
FROM PIRATE TO PLAINTIFF:
ACCELERATING DEVELOPMENT THROUGH THE STRATEGIC
EVOLUTION
OF INTELLECTUAL PROPERTY DOCTRINE

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Abstract

In an abstract sense the idea that one person is assigned the right to literally prevent every other person in a free society from engaging in certain actions, or acts of expression, in order to benefit that society as a whole, is counterintuitive and a bit troubling. Yet this notion of state enforced intellectual property (IP) is universal across the modern developed world, unambiguously etched into the founding document of the United States, and is perhaps one of the most powerful levers influencing the path to modern economic development. It is a complex tool that is prone to being used as a blunt instrument, and for developing countries seeking to effectively leverage IP policies, the incentives created must constantly be assessed and fine-tuned to align with the business model of strategic industries. For a country without a compatible social, economic, and legal tradition getting this right can be difficult, and pressure from the outside world to adopt more rigorous IP standards only further complicates the matter.

The modern context for this development is a world in which unprecedented amounts of wealth, technology, and knowledge concentrated in mature slow growth economies, looks to be invested in IP intensive industries such as pharmaceuticals and software located within emerging markets. Inevitably this risk/reward calculus will involve an assessment of the state of IP jurisprudence and consequently the stakes for proper market signaling have never been higher. Developing countries such as India and China have adopted unique strategies related to IP jurisprudence that are reflective of their history, culture, social structure, and economy, while foreign governments and firms struggle to influence and quantify the risks of operating in these markets. Ultimately a candid and holistic assessment of the intentional and unintentional incentives created by a particular IP policy is necessary in order to navigate these risks, and as long as a developing county is a net consumer rather than a net producer of IP they will have an incentive to maintain a relatively underdeveloped IP regime.

Preface

Before diving into the topic of intellectual property (IP), and the role that it plays in the development of individual industries and countries, it will be helpful to define the scope of the paper and clearly state the assumptions on which this discussion proceeds. The arguments in this paper are made from the paradigm that IP policy is an economic tool used to shape the incentives for individual and corporate behavior in the marketplace. In other words, there is no moral impetus for the notion that an individual or an entity is entitled to a disproportionately greater profit, by way of monopoly, from an original idea or novel combination of knowledge that they have formulated. As articulated in the United States Constitution these rights are a means to “promote science and the useful arts,” an economic argument.

It is necessary to clearly acknowledge the potential for various non-economic factors to influence large scale economic behavior, especially internationally across different cultures and economic systems. A complete understanding of the topic should include data driven insights from fields such as sociology, psychology, and behavioral economics to shed light on the limitations of classical economic theory. This type of analysis is beyond the scope of this essay.

This essay focuses on exploring the range of incentives, both intentional and unintentional, that are created by the interaction of the key moving parts of an IP regime. These major parts are identified as the type of protection offered, (i.e. patent, copyright and trademark), the scope of this protection, the subject matter to which this protection is extended, and the mechanism and degree to which these protections are enforced. To demonstrate the relationship between IPR and the incentives that they produce, two prominent modern industries will be analyzed. The analytical framework will then be expanded to include additional factors relevant to the development of economies and international trade. After constructing a basic paradigm for the relationship between IP policy and various stages of economic development, this model is applied to the developmental histories of two advanced modern economies, the United States in the west and South Korea in the east. This model will be applied to the developing countries of China and India, highlighting major mile-

stones and analyzing current events in the context of the established paradigm.

Business Models, Incentives, and the Role of Intellectual Property

The concept of IP has played a prominent role in the development of modern high technology industries and knowledge based economies.¹ A classic example of this relationship can be found in the pharmaceutical industry of the west.² It is no coincidence that in 2010 the top ten pharmaceutical companies by revenue³ were based in the United States (US) or Europe, regions where strong intellectual property rights (IPR) covering pharmaceutical drugs exist.⁴ The business model and structure of the pharmaceutical industry is the quintessential example of one that depends on strong IP protection in order to remain viable.⁵

The cost of delivering a new drug to market is widely debated⁶, taking into account the cost of drug failures, the figures range from around \$1 billion up to \$4 billion dollars.⁷ However, the cost of

¹ Robin Cowan & Elad Harrison, *Intellectual Property Rights in a Knowledge-Based Economy*, in MERIT-INFONOMICS RESEARCH MEMORANDUM SERIES 1 (2001) (recognizing intellectual property for its critical role in the growth of technology industries and knowledge-based economies over time).

² See Gerald J. Mossinghoff & Thomas Bombelles, *Intellectual Property Protection And The Pharmaceutical Industry*, OBLON (1996), archived at <http://perma.cc/BL3E-JBJZ> (contrasting the American view of IP law as it pertains to the pharmaceutical industry, with the rest of the world).

³ See Richard Nilsen, *List of Top 10 Pharma Companies*, LIVESTRONG (Aug. 20, 2015), archived at <http://perma.cc/CM7S-AFJZ> (describing revenue of top ten pharmaceutical companies in 2010).

⁴ See *The top 10 biggest pharmaceutical companies of 2014*, PHARMECUTICAL-TECHNOLOGY.COM (Oct. 9, 2014), archived at <http://perma.cc/BJM2-8ML2> (highlighting the regions of the world where intellectual property rights covering pharmaceutical drugs exist).

⁵ See Mossinghoff & Bombelles, *supra* note 2 (stating intellectual property is the “cornerstone” of the pharmaceutical industry’s existence).

⁶ See *Cost to Develop and Win Marketing Approval for a New Drug is \$2.6 Billion*, TUFTS CTR. FOR THE STUDY OF DRUG DEV. (Nov. 18, 2014), archived at <http://perma.cc/R6H9-5XPU> (noting inconsistent opinions on the cost of delivering a new drug to the market).

⁷ See Matthew Herper, *The Truly Staggering Cost of Inventing New Drugs*, FORBES (Feb. 10, 2012), archived at <http://perma.cc/P6ST-UN52> (discussing the average

copying these drugs once they are developed can be as low as half a million dollars.⁸ At a discount of 80-85% to reproduce a drug once it has been invented,⁹ there would simply not be any private entities willing to invest in developing innovator products without being assured some form of market exclusivity.¹⁰

This exclusivity has traditionally come in the form of patents granted by a governmental agency and enforced through the judicial system.¹¹ While this paradigm has been copied around the world it is not necessarily the only way to achieve this.¹² For example, regulatory channels can be used to grant exclusivity for regulated products.¹³ In the US the Food and Drug Administration (FDA) often grants a monopoly under the 505(b)(2)¹⁴ regulatory approval pathway using the statutory authority granted by the Hatch-Waxman Act.¹⁵ These

cost for new drug development, ranging from \$1 billion, to \$4 billion, to as much as \$11 billion).

⁸ See Sheryl Gay Stolberg & Jeff Gerth, *Keeping Down the Competition; How Companies Stall Generics And Keep Themselves Healthy*, N.Y. TIMES (July 23, 2000), archived at <http://perma.cc/8EUT-L9FS> (providing a rough estimate of the cost of copying or producing generic versions of these drugs once they are developed).

⁹ See Trefis Team, *Why Are Generic Drug Prices Shooting Up?*, FORBES (Feb. 27, 2015), archived at <http://perma.cc/EW5S-LMNW> (indicating the average cost of generic drug prices).

¹⁰ See Jackie Judd et al., *Drug Companies Preventing Generic Drugs*, ABC NEWS, archived at <http://perma.cc/HCW5-PNCL> (inferring pharmaceutical companies would not invest in the production of new drugs without some regulation on when and how these drugs can be produced in generic form).

