor People's Knowledge, 2001 at 208. But see Lall, infra note 91 who argues that often these short term costs are offset by long term benefits to developing nations.
 60. Commission on Intellectual Property Rights, Integrating Intellectual Property Rights and Development Policy, 2002 [hereinafter CIPR 2002], at 5.
 61. Kohr 2005 at 4. See also The United Nations Conference on Trade and Development (UNCTAD) and the International Centre for Trade and Sustainable Development (ICTSD), Resource Book on TRIPS and Development 60, 2005; <http://www.iprsonline.org/unctadictsd/ResourceBookIndex.htm> [hereinafter UNCTAD-ICTSD 2005]. This has been deproscribed as developing countries paying 'patent rents' due to their status as net importers of patented technologies.
 62. Professor John Barton argues, a strong intellectual property regime 'is not a necessary condition...and is absolutely not a sufficient condition for foreign investment'. Barton infra note 87.
 63. Maskus, K. E. and Reichman, J. H., The Globalization of Private Knowledge Goods and the Privatization of Global Public Goods, 7 J. Int'l Econ. L. 279, 282, June 2004.
 64. Barton infra note 87. See also Lall Infra note 91 who agrees with this assessment for many developing countries, but notes that optimal IPR varies by income level of the developing nation and that many middle income developing nations can benefit from stronger IPR.
 65. This is seen in the case of HIV/AIDS drugs that are available in some developing countries but are too expensive for the majority of patients to afford. See UNCTAD-ICTSD 2005 at 364.
 66. Carlos Correa argues, 'tighter intellectual property rights, and more stringent technological protection, may undermine the basic conditions for sustainable knowledge production...'. Correa infra note 109.
 67. See Lall infra note 91, arguing that lax IPR may be beneficial as a major form of learning in developing nations is through imitation and reverse engineering.
 68. UNDP 2001 at 9.
 69. See, generally Robert Merton, Social Theory and Social Structure, 610, 1968.
 70. Blumenthal, D., Campbell, E. G., Anderson, M. S., Causino, N. and Louis, K. S., Withholding research results. In *Academic Life Science—Evidence from a National Survey of Faculty*, 277 JAMA 1224, 1997. More recently though they came to a different conclusion 'Data withholding is relatively common and takes multiple forms (and) that a variety of characteristics of investigators and their fields may influence data-withholding'. Blumenthal, D. et al., *Data Withholding in Genetics and the other Life Sciences: Prevalence and Predictors*, 81 Academic Medicine 137, 142, 2006. See, also Campbell, E. et al., *Data Withholding in Academic Genetics: Evidence from a National Survey*, 287 JAMA, 473, 2002. Note though that John P. Walsh and Wei Hong found that while 'Secrecy is strongly predicted by scientific competition [...] the focus on commercialization as the cause may be misplaced'. Secrecy is increasing in step with competition. *Nature*, 2003, 422, 801. See also Rai, A. K., Open and Collaborative Research: A New Model for Biomedicine, Intellectual Property Rights. In *Frontier Industries: Software and Biotech* (ed. Robert Hahn), AEI-Brookings Press, Forthcoming; <http://ssrn.com/abstract=574863>, 'Indeed, in the biological sciences, such calls for access may even create a Mertonian sphere more robust than that which existed before 1980'.
 71. Heller, M. A. and Eisenberg, R. S., Can patents deter innovation? The anticommons in biomedical research. *Science*, 1998, 280, 698–701.
 72. Sherwood, R., in a series of studies evaluating components of intellectual property systems within developing nations including: enforcement, administration, life forms, treaties and the statutory treatment of copyright, patents, trademarks, and trade secrets, implies that innovation is best spurred providing in some instances protection that may be stronger than the minimum requirements of TRIPS. Sherwood, R. M., *Intellectual Property Systems and Investment Stimulation: The Rating of 18 Developing Countries* 78, 1997; <http://www.kreative.net/ipbenefits/ip18/default.htm>
 73. Inventing a better future: strategy for building worldwide capacities. In *Science and Technology*, Inter Academy Council Report, January 2004; http://ioc.unesco.org/Oceanteacher/oceanteacher2/01_GlobOcToday/07_ProgAgen&Orgs/icsu/InventingABetterFuture.pdf
 74. Grubb, P., *Patents for Chemicals, Pharmaceutical and Biotechnology*, Oxford University Press, 2004, 4th edn (pointing to countries like Hong Kong and Singapore that have benefited greatly from robust patent regimes. Grubb also points to the rapid growth in the US and Japanese economies after setting up robust patent regimes).