¹¹ See Dr. Ananya Mandal, MD, *Drug Patents and Generic Pharmaceutical Drugs*, NEWS MEDICAL (Sept. 8, 2014), archived at <http://perma.cc/KK59-NF34> (demonstrating how pharmaceutical companies that produce a drug can retain exclusive rights to that drug for a limited time).

¹² See RICHARD ELLIOTT & MARIE-HELENE BONIN, PATENTS, INTERNATIONAL TRADE LAW, AND ACCESS TO ESSENTIAL MEDICINES 7 (May 2002) (acknowledging the multiple ways foreign nations regulate patents on pharmaceuticals).

¹³ See *id.* at 3 (recognizing that if a country does not meet its obligation under the TRIPS agreement, it may face enforcement actions by the World Trade Organization's Dispute Settlement Understanding).

¹⁴ See CTR. FOR DRUG EVALUATION AND RESEARCH, U.S. FOOD AND DRUG ADMINISTRATION, GUIDANCE FOR INDUSTRY: APPLICATIONS COVERED BY SECTION 505(B)(2) 1 (Oct. 1999) (identifying types of applications covered by section 505(b)(2) of the Federal Food, Drug, and Cosmetic Act).

¹⁵ See Drug Price Competition and Patent Term Restoration Act of 1984, Pub. L. No. 98-417, 98 Stat. 1585 (codified as amended at 15 U.S.C. §§ 68b-68c, 70b (1994); 21 U.S.C. §§ 301 note, 355, 360cc (1994); 28 U.S.C. § 2201 (1994); 35

types of mechanisms should not be overlooked when considering an IPR structure, since they can allow for a more precise engineering of policy to maximize the fit with a particular industry while maximizing public policy objectives.¹⁶

The laws regulating intellectual property are almost always slower to change than the industries they govern.¹⁷ This reality, stemming from the typical bureaucratic and judicial vehicles for reform, has the potential to produce suboptimal economic incentives and inefficiencies in the market during the lag period.¹⁸ Consequently as both the developed and developing world both struggle to find pro-growth economic policies, the effects of IPR on the high technology sectors with the promise of delivering this growth, is a worthwhile topic of discussion.¹⁹

Traditionally countries have had few industry specific IPR regulations beyond basic patentable subject matter restrictions.²⁰ However, the types of incentives necessary to create desired outcomes vary widely depending on the fundamental structure of the industry.²¹ Strong IPR, with long periods of exclusivity, are best justified when trying to encourage investments in industries for which developing new products require a large investment, over a long period of time, involve high risks, and are considerably less expensive

U.S.C. §§ 156, 271, 282 (1994)) (codifying the extension of patents, the infringement of patents, and announcing how to challenge the validity of patents).

¹⁶ See DENNIS S. FERNANDEZ & JAMES T. HUIE, STRATEGIC BALANCING OF PATENT AND FDA APPROVAL PROCESSES TO MAXIMIZE MARKET EXCLUSIVITY 2-4 (outlining the benefits of using a regulatory mechanism to obtain a patent to maximize the benefits of the company, the industry and public policy as a whole).

¹⁷ See Shanker A. Singham, *Competition Policy and the Stimulation of Innovation: Trips and the Interface Between Competition and Patent Protection in the Pharmaceutical Industry*, 26 BROOK. J. INT'L. 363, 413-14 (2001) (demonstrating the intellectual property industry's need for a dynamic and robust system).

¹⁸ See *id.* at 366 (discussing various incentives and inefficiencies in development of intellectual property).

¹⁹ See Judd et al., *supra* note 10 (highlighting the importance of patent protection for pharmaceutical patents on stimulating growth for developing countries and developed countries).

²⁰ See Chandra N. Saha & Sanjib Bhattacharya, *Intellectual Property Rights: An Overview and Implications in Pharmaceutical Industry*, 2(2) J. ADVANCED PHARMACEUTICAL TECH. RES. 88-93 (2011) (discussing IPR regulations as a multi-dimensional task).

²¹ See Singham, *supra* note 17, at 368 (stating how profits from a monopoly affect intellectual property rights).

to copy once developed.²² Conversely, industries in which products can be developed quickly with minimal investment, and copying or reverse engineering of the final product is not necessarily cost effective, are likely to be industries in which strong IPR are not as important to incentivize investment in developmental activities.²³

These descriptions mirror the business models of the pharmaceutical industry, juxtaposed by the software and electronics industry.²⁴ In the latter industries, the time and resources spent on development is decreasing, incremental innovation is increasing as product lifecycles shorten, and inventors are successfully implementing alternative development models such as open innovation²⁵ that do not rely on traditional IPR.²⁶ In the electronics industry, companies often save money from copying or reverse engineering competitor products, the same way generic pharmaceutical companies copy drugs, however the fundamental incentives may not be the same.²⁷ Short product lifecycles mean in the amount of time it takes to successfully reverse engineer an electronics product and bring it to market, the product may be obsolete.²⁸ In this industry non-patent IPR like design copyright and trademark can be more important.²⁹ Hardware

²² See Singham, *supra* note 17, at 366 (illustrating that when patents increase, there is an increase to towards effective patenting).

²³ See Singham, *supra* note 17, at 378-79 (detailing that when countries provide no incentives to patent products, there is a higher rate of patent copycats).

²⁴ See BRUCE LEHMAN, *THE PHARMACEUTICAL INDUSTRY AND THE PATENT SYSTEM 2* (2003) (identifying characteristics of the electronics industry, which the pharmaceutical industry will likely utilize in future).

²⁵ See HENRY W. CHESBROUGH, *OPEN INNOVATION: THE NEW IMPERATIVE FOR CREATING AND PROFITING FROM TECHNOLOGY* 56-57 (2003) (explaining the process of innovation about how companies utilize and advance technologies to create new products and services).

²⁶ See JENNIFER BRANT & SEBASTIAN LOHSE, *INNOVATION AND INTELLECTUAL PROP. SERIES, THE OPEN INNOVATION MODEL* 10-11 (describing the successful implementation of open innovation).

²⁷ See Lindsay Moore, *Reverse engineering for competitive advantage*, *NEW HOPE* 360 (Jun. 1, 2008), archived at <http://perma.cc/5HTT-4XH3> (discussing advantages of copying and reverse engineering competitor products).

²⁸ See James C. Hayton et al., *Why Do Firms Join Cooperative Research Centers? An Empirical Examination of Firm, Industry, and Environmental Antecedents in COOPERATIVE RESEARCH CENTERS AND TECHNICAL INNOVATION* 43 (Craig Boardman et al. eds., 2013) (discussing consequences of reverse engineering products with short lifecycles).

²⁹ See Moore, *supra* note 27 (noting how reverse engineering can be used to avoid infringing on a competitors patent while producing a similar product).

makers like Apple for example are able to achieve gross margins approaching 90%, while their competitors struggle to achieve margins of 30%³⁰ for functionally identical products, presumably because of a strong brand name and attractive design features.³¹

In the US a software application for a mobile device is often eligible for patent protection as well as copyright protection.³² Under this regime these relatively simple software applications, developed in as quickly as a weekend for as little as \$1000³³, and complex biologic drugs, developed over the course of a decade for the cost of \$1 Billion or more, are offered the same length of statutory protection.³⁴ They are also both subject to many of the same fees, standards, and procedures for obtaining and enforcing the patent.³⁵ Without finely tuned IPR these extremes in business models and industry structure increase the chances of introducing unintended inefficiencies into the marketplace.³⁶

³⁰ See Jonathan Goldberg, *Apple drives another nail in hardware's coffin – if you're not Apple*, VENTUREBEAT (Oct. 24, 2012), archived at <http://perma.cc/X9JB-J6UY> (comparing Apple's gross margin to other software companies).

³¹ See Jim Edwards, *Apple Has Forced A Huge Change At Samsung – As These 2 Phones Unveiled Last Night Show*, BUS. INSIDER (Oct. 31, 2014), archived at <http://perma.cc/3WYU-6XY8> (explaining Apple's effect on consumer buying behavior).

³² See *Patenting Software*, WORLD INTELL. PROP. ORG., archived at <http://perma.cc/ZCJ4-8AFB> (comparing patent protections to copyright protections, and explaining the requirements to be eligible).

³³ See Kate Harrison, *The App-titude Test: Is Creating a Mobile App Right For You?*, FORBES (Aug. 14, 2012), archived at <http://perma.cc/2X47-ZBFR> [hereinafter Harrison, *The App-titude Test*] (describing minimum cost for creating a basic content mobile application).

³⁴ See U. S. COPYRIGHT OFF., *DURATION OF COPYRIGHT*, (2011) (describing requirements and length of copyrights for works created on or after January 1, 1978); see also *Types of Patents*, U.S. PAT. AND TRADEMARK OFF. (Oct. 3, 2013), archived at <http://perma.cc/YQZ5-Y8JG> (articulating types of patents and length of protection period).

³⁵ See *General Information Concerning Patents*, U.S. PAT. AND TRADEMARK OFF. (Oct. 2014), archived at <http://perma.cc/VW8H-HJSV> (outlining standards, fees, and enforcement of patents).

³⁶ See BRANT & LOHSE, *supra* note 26, at 16 (suggesting difficulties that can arise from inadequate IPR).

This is also a case where the same standards for IPR, in different industries, can produce different incentives.³⁷ In the pharmaceutical industry, the resources and time spent obtaining a patent are negligible in comparison to that spent developing the product.³⁸ A patent is a small precondition to enable a company to realize an acceptable risk-adjusted return on a much larger investment of resources.³⁹ New drugs must also go through a rigorous clinical trial period and be shown to produce equivalent or better outcomes than existing drugs on the market.⁴⁰ A patent on a drug is therefore only commercially valuable if that drug can meet the relevant regulatory standards and gain marketing approval.⁴¹

This scheme incentivizes the drug company to invest resources maximizing the quality of their product before it goes to market.⁴² This is important, not only in gaining the initial regulatory approval, but also for the drug to remain competitive on the marketplace for the full term of the patent, thus ensuring a constant revenue stream.⁴³ To achieve this, teams of scientists within companies create strategic alliances and collaborate across companies.⁴⁴

³⁷ See LEHMAN, *supra* note 24, at 8 (referencing incentives specifically within pharmaceutical industry).

³⁸ See MICHELE BOLDRIN & DAVID K. LEVINE, *AGAINST INTELLECTUAL MONOPOLY* 243-44 (2008) (noting cost is far greater to produce pharmaceutical products than it is to patent them).

³⁹ See Max Colice, *Should You Invest in Patent Protection?*, COOLEY GO, *archived at* <http://perma.cc/2DJN-9F8P> (suggesting that although patent protection is a risky investment, it also greatly increases a company or product's valuation).

⁴⁰ See *NIH Clinical Research Trials and You*, NAT'L. INSTITUTES OF HEALTH (Jun. 2015), *archived at* <http://perma.cc/WZ6F-5J8U> (discussing clinical trial period for new drugs). "Typically, clinical trials compare a new product or therapy with another that already exists to determine if the new one is as successful as, or better than, the existing one." *Id.*

⁴¹ See VALENTINA SARTORI ET AL., MCKINSEY & COMPANY, *VALUE-DRIVEN DRUG DEVELOPMENT – UNLOCKING THE VALUE OF YOUR PIPELINE 1* (2011) (outlining regulatory standards for new drugs gaining market approval).

⁴² See *id.* at 4 (discussing company investments and their products).

⁴³ See JEFF COHEN ET AL., *STRATEGIC ALTERNATIVES IN THE PHARMACEUTICAL INDUSTRY* 26 (2007) (analyzing incentives to maximize product quality).

⁴⁴ See *id.* at 13-15 (demonstrating importance of strategic alliance and collaboration between companies).

Drugs also tend to consist of a relatively small number of patentable components.⁴⁵ Because of this it is manageable to understand the IP landscape and if need be negotiate the licenses necessary to optimize and sell the product.⁴⁶ With this industry structure the current patent system makes a lot of sense. By granting long term property rights to intangible knowledge, companies can take big bets on risky projects.⁴⁷ A viable market place is also created to support entities with piecemeal solutions. For example a novel drug formulation technology which can be in-licensed, but is not itself a consumer level revenue generating product.⁴⁸

Conversely, in the software industry the resources and time spent obtaining a patent can be equal to or greater than the resources spent developing the product.⁴⁹ IP protection in this case is less likely to be a necessary precondition to an economically viable investment of resources.⁵⁰ In fact by obtaining IPR the investment may be significantly increased due to the cost of the patent.⁵¹ This will, in turn, increase the required return necessary to exceed the firms cost of capital, and decrease the viability of smaller projects.⁵² Additionally, the structure of the industry means strong IPR run the risk of enabling a single company or developer to achieve outsized profits,

⁴⁵ See David Taylor, *The Pharmaceutical Industry and the Future of Drug Development*, in PHARMACEUTICALS IN THE ENVIRONMENT 20 (R.E. Hester & R.M. Harrison eds., 2015) (portraying how these products can consist of more than one patentable component).

⁴⁶ See Robert Tierney et al., *The Pharmaceutical Technology Landscape: A New Form of Technology Roadmapping*, 80 TECH. FORECASTING & SOC. CHANGE 194, 208 (2013) (discussing intellectual property landscape as relating to pharmaceuticals).

⁴⁷ See Howard Smith, *What Innovation Is: How Companies Develop Operating Systems for Innovation*, THE TRIZ JOURNAL, (Feb. 22, 2006), archived at <http://perma.cc/QUR4-FLZ5> (observing impact that intellectual property rights have on the patent system).

⁴⁸ See *id.* (offering alternative ideas to generate revenue from lower level consumer products).

⁴⁹ See Gene Quinn, *The Cost of Obtaining a Patent in the US*, IPWATCHDOG (Apr. 14, 2015), archived at <http://perma.cc/W2FJ-P5YB> (comparing time it takes to develop product versus resources saved within software industry).

⁵⁰ See *id.* (balancing costs and benefits of IP protection).

⁵¹ See *id.* (describing increasing costs of patents).

⁵² See Thomas G. Field, Jr., *IP Basics: Seeking Cost-Effective Patents*, UNIV. N.H. SCH. OF LAW, archived at <http://perma.cc/YG84-YUPD> (explaining need for higher profits when obtaining patents).

simply by deterring competition from individuals and resource constrained startup companies, which are poorly equipped to understand and manage litigation risk.⁵³

In the software industry the low cost of developing products means small and even one person organizations can be viable.⁵⁴ Unlike the pharmaceutical industry, incremental innovation often takes place quickly and outside of the organizational confines of companies and alliances where IP is pooled or jointly owned.⁵⁵ Instead, each entity might produce a snippet of code to perform an additional function, or even the same function by a more efficient mechanism.⁵⁶ The aggregate effect can be seen in smartphone products where it is estimated that claims from as many as a quarter million patents cover some aspect of the final embodiment of the product sold to consumers.⁵⁷

Instead of focusing on the next improvement or innovation, the rational profit-maximizing entity might instead decide to devote its resources to obtaining a patent with sufficiently broad claims to cover these incremental improvements and then enforce these rights on competitors operating in this space.⁵⁸ The same function can often be achieved by a variety of coding approaches, offering patents rather than just copyrights, allows a patent owner to prevent others from performing the functions covered in the claims, even with alternative, potentially more efficient, software code.⁵⁹ Certainly from a public policy prospective this has the potential to produce a suboptimal in-

⁵³ See JAMES HENDERSON, *HEALTH ECONOMICS AND POLICY* 46 (Leah Wichnick ed., 6th ed. 2015) (portraying monopolistic traits of company owned patents).