 75. Maskus infra note 116 at 2236.
 76. UNCTAD/ICTSD supra note 61.
 77. Sherwood, R. M., Intellectual property systems and investment stimulation: The rating of 18 developing countries, 1997; <http://www.kreative.net/ipbenefits/ip18/default.htm> at 79.

78. Grubb, supra note 74. See also, Kanwar, S. and Evenson, R., *Does Intellectual Property Protection Spur Technological Change?*, Economic Growth Center, Yale University Center Discussion Paper No. 831. 'The evidence unambiguously indicates the significance of intellectual property rights as incentives for spurring innovation'; http://www.econ.yale.edu/growth_pdf/cdp831.pdf.
79. Sherwood, supra 72 at 79.
80. See Schiff, E., *Industrialization Without National Patents: The Netherlands, 1869–1912; Switzerland, 1850–1907* (Princeton 1971) (regarding the fact that the Netherlands abolished its patent system in 1869 (re-established 1912), and noting that while the rate of industrialization was not significantly slower in the Netherlands during this period, the country experienced a boom immediately following the reintroduction of patents). See also Grubb, supra note 74 at 54 (arguing that it is in a developing country's best interests to accept and implement TRIPS rather than trying to 'emasculate' it).
81. Solow, R., Technical change and aggregate production function. *Rev. Econ. Stat.*, 1957, **39**, 312–320. See also, Omem, G., 'Economists have attributed more than half of the gains in GNP and up to 85% of the gains in per capita income over the past few decades to advances in science and technology'. *Science*, 2006, **314**, 1696.
82. The late Professor Mansfield was a leading economic analyst of technology and author of economics textbooks used by millions of college students, and an economics professor at the University of Pennsylvania. See <http://www.upenn.edu/almanac/v44/n14/obitmansfield.html>
83. Sherwood, supra 72 at 74 (describing these as 'wasted resources'). Note also the opportunity lost when corporations refrain from pursuing R&D in countries where they feel their products will not receive adequate levels of protection. See e.g. Kamal Saggi, supra note 48.
84. 'These studies support two important conclusions. First, weak patent rights are significant barriers to manufacturing trade, particularly in IPRs-sensitive goods', Maskus infra note 116 at 2231.
85. Maskus infra note 116 at 2231.
86. UNCTAD/ICTSD supra note 61.
87. See, e.g. Barton, J., Patents and the transfer of technology to developing countries. In Organisation for Economic Cooperation and Development Directorate for Science, Technology and Industry, Patents, Innovation and Economic Performance Conference Proceedings, report of Conference held in Paris on 28 and 29 August 2003, and Park, W. G. and Lippoldt, D., OECD Working Party of the Trade Committee, The Impact of Trade-Related Intellectual Property Rights on Trade and Foreign Direct Investment in Developing Countries; <http://www.oecd.org/dataoecd/59/46/2960051.pdf>
88. Sherwood, supra 72 at 79. See also, Javorcik, B. S., The composition of foreign direct investment and protection of intellectual property rights: evidence from transition economies, 48 *European Economic Review* at 39, 2004. Finding empirical evidence that shows that weak protection deters FDI particularly in technology intensive sectors, particularly drugs, cosmetics, health-care products, chemicals, machinery and electrical equipment. Moreover, investors will look more towards distribution as opposed to local production, although strong IPR may also lead foreign investors to license rather than to invest in local production facilities. Id.