⁵⁴ See Field, *supra* note 52 (acknowledging IP benefits gained by smaller businesses in the software industry).

⁵⁵ See LEHMAN, *supra* note 24, at 2 (distinguishing practices between pharmaceutical patents and electronic industry patents).

⁵⁶ See *Patenting Software*, *supra* note 32 (describing more efficient ways or producing software codes).

⁵⁷ See Steve Lohr, *Apple-Samsung Case Shows Smartphone as Legal Magnet*, N.Y. TIMES (Aug. 25, 2012), archived at <http://perma.cc/8THP-T6Y3> (acknowledging the multiple contributors to a single project).

⁵⁸ See Ryan Davis, *Fed. Cir. Gives Defendants New Way To Attach Broad Patents*, LAW360 (Jun. 17, 2015), archived at <http://perma.cc/7MSX-W4SK> (suggesting the holding in *Williamson v. Citrix* requires more specificity in how a function performs).

⁵⁹ See *Copyright v. Patent: A Primer on Copyright and Patent Protection for Software*, UNIV. OF WASH. SCH. OF LAW, archived at <http://perma.cc/XF2J-L8E3> (proferring the advantages of patents over copyrights).

centive.⁶⁰ It would be beneficial to encourage economic actors to leverage their time, resources and talents to grow the economic pie and advance the field, then fight over who is entitled to a fixed slice of it.⁶¹ When this type of behavior scales patent thickets emerge and the so-called tragedy of the anti-commons ensue.⁶² In this situation, socially desirable behavior is prevented by the conflict of multiple rights holders, often resulting in a stalemate.⁶³

The temporal element of patents in an industry that evolves as rapidly as the software industry is also important to consider.⁶⁴ Patents are not published for eighteen months after filing, the value of the core quid pro quo exchange, of public disclosure for monopoly protection, can start to break down.⁶⁵ In a rapidly changing industry, rather than serving as a mechanism to inform others of ideas, and promote efficiency through the elimination of duplicative efforts, diffusion of ideas and the eventual transition to the public domain for free use, these patents can turn into a history book of who did what and when; a history book that is increasingly being used as fodder for legal battles of unprecedented size and scope.⁶⁶

The shorting product lifecycles and increasing patent backlog at the USPTO also presents the plausible scenario where a company might develop a patentable invention, file a patent with the PTO, incorporate this invention into a product sold on the market, and have that product become obsolete before the patent ever publishes, much

⁶⁰ See John Swinson, *Copyright or Patent or Both: An Algorithmic Approach to Computer Software Protection*, 5 HARV. J.L. & TECH 145, 212-14 (1991) (observing that dual protections for software is inadequate and counterproductive).

⁶¹ See *id.* at 212 (reiterating the different foci of patent and copyright law).

⁶² See Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621, 642-45 (1998) (noting the occasional negative impacts that rapid innovation can have upon the market).

⁶³ See *id.* at 679 (highlighting potential consequences of anti-commons situations).

⁶⁴ See *Patent Process Overview*, U.S. PAT. AND TRADEMARK OFF., archived at <http://perma.cc/E7JR-3VSK> (providing step by step explanation to apply for and maintain a patent).

⁶⁵ See 35 U.S.C. § 122 (2012) (declaring the 18-month rule for patent publication after issue).

⁶⁶ See Florian Mueller, *Apple seeks \$2.5 billion in damages from Samsung, offers half a cent per standard –essential patent*, FOSS PATENTS (Jul. 24, 2012), archived at <http://perma.cc/A4ZN-YZRM> (highlighting an example of patent infringement litigation between Apple and Samsung).

less issues.⁶⁷ In this case patent protection is largely irrelevant and a copycat firm might legally reverse engineer and sell the patent pending product until the patent publishes.⁶⁸ Finally, patentable inventions in a field approximating Moores Law⁶⁹ are certain to be obsolete by the time it enters the public domain, at end of the 20 year patent term, rendering this aspect of the bargain wholly worthless to the public.⁷⁰

This issue of patent terms is also one that manifests itself differently in different industries.⁷¹ If the invention is still profitable at the end of the patent term, as is often the case in pharmaceuticals, a profit maximizing firm can be expected to use litigation, or other tools, to effectively extend this period of exclusivity beyond the statutorily granted period if the costs to do so are less than the incremental profit it produces.⁷² This problem can clearly be seen in the pharmaceutical industry in so-called “pay to delay” agreements.⁷³ In these agreements an innovator pharmaceutical company pays a generic company to delay introducing their copycat version to the marketplace.⁷⁴ Despite the fact that these agreements are being challenged on the grounds of anti-trust violations, a more insidious trend of over-

⁶⁷ See John Schmid, *Despite efforts to improve, U.S. patent approvals move slower*, JOURNAL SENTINEL ONLINE (Jan. 16, 2011), archived at <http://perma.cc/AJ5S-8TJB> (noting that the patent process can take so long, due to the backlog, that patents can become irrelevant prior to a decision).

⁶⁸ See 35 U.S.C. § 154(d) (2012) (giving the inventor some provisional rights but requiring that the application be published).

⁶⁹ See *Moore's Law OR How Overall Processing Power for Computers will Double Every Two Years*, MOORE'S LAW, archived at <http://perma.cc/557M-3LZV> (explaining that Moore's Law is a computing term which originated around 1970). The simplified version of this law states that processor speeds, or overall processing power for computers will double every two years. *Id.*

⁷⁰ See Schmid, *supra* note 67 (discussing the length of time it takes for patents to issue and the damage such delays cause businesses).

⁷¹ See *Types of Patents*, *supra* note 34 (describing the different patent terms, which vary by patent type, for use in various industries).

⁷² See Prasad K. Chaitanya et al., *Exclusivity Strategies of Innovator Drug Developers*, 2 INT'L J. DRUG REG. AFF. 21 (2014) (describing various methods for maintaining patent exclusivity); see also Yuki Onoe, “Pay-For-Delay” Settlements in Pharmaceutical Litigation: Drawing a Fine Line Between Patent Zone and Anti-trust Zone, 9 J. MARSHALL REV. INTELL. PROP. L. 528, 530 (2010) (highlighting the use of “pay-for-delay” settlement agreements in various industries).

⁷³ See Onoe, *supra* note 72, at 528-29 (characterizing the “pay-for-delay” settlements).

⁷⁴ See Onoe, *supra* note 72, at 528-29 (offering an example of “pay-to-delay”).

ly-aggressive litigation to delay generics and intimidate their manufacturers may be taking its place.⁷⁵ To support this view a vocal generic pharmaceutical executive recently stated that frivolous litigation, from innovator companies trying to extend their period of exclusivity or dissuade competition, has unnecessarily added millions of dollars onto the costs of developing generic drugs;⁷⁶ a cost that is presumably passed on to patients.⁷⁷ Providing incentives for successful inventors to produce further innovations, as opposed to one time profit taking, should be a core economic goal of any intellectual property regime.⁷⁸ Thus, limiting a period of exclusivity to a timeframe that makes sense, based on the lifecycle of the product, is an important consideration in maximizing the incentive to not only initially invest in innovative activity, but also to reinvest the proceeds into further innovative activities.⁷⁹

This analytical framework for viewing incentives can be applied at the company, industry, and country levels.⁸⁰ Much like a private profit maximizing firm, individual countries can be expected to behave in such a way as to maximize their own economic gains.⁸¹ The next section will identify key inputs that shape an intellectual property regime, as well as identifiable stages, as a country transitions from the earliest phases of economic development to a modern knowledge based economy.

⁷⁵ See Onoe, *supra* note 72, at 530 (noting that “pay-for-delay” settlements may be challengeable under anti-trust regulations); see also Stolberg & Gerth, *supra* note 8 (exposing details of litigation used to impede the manufacture of a generic pharmaceutical drug).

⁷⁶ See Stolberg & Gerth, *supra* note 8 (quoting Charles Lay, former chief executive and president of generic drug company Geneva, who states that the lawsuits drive up the cost of developing generic drugs).

⁷⁷ See Stolberg & Gerth, *supra* note 8 (noting that the higher cost of producing generic drugs makes the drugs more expensive for the consumers).

⁷⁸ See Stolberg & Gerth, *supra* note 8 (detailing that the Hatch-Waxman legislation was meant to provide innovative incentive, but drug companies started to give one time payouts to avoid the new generic drug competition made, thus actually hurting innovative incentive).

⁷⁹ See Chaitanya et al., *supra* note 72, at 21 (describing the importance of exclusivity limits for recuperating profits and future innovation).

⁸⁰ See Onoe, *supra* note 72, at 528-29 (explaining how “pay-for-delay” settlements work); see also *infra* pp. 60-86 (examining IP practices at the country level).

⁸¹ See *infra* pp. 60-86 (analyzing how different countries act and attempt to act in their economic self-interest).

The Current and Future Role of Intellectual Property in Modern Developed Economies

A study in 2006 found that nearly 80% of the value of fortune 500 companies was in intangible assets.⁸² While this figure is controversial and some have argued misleading, the observation that it has approximately doubled every ten years since 1975⁸³ demonstrates a clear trend.⁸⁴ Apart from the sheer value of intangible assets, the ways in which IP is used, and the strategic role that it plays in business, has radically shifted.⁸⁵ Traditionally, patents were obtained by operating companies to simply prevent others from selling products covered by their claims.⁸⁶ Today new business models have arisen in which companies who do not produce any products, so called non-practicing entities (or commonly “patent trolls” by those on the receiving end of lawsuits), purchase patents and enforce them against operating companies in an attempt to extract licensing fees.⁸⁷

Precisely measuring the value of these intangible assets is highly complex, if not impossible, in the real world.⁸⁸ Economists have tried to model the IP litigation system with empirical data;⁸⁹ the result is a set of multivariable equations that would terrify most lawyers and politicians.⁹⁰ The inputs of these equations however, con-

⁸² See Keith Cardoza et al., *The Power of Intangible Assets*, INTELL. ASSET MGMT., Apr./May 2006 at 31, 33-34 (analyzing intangible value as a percentage of book value for S&P 500 companies).

⁸³ See *id.* at 34 (describing general growth of intangibles).

⁸⁴ See *id.* at 34-35 (tracing market value growth to companies' intangible assets).

⁸⁵ See KAMIL IDRIS, WORLD INTELLECTUAL PROPERTY ORG., INTELLECTUAL PROPERTY: A POWER TOOL FOR ECONOMIC GROWTH 4 (2003) (explaining the shift in modern IP management).

⁸⁶ See *Patent Pros and Cons*, INVENTOR BASICS, archived at <http://perma.cc/A38P-M355> (illustrating the traditional reasons for obtaining a patent).

⁸⁷ See David Applegate, *Who Are Patent Trolls and What Will H.R. 9 Do About Them?*, FORBES (MAY 29, 2015), archived at <http://perma.cc/EN8K-MW5Q> (warning companies of potential patent troll threats).

⁸⁸ See Jean O. Lanjouw & Josh Lerner, *The Enforcement of Intellectual Property Rights: A Survey of the Empirical Literature 1* (Nat'l Bureau of Econ. Research, Working Paper 6296, 1997) (explaining how the dynamic nature of intellectual property creates difficulty in quantifying value for the purposes of litigation).

⁸⁹ See *id.* at 7 (discussing the benefits and pitfalls inherent in various valuation models which have been employed during litigation).

⁹⁰ See *id.* at 6-7 (describing the complex system of IP litigation).

tain lessons for policy makers and are illustrative of the manner in which IP legislation or judicial decisions can shape economic incentives.⁹¹ Any change that affects the expected benefits of litigation, or the costs of obtaining and enforcing IP, will change the dynamic of the whole system.⁹² Furthermore, the probability inputs in the real world are highly subjective, meaning that an increase in the certainty of the system will allow economic actors to make better decisions in any given situation.⁹³ With enough certainty, plaintiffs and defendants may be able to come to the same conclusion on the value of an impending lawsuit and settle early saving time, money, and resources that can be directed towards other economically productive activities.⁹⁴

The increasing propensity to litigate, even among operating companies, has spurred a phenomenon of companies stock piling patents defensively, sometimes without the intention of ever commercially practicing the technology.⁹⁵ The strategy here is to be able to strike back at any competitors daring enough to filing lawsuits

[T]he payoff that the potential plaintiff expects from filing a claim is: $(Y + Waj - L) + \text{Max}\{0, \phi[(L + I) - j(W\alpha - w)]\} \dots$
 [and] the expected payoff to the defendant if a claim is filed is:
 $(y - wj - 1) + \text{Max}\{0, (1 - \phi)[(L + 1) - j(W\alpha - w)]\}$.

Id. In these equations, capital letters refer to the plaintiff, where “Y” represents the plaintiff’s current expected income or net profit, “W” represents the expectation of receiving judgment, and “L” refers to net legal costs. *Id.* at 2-3. Lower-case letters refer to the defendant, where “y” represents the defendant’s expected income given harm caused to the plaintiff, “j” refers to the amount expected to be paid in judgment if the plaintiff wins, and “w” represents the defendant’s expectation of paying. *Id.* at 3. The symbol “ α ” represents the plaintiff’s expected returns from a favorable judgment, compared to the actual judgment paid by the defendant. *Id.* at 4. Finally, “ ϕ ” represents the Nash bargaining solution. *Id.* at 6.

⁹¹ See Lanjouw & Lerner, *supra* note 88, at 19 (exploring how some IP policies can shape economic incentives).

⁹² See JANE LAMBERT, ENFORCING INTELLECTUAL PROPERTY RIGHTS 144 (2009) (addressing the importance of evaluating pros and cons to obtaining IP protection).

⁹³ See Michael Meehan, *Increasing Certainty and Harnessing Private Information in the U.S. Patent System: A Proposal for Reform*, 2010 STAN. TECH. L. REV. 1, 30 (2010) (evaluating the certainty and reliability of the IP system).

⁹⁴ See Lanjouw & Lerner, *supra* note 88, at 13-15 (discussing the effect of a lawsuit’s quantifiable value to both parties on the likelihood of negotiating and reaching a settlement).