89. See Balamoune-Lutz, M. N., Does FDI contribute to economic growth? Knowledge about the effects of FDI improves negotiating positions and reduces risk for firms investing in developing countries, *Business Economics*, 2004. But see Carkovic, M. and Levine, R., Does foreign direct investment accelerate economic growth?, 2002. 'While microeconomic studies generally, though not uniformly, shed pessimistic evidence on the growth-effects of foreign capital, many macroeconomic studies find a positive link between FDI and growth.' Although, the authors, with a slightly different analysis, were unable to find a strong influence; http://www.worldbank.org/research/conferences/financial_globalization/fdi.pdf
90. Maskus at 129–130. See also Kanwar and Envenson, supra note 78.
91. See Taylor, M. S., TRIPS and technology transfer. *Can. J. Econ.*, 1993, **26**, 625; see also Taylor, M. S., TRIPS, trade, and growth. *Int. Econ. Rev.*, 1994, **35**, 361; arguing that weak protection in the South can result in less transfers of technology from defensive and risk averse inventors in the North, eliminating any potential gains from a weak protection system. See also Diwan, I. and Rodrick, D., Patents, appropriate technology and north-south trade. *J. Int. Econ.*, 1991, **29**, 27. See also Maskus, who finds that middle-income developing countries (as defined by the World Bank) tend to have positive impacts on technology transfer due to intellectual property rights. See also, Lall, S., Indicators of the relative importance of IPRs in developing countries. *Res. Policy*, 2003, **32**, 1657. But see Mengistie, supra note 44 at 24, 'International technology transfer can only be tapped and harnessed to national development endeavors in a situation where the country has a better history of research and development activities, coupled with a relatively strong level of local technological capability.'
92. Maskus at 132.
93. See Maskus at 132, reporting that the largest impacts were in nations with strong imitations capacities, although all nations tended to produce positive trade impacts.
94. Although Maskus argues that most show a positive correlation. See Maskus at 134.
95. See Mengistie supra note 44 at 22, expounding on the debate. Many experts have found a direct link between stronger IPR and increased FDI, citing Idris, K., *Intellectual Property: A Power Tool for Economic Growth*, 2002, who notes particular examples such as Brazil and India. Mengistie also notes that there are those who have found that stronger IPRs result in a qualitative and quantitative difference in investment and licensing by foreign firms. Conversely, it can be argued that stronger patent regimes lead to higher costs for technology and that reduced the transfer of technology into developing nations. Note also that IP protection alone will not increase FDI 'strong IP rights alone provide neither the necessary nor sufficient incentives for firms to invest in particular countries... investment decision is contingent on many factors'. See also Helpman, E., Innovation, imitation, and intellectual property rights. *Econometrica*, 1993, **61**, 1247–1280.
96. See Maskus 133. Weak protection discourages investment in production although not in distribution. But see *GRAIN: Intellectual Property Rights and Biodiversity: The Economic Myths*, Global Trade and Biodiversity in Conflict, Issue no. 3, 1998, noting that 'most FDI is concentrated in the hands of a small number of companies [...] Ten developing countries alone absorb 80% of all FDI flowing to the South. This must be weighed against payment of licences and royalties by all developing countries to foreign IPR holders, which drains precious reserves'.
97. But see Braga, Carlos, Fink, Carsten, How stronger protection of intellectual property rights affect international trade flows, World Bank, February 1999; <http://www.worldbank.org/html/dec/Publications/Workpapers/wps2000series/wps2051/wps2051.pdf>. 'Economic analysis suggests that the effects of IPRs protection on bilateral trade flows are theoretically ambiguous. ...it is difficult to generate normative recommendations. When estimating the effects of IPRs protection ...empirical results suggest that, on average, higher levels of protection have significantly positive impact on non-fuel trade. However, this result is not confirmed when confining the estimation to high technology goods where we found IPRs to have no statistically significant impact'.

98. See Lall, *supra* note 91.
99. Barton *supra* note 87 at 324–325.
100. Id. at 325, arguing, however, that in these circumstances ‘trade secrecy may be as important as patent law’.
101. Id. at 326.
102. ‘The biodiversity convention creates IPR in traditional knowledge and urges unprecedented compensation and knowledge-sharing. By patenting traditional knowledge, developing countries would presumably profit in the same way that developed countries currently profit from technical knowledge’. 27 *Golden Gate U.L. Rev.* 631, 662 citing *Intellectual Property Rights For Indigenous Peoples: A Sourcebook* (ed. Greaves, T.), Society For Applied Anthropology, 1994.
103. 27 *Colum. J. L. & Arts* 277, 298.
104. UNCTAD-ICTSD 2005 at 364.
105. See Maskus, *infra* note 106 at 136, noting that most patent applications in developing nations will be from inventors in developed nations for the short term.