⁹⁵ See Elizabeth Woyke, *An Insider on the Nortel Patent Auction and Its Consequences*, FORBES (July 7, 2011), archived at <http://perma.cc/G9JG-2AEB> (explaining company strategies when purchasing patents).

against them, thus deterring the litigation in the first place.⁹⁶ Like a nuclear arms race, the large patent positions some major tech players have amassed⁹⁷ could mean mutually assured destruction if they were to aggressively enforce them against one another.⁹⁸ This has also spawned innovative business models on the other side of the litigation game.⁹⁹ Entities such as RPX Corp strategically buy patents which companies that pay a membership fee to utilize them for defensive purposes.¹⁰⁰ Thus, the new reality in many of these high-tech industries is one in which defending yourself from litigation, warranted or not, is a cost of doing business and should be considered and incorporated into the overall operating strategy.¹⁰¹

This type of behavior represents a new extreme in the boundaries of IPR, and may itself be a discrete stage on the way to an even greater shift towards a knowledge based economy, or perhaps an overreach that will eventually be reined in.¹⁰² The jury is still out on the ultimate economic effects of this trend, and logical arguments can be made to advance either position.¹⁰³ On the positive end of the spectrum, an increased level of enforcement raises the interest in parties on both sides of lawsuits in owning and licensing IP.¹⁰⁴ After all, because the information is public (other than trade secrets), without

⁹⁶ See *id.* (discussing the use of patents as a defensive mechanism against lawsuits).

⁹⁷ See *id.* (describing how companies accumulate large quantities of valuable material over time).

⁹⁸ See *id.* (exploring the amassing of patents as a “strategic element” which may result in destructive competition among companies).

⁹⁹ See *id.* (acknowledging one example of strategic patent collection).

¹⁰⁰ See *FAQs*, RPX CORPORATION, *archived at* <http://perma.cc/F2GN-V96R> (explaining RPX’s pre-litigation method of acquiring problematic patents before they are bought by non-practicing entities).

¹⁰¹ See David E. Mixon & David V. Lucas, *Everything to Consider in a Defensive Response to IP Threats*, INSIDECOUNSEL (Mar. 18, 2014), *archived at* <http://perma.cc/3CBN-7YKK> (recognizing the need to incorporate litigation expenses into overall operating strategy).

¹⁰² See James R. Farrand, *Territoriality and Incentives under the Patent Laws: Overreaching Harms U.S. Economic and Technological Interests*, 21 BERKELEY TECH. L.J. 1215, 1253 (2006) (expanding upon the dangers of infringement and overreaching patent purchases).

¹⁰³ See *id.* at 1290-91 (acknowledging the uncertain impact that patent laws will ultimately have on the U.S. economy).

¹⁰⁴ See Mark C. Howland, *The Impact of Bankruptcy on IP Litigation and Licensing*, JONES DAY (Apr. 2010), *archived at* <http://perma.cc/Y72E-XTLK> (describing the judicial procedures of bankruptcy and how that, in turn, impacts licensing).

the threat of enforcement, buying or licensing IP is tantamount to a charitable donation.¹⁰⁵ An increased interest in owning IP will in turn boost the liquidity in the market for IP based transactions.¹⁰⁶ By providing a more efficient marketplace for inventions, an increased level of specialization becomes possible.¹⁰⁷ For example, in a smartphone each individual invention, on its own, may be of limited utility, but when combined with hundreds or thousands of other innovations into a final product, they become incredibly useful.¹⁰⁸ By providing small entities (ones that cannot amass and combine all of the innovations necessary to produce, manufacture, distribute and support a consumer ready product) a liquid marketplace for the specialized knowledge based assets they produce, they become increasingly viable.¹⁰⁹

The opposite argument is also plausible. In industries with aggressive litigation the risk of a given project will rise, and companies will simply decide the risk adjusted return is insufficient to justify operating in those markets.¹¹⁰ This decreased level of operators in the field will consequently decrease the level of competition, which will slow innovation and increase the level of monopolistic behavior which in turn decreases the efficiency of the marketplace.¹¹¹ There is plausible evidence that ideas are rarely completely novel and simul-

¹⁰⁵ See Allen W. Wang, *Rise of the Patent Intermediaries*, 25 BERKELEY TECH. L.J. 159, 163 (2010) (elucidating on the incidental public benefit of filing a patent).

¹⁰⁶ See *id.* at 163-64 (justifying the risk of patent ownership by reiterating the possibility of valuable portfolio ownership).

¹⁰⁷ See Andrei Hagiu & David Yoffie, *Intermediaries for the IP market 1* (Harv. Bus. Sch., Working Paper No. 12-023, 2011) (discussing the market forces that allow for specialization in IP law).

¹⁰⁸ See Lohr, *supra* note 57 (reiterating the issue of marketing a device which has thousands of patents attached to it).

¹⁰⁹ See Kristen Osenga, *Formerly Manufacturing Entities: Piercing the "Patent Troll" Rhetoric*, 47 CONN. L. REV. 435, 452-53 (2014) (describing the positive impact of the new liquid marketplace on small entities).

¹¹⁰ See Alexander I. Polorak & Paul J. Lerner, *Introducing Litigation Risk Analysis*, MANAGING INTELLECTUAL PROPERTY, May 2001, at 4-5 (applying risk analysis for patent litigation and market operations).

¹¹¹ See Corinne Langinier & GianCarlo Moschini, *The Economics of Patents: An Overview 3* (Ctr. for Agric. and Rural Dev., Working Paper No. 02-WP 293, 2002) (acknowledging economic consequences of scarce operators and its effect on levels of competition).

taneous independent inventions is actually quite common.¹¹² When companies expend resources going to court, they are distracted from their ideal economic tasks of developing the next innovation and delivering it to the marketplace.¹¹³

The unprecedented level of productivity and pace of innovation in modern society can largely be attributed to new tools for organizing, recalling, analyzing, and sharing knowledge.¹¹⁴ These tools are so new and game changing, there is little applicable real world data which can be used to predict the long term impacts of various policy directions.¹¹⁵ Therefore many of these arguments are theoretical, and as more and more countries reach this level of development, where these types of issues arise, it will be important to analyze how different policies may have led to different outcomes.¹¹⁶ As demonstrated by the current predicament, the question of the optimal level and structure of IPR does not converge and simply go away as countries develop.¹¹⁷ Conversely it becomes more difficult to predict as the system increases in complexity, and at the same time the stakes continue to rise as a greater portion of the economy builds business models reliant on IP protections.¹¹⁸ This leads to a situation where constant tweaking of IP policies is necessary to achieve developmental goals.¹¹⁹ In light of this observation, another important milestone

¹¹² See Mark A. Lemley, *The Myth of the Sole Inventor*, 110 MICH. L. REV. 709, 711 (2012) (indicating that most modern day inventions are not original).

¹¹³ See Eduardo Porter, *Tech Suits Endanger Innovation*, N.Y. TIMES (May 29, 2012), archived at <http://perma.cc/WA23-344P> (explaining how litigation trumps innovation).

¹¹⁴ See Marina du Plessis, *The Role of Knowledge Management in Innovation*, 11 J. KNOWLEDGE MGMT. 20, 27 (2007) (addressing the role of tools for knowledge management in increasing both productivity and the pace of innovation).

¹¹⁵ See *id.* at 28 (recognizing a need for additional research to determine the impact of knowledge management on innovation).

¹¹⁶ See *id.* (stressing the valuable impact that research has on knowledge and innovation).

¹¹⁷ See Llewellyn Joseph Gibbons, *Do As I Say (Not As I Did): Putative Intellectual Property Lessons for Emerging Economies from the Not So Long Past of the Developed Nations*, 64 SMU L. REV. 923, 933-34 (2011) (discussing actual and opportunity costs on developing countries when imposing intellectual property rights enforcement regime).

¹¹⁸ See *id.* at 934 (suggesting difficulties in determining IPR structures to due increase in businesses requiring IP protection).

¹¹⁹ See WILLIAM KINGSTON, *BEYOND INTELLECTUAL PROPERTY: MATCHING INFORMATION PROTECTION TO INNOVATION* 171-72 (2010) (discussing developing

in the path to a developed economy is the establishment of institutions capable of delivering the sophisticated level of training necessary to make and enforce IP policy.¹²⁰

Common Themes in the Development of an Intellectual Property Regime

The development of nations is an unpredictable process.¹²¹ Some countries like South Korea and Singapore have made impressive progress in a very short period of time,¹²² while for other countries in the region, such as Thailand and Indonesia, it is a much longer process.¹²³ Still other countries like Ethiopia, thought to be one of the oldest countries in the world,¹²⁴ have failed to make any progress and remain one of the world's most impoverished with a GDP per capita of around \$1,100 USD¹²⁵.

In a recent law review article appropriately titled, "Do as I Say (Not as I Did)" Professor Llewellyn Gibbons starts with the contention that it is a, "generally accepted position that every country that has become a developed country did so by freeriding on the intellectual property of citizens of more developed countries."¹²⁶ Indeed the United States is no exception, and there are records of direct

countries' frustration with having to comply with constant updates of IPR regulations by western countries).

¹²⁰ See Gibbons, *supra* note 117, at 944 (describing the role of quasi-governmental agencies in helping developing countries enforce IP policies).

¹²¹ See JOACHIM MÜLLER, REFORMING THE UNITED NATIONS: THE QUIET REVOLUTION 97 (J2001) (characterizing the evolution of developing nations).

¹²² See MARCUS POWELL & JOHN LINDSAY, SKILLS DEVELOPMENT STRATEGIES FOR RAPID GROWTH AND DEVELOPMENT: THE EAST ASIAN ECONOMIC MIRACLE 16 (Ctr. For Emp. Initiatives 2010) (discussing progress made by South Korea and Singapore).

¹²³ See *id.* at 1 (describing incredibly slow progress of Thailand and Indonesia).

¹²⁴ See World Fact Book, *Africa: Ethiopia*, CENTRAL INTELLIGENCE AGENCY (Sept. 15, 2015), archived at <http://perma.cc/Q5VZ-HDR7> (providing Ethiopian history, governmental issues, and statistics).

¹²⁵ See *id.* (demonstrating Ethiopia's official GDP per capita).

¹²⁶ See Gibbons, *supra* note 117, at 924 (suggesting developing countries need the assistance from economically advanced countries).

United States government involvement in industrial espionage of British textile mills as early as the 1780s.¹²⁷

If the general proposition is not controversial, the most effective point in development to start enforcing IPR, and the mechanism in which to do so, is anything but.¹²⁸ Professor Gibbons advances the position that uncompensated intellectual property transfer (rather than use the word piracy), should be viewed as a form of foreign aid, and tolerated until later stages of development when domestic firms start to compete with the original IP rights holder in a meaningful way.¹²⁹ Conversely, the Business and Industry Advisory Committee (BIAC) to the Organization for Economic Co-operation and Development (OECD) advances the position that the minimum standard set forth in the Trade Related Aspects of IP (TRIPs) agreement is critical to spurring investment and development in even the least developed countries.¹³⁰

This represents a major divergence in the thinking and philosophy of IP policy development.¹³¹ International treaties such as TRIPs seek to impose more mature IP regulation at an earlier stage in development.¹³² It may partly be a reflection of the economic interests of the (more developed) drafting nations propagating the treaty, but the philosophy seems to be one of build it and they will come i.e. installing a robust IPR regime at an early stage in a country will then

¹²⁷ See *Economic Growth and the Early Industrial Revolution*, US HISTORY.ORG (2015), archived at <https://perma.cc/B6D4-YTAY> (illustrating the beginning of the American Industrial Revolution).

¹²⁸ See S. K. VERMA & N.V. MURALIDHAR RAO, WIPO, THE IMPACT OF INTELLECTUAL PROPERTY SYSTEM ON ECONOMIC GROWTH: FACT-FINDING SURVEYS AND ANALYSIS IN THE ASIAN REGION: COUNTRY REPORT – INDIA 2, 17 (2007) (analyzing development of IPR enforcement). It is believed that IP rights are essential to economic development and to the encouragement of investment. It is therefore critical that minimum standards for IP protection are implemented and enforced worldwide, including in the developing world. *Id.* at 17.

¹²⁹ See *id.* at 16 (demonstrating how India uses technological spillovers from developing countries to aid in their own country's progression).

¹³⁰ See *id.* at 2 (indicating TRIPs Agreement is adversely affecting advancement in developing countries).

¹³¹ See Yee K. Kim et al., *Appropriate Intellectual Property Protection and Economic Growth in Countries at Different Levels of Development*, 41 RESEARCH POLICY 358, 358 (2011) (observing differences in IP policy development).

¹³² See *id.* at 358-60 (discussing stages of economic development).

attract the kind of investment and collaboration, that leads to a modern knowledge based economy.¹³³

In the other camp, scholars like Professor Gibbons advocate implementation of strong IPR later in the development cycle.¹³⁴ The rationale is that relaxed IP regulation, allowing for uncompensated transfer of IP, is an efficient mechanism for a developing economy to learn basic skills and catch up.¹³⁵ In this model developed countries should tolerate piracy through the early and well into the middle developmental stages, in an effort to move the country along this process as quickly as possible.¹³⁶ By allowing a developing country relatively free access to intellectual capital, it can rapidly move up the learning curve, and develop the skills and associated wealth necessary to build a marketplace attractive to Multi-National Corporations (MNCs).¹³⁷ The theme here is that instead of blindly pushing for the strengthening and harmonization of IPR in developing countries, the focus should be on finding appropriate levels of IP protection for the particular stage of development.¹³⁸

It is perhaps useful here to introduce an analogy to the function of an IP regime in building a knowledge based economy, as that of scaffolding (IPR) in the construction (development) of a building (economy).¹³⁹ The rate at which scaffolding is assembled needs to approximate the rate at which the underlying structure is constructed.¹⁴⁰ If the scaffolding lags the construction of the building by too much it becomes the bottleneck, by restricting the movement of raw

¹³³ See *id.* at 360 (evaluating economic interests of more developed nations).

¹³⁴ See Gibbons, *supra* note 117, at 933 (contrasting ideas of implementing IPR).

¹³⁵ See Keith E. Maskus, *Intellectual Property Rights and Economic Development*, 32 CASE W. RES. J. INT'L L. 471, at 481 (2000) (discussing efficient IP mechanisms for developing countries' economies).

¹³⁶ See *id.* at 473 (analyzing central economic objectives of IP mechanisms).

¹³⁷ See LINSU KIM, UNCTAD-ICTSD, *TECHNOLOGY TRANSFER & INTELLECTUAL PROPERTY RIGHTS: THE KOREAN EXPERIENCE* 1, 4 (2003) (discussing developing countries ability to make the marketplace more attractive to MNCs).

¹³⁸ See Maskus, *supra* note 135, at 472 (reviewing the appropriate levels of IP protection and their effect on economic growth).

¹³⁹ See Cowan & Harrison, *supra* note 1, at 2 (describing the role of intellectual property rights in a knowledge-based economy).