106. Maskus, K., *Intellectual Property: Balancing Incentives with Competitive Access: Global Economic Prospects and the Developing Countries* (ed. Richard Newfarmer), Economic Policy and Prospects Group of the International Bank for Reconstruction and Development, The World Bank, 2002.
107. Id. See also Nunnenkamp, P. and Spatz, J., *Intellectual property rights and foreign direct investment: The role of industry and host-country characteristics*, 2003; <http://www.uni-kiel.de/ifw/pub/kap/2003/kap1167.pdf>, stating that ‘the threat of an unauthorized use of intellectual-property-related assets and, thus, FDI depends on industry as well as host-country characteristics. Furthermore, stronger IPR protection tends to induce high-quality FDI’. See WTO Secretariat, *Trade Policy Review of Jamaica*, 2004; http://www.wto.org/english/tratop_e/tpr_e/s139-0_e.doc for a review of Jamaica’s trade policies and developments.
108. The World Bank has developed a widely accepted classification schema expressing more refined differences between countries than the simple binary classification of developed versus developing countries. Under this schema, the World Bank divides countries by their Gross National Income (GNI) and classifies Jamaica as a country with a lower-middle-income economy. See <http://www.worldbank.org/data/countryclass/classgroups.htm>. See also United Nations Development Programme, *Human Development Report 2005*; <http://www.unisdr.org/disaster-statistics/pdf/Classification-countries-UNDP-report-2004.pdf> (classifying Jamaica as ‘Medium Human Development’ country according to its Human Development Index, which is based on health, knowledge, and standard of living indicators).
109. ‘Developing countries will recognize significant gains in the long term from stronger IPRs [...]. However, this finding pertains mainly to large industrializing economies and not to the least developed countries.’ Maskus, K., *Intellectual Property Rights for Developing Countries and World Growth*, Institute for International Economics, 16 August 2000; <http://www.iie.com/publications/newsreleases/newsrelease.cfm?id=58>. But see Correa, C., Who notes that ‘developing countries do not appear to be benefiting from the increased transfers of technology and foreign direct investment which, it was claimed, stronger intellectual property protection would promote’. Correa, C., *How intellectual property rights can obstruct progress*, [SciDev.net](http://www.scidev.net/dossiers/index.cfm?fuseaction=dossierreaditem&dossier=8&type=3&itemid=375&language=1) (4 April 2005; <http://www.scidev.net/dossiers/index.cfm?fuseaction=dossierreaditem&dossier=8&type=3&itemid=375&language=1>).
110. Yang, G. and Maskus, K., *Intellectual property rights, licensing and innovation working paper*, World Bank, February 2003, presenting empirical argument that suggests that increased intellectual property rights in southern countries will increase access to innovation and increase the relative level of wages in the south via licensing. But see Kumar, N., *Intellectual property rights, technology and economic development experiences of Asian countries*, <http://www.epw.org.in/articles/2003/01/5391.pdf>, finding that stronger intellectual property rights in developing nations, particularly those required by TRIPS, will and have already been shown to inhibit access to medication. The authors argue that the notion of harmonizing intellectual property rights across vastly different levels of development is a recipe for disaster. See also Boyle, J., *A manifesto on WIPO and the future of intellectual property*, *Duke Law and Technology Review*, 2004, arguing that even developed nations would be better off with less intellectual property protection. But see Roffe, P., *Abuses of patent monopoly: A legal appraisal*, *World Develop.*, 1974, 2, 15–26, who cites cases of patents specifically excluding important information that would benefit developing nations.
111. Note also that Maskus argues that the size of the economy itself has no correlation with strong patent rights. Maskus, 132.
112. See, generally, Kisielewski, M., Asher, J., Brewster, A. and Hansen, S., *The Effects of Patenting in the AAAS Scientific Community*, 2006.
113. CIPR 2002 at 23.
114. Suthersanen, U., *Utility models and innovation in developing countries*, UNCTAD-ICTSD Issue Paper No. 13, 2006, at 9; <http://www.iprsonline.org/unctadictsd/dialogue/2006-03-03/uma%20suthersanen%2013%20final.pdf>
115. The premise of such a question must by definition ignore the vast differences between the economics, politics and technologies that make the world then, and the world now, such incomparable places.