¹⁴⁰ See UMA LELE ET AL., *INTELLECTUAL PROPERTY RIGHTS IN AGRICULTURE: THE WORLD BANK'S ROLE IN ASSISTING BORROWER AND MEMBER COUNTRIES* 8 (2000) (discussing the implementation of sufficient IPR legislation to protect a delicate infrastructure).

construction materials and hindering the access necessary for laborers to construct the next floor.¹⁴¹ However, given that scaffolding typically rests on the outer walls of the building and depends on that for support, if one were to build the scaffolding much higher than the accompanying building, the scaffolding would be hanging unsupported.¹⁴² In this state the scaffolding could become unstable such that any kind of disturbance, a strong wind for example, might cause it collapse.¹⁴³ Construction workers would be very hesitant to use and rely on this scaffolding for fear it could collapse on them, in the same way businessmen and lawyers are hesitant to rely on laws and regulations they view as fluid or unstable when considering long term investments in IP intensive R&D.¹⁴⁴ To complete the analogy, viewing the progress of the structure from a great distance, as is often the case for foreign firms considering FDI, it may be difficult to differentiate between the scaffolding and the building.¹⁴⁵ In this case one may be tempted to make the simplifying assumption that the height of the scaffolding can be used to approximate the progress of the building, an assumption which is risky and may not always be correct as the discussion on China will illustrate.¹⁴⁶

The purpose of this discussion thus far has not been to propose a new structure for the patent system or even to advocate for specific IP reforms, but rather to discuss the ways in which IP policies should be seen as a delicate economic tool and can lead to unintended consequences.¹⁴⁷ The framework for this type of analysis is

¹⁴¹ See *id.* at 56 (warning against delaying reform in IPR legislation in agribusiness in developing countries).

¹⁴² See *id.* at 57 (creating a parallel between Brazil's rapid development in agricultural business and scaffolding).

¹⁴³ See *id.* at 56 (drawing a parallel between the need for updated knowledge and the need for stronger scaffolding).

¹⁴⁴ See *id.* (commenting on the reluctance of developed countries to enter into trade with underdeveloped countries).

¹⁴⁵ See JONATHAN D. PUTNAM, *INTELLECTUAL PROPERTY AND INNOVATION IN THE KNOWLEDGE-BASED ECONOMY* 1-2 (2006) (examining difficulty to distinguish between IPR and foreign economies from outside perspectives).

¹⁴⁶ See PETER NOLAN, *IS CHINA BUYING THE WORLD?* 47-48 (2012) (maintaining that a large and highly controlled system is not always indicative of a successful system).

¹⁴⁷ See Maskus, *supra* note 135, at 493 (outlining the risk behind the use of IP policies).

directly applicable to the process of developing an economy.¹⁴⁸ However, the process of nation building introduces a host of unique variables.¹⁴⁹ These include cultural values and motivations of private actors that cannot always be traced back to dollars and cents, often violating a key assumption in classical economic analysis that assumes rational actors.¹⁵⁰ These additional variables can cause traditional theoretical models, and arguments based on them, to break down, and leave room for multiple plausible arguments.¹⁵¹

A Developmental Paradigm

An important pre-requisite to proceeding down the developmental path is a degree of political stability.¹⁵² Given an island of lawless inhabitants, the first step towards a more modern form of economic prosperity would be to install the basic legal mechanisms to discourage antisocial behavior and establish the fundamentals of property and contract law.¹⁵³ These basic laws allow individuals to develop specialized skill sets beyond providing for their own basic needs, and consequently, organize themselves into social structures that rely on trade with one another to more efficiently fill their needs.¹⁵⁴ Property rights, once established, form the basis of intellectual property rights by extending ownership principles to intangible

¹⁴⁸ See Maskus, *supra* note 135, at 495-96 (explaining the contributions of IP policies to developing countries in order to strengthen their regimes).

¹⁴⁹ See Maskus, *supra* note 135, at 495-96 (highlighting the complexity of economic development based on numerous variables).

¹⁵⁰ See Ji Y. CHOI, REALITY, NORMS AND IDENTITY IN INTERNATIONAL RELATIONS 2 (2015) (characterizing actors' interests and preferences).

¹⁵¹ See *id.* (recognizing that variables can dismantle traditional arguments and create new ones).

¹⁵² See ROBIN STRYKER, PUB. HEALTH L. RES. PROGRAM, MECHANISMS OF LEGAL EFFECT: PERSPECTIVES FROM THE LAW & SOCIETY TRADITION 4-5 (2012) (describing the contribution of law and society and its effects on politics).

¹⁵³ See Stephen Haggard, & Lydia Tiede, Presentation given at the University of Texas School of Law, The Rule of Law and Economic Growth: Where Are We? 6 (Mar. 25-26, 2010) (transcript *archived at* <https://perma.cc/VMR9-6QJG>) (explaining the connections between property and contract law and economic development).

¹⁵⁴ See Matt Ridley, *When Ideas Have Sex*, TED (Jul. 2010), *archived at* <http://perma.cc/Z8T4-PBY9> (discussing how the mating of ideas throughout history has created new ideas).

ideas.¹⁵⁵ Thus, property rights are a necessary precondition to IPR, and the nature of those property rights will form the basis of an IP policy.¹⁵⁶ For example, in a truly communist society, where personal property does not exist and everything belongs to the state, a western style IP regime granting individuals patents, trademarks, and copy-rights doesn't make much sense.¹⁵⁷

While the developmental path a country proceeds on depends on a mix of political leadership, economic structure, resources (including both natural and human), as well as historical and geographic considerations, certain generalizable stages and transition periods can be observed.¹⁵⁸ The first stage involves transferring away from a subsistence agrarian economy.¹⁵⁹ Once basic economic, political and legal structures are in place an economy will logically start to grow by leveraging its core competitive advantages, typically natural resources and the cost of labor.¹⁶⁰ Aside from specialized industries capitalizing on unique natural resources (e.g. oil, mining), an unskilled labor force willing to work for low wages will often lead to the establishment of a low-tech manufacturing and basic service economy.¹⁶¹ If the political and economic system is viewed as stable, and compatible with free trade (as opposed to protectionist), the

¹⁵⁵ See Peter Drahos, *The Universality of Intellectual Property Rights: Origins and Development*, WORLD INTELLECTUAL PROPERTY ORGANIZATION, archived at <http://perma.cc/38ZE-6BNE> (establishing the origins of intellectual property in basic property law).

¹⁵⁶ See *id.* (asserting the relationships between property and intellectual property rights).

¹⁵⁷ See Heiki Pisuke, Advisor to the Estonian Minister of Justice, Forum on Creativity And Inventions – A Better Future For Humanity In The 21st Century, The Role Of Intellectual Property (Copyright) And Future Challenges To Creators, Industry, Legislators And Society At Large: The Challenge For Post-Communist Countries 5 (Oct. 5-7, 2000) (transcript archived at <http://perma.cc/6DA4-92KH>) (inferring that countries could not successfully implement intellectual property right laws until they were post-communist countries).

¹⁵⁸ See WALT WHITMAN ROSTOW, *THE STAGES OF ECONOMIC GROWTH: A NON-COMMUNIST MANIFESTO* 4 (3rd ed. 1991) (describing the five stages of economic growth).

¹⁵⁹ See *id.* at 4 (describing stages of growth, wherein the first stage is a traditional society characterized by subsistence agriculture or hunting and gathering).

¹⁶⁰ See *id.* at 8 (explaining growth of an economy in the take-of stage).

¹⁶¹ See