116. Although see comments by Maskus, K., ‘After all, many countries have developed economically in the presence of weak IPRs, including Korea, Taiwan, Japan, and, arguably, the United States. (Nevertheless) Other countries have suffered stagnation in the presence of weak IPRs, including Brazil, Argentina, and India. Clearly there are many factors involved’. *Lessons from Studying the International Economics of Intellectual Property Rights*, 53 *Vand. L. Rev.* 2219, 2233.
117. See, e.g. Doron Ben Attar’s public lecture at the Contested Commons/Trespassing Publics Conference organized by Sarai-CSDS and Alternative Law Forum in Delhi, on 6–8 January 2005; See also Scharf, J. T. and Westcott, T., *A History of Philadelphia 1609–1884*, L. H. Everts and Co, 1884.
118. Letter from Thomas Jefferson to Isaac McPherson (13 August 1813), in 6, *The Writings of Thomas Jefferson* (ed. Washington, H. A.), 1857, 175, pp. 180–181.
119. See, generally, Hughes, Justin, *Copyright and Incomplete Histories: Of Piracy, Propertization, and Thomas Jefferson*, *Southern California Law Review*, Forthcoming; SSRN: <http://ssrn.com/abstract=934869>
120. ‘It is widely acknowledged that Jefferson was not at the Constitutional Convention. He was a “Founding Father” who was not a “Framer” – this by itself, should largely curtail the use of Jefferson as a reliable source of the meaning of Article I of the Constitution. Hughes *supra* note 119 (citations omitted).
121. Article I, Section 8, Clause 8 of the United States Constitution.
122. Hughes *supra* note 119.
123. Paine, T., *Introduction to Letter to the Abbe Ryanal, on the Affairs of North America. In Which the Mistakes in the Abbes Account of the Revolution of America are Corrected and Cleared Up*, 1782, in *The Life and Writings of Thomas Paine* 180, 182 (ed. Wheeler, D. E.), 1908 (quoted by Hughes *supra* note 119).
124. Noah Webster, *A collection of papers on political, literary, and moral subjects* 173–74 (1843) (quoted by Hughes *supra* note 119).
125. *From the legislation of Massachusetts and Rhode Island*; 24 *Journals of the Continental Congress, 1774–1789*, at 326 (ed. Gaillard Hunt), 1922. See also Solberg, T., *Copyright Enact-*

-
- ments of the United States 1783–1906, at 11 (1906) (quoted by Hughes *supra* note 119).
126. Letter from Thomas Jefferson to Oliver Evans (2 May 1807), in 5 *The Writings of Thomas Jefferson* 74, 76 (ed. Washington, H. A.), 1857 (quoted by Hughes *supra* note 119)
 127. Ben Atar *supra* note 117.
 128. Ben Atar *supra* note 117.
 129. International IP treaties were created partially because countries had not respected each other's IP without bilateral treaties requiring that they do. The Paris convention attempted to make national treatment an obligation that would not require independent bilateral treaties amongst multiple different countries.
 130. Ben Atar *supra* note 117.
 131. Paris Convention for the Protection of Industrial Property, March 20, 1883, revised in Stockholm, 14 July 1967, 21 UST, 1583, 828 U.N.T.S. 303; http://www.wipo.int/treaties/en/ip/paris/pdf/trtdocs_wo020.pdf
 132. Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the Legal Protection of Databases, 1996 O.J. (L 78) 20, <http://europa.eu.int/ISPO/infosoc/legreg/docs/969ec.html>
 133. Berne Convention for the Protection of Literary and Artistic Works, 9 September 1886; revised 24 July 1971, S. Treaty doc. no. 99–27, 828 UNTS 221, Article 6; http://www.wipo.int/treaties/en/ip/berne/trtdocs_wo001.html
 134. http://www.wto.org/english/tratop_e/devel_e/d1who_e.htm
-
- ACKNOWLEDGEMENTS. I thank Jack Lerner, Hillary Freudenthal, The Society in Science, the Branco Weiss Fellowship, The Center for Law and the Biosciences at Stanford Law School and the Berkeley Law, University of California Samuelson Law, Technology and Public Policy Clinic. I also thank the Society in Science, the Branco Weiss Fellowship, affiliated with Swiss Federal Institute of Technology Zürich (ETH); JD 2007 University of California, Berkeley, Boalt Hall School of Law; M.Phil. Genetics Yale University (2002); Ph.D. Bioinformatics/Genetics Yale University (2004).
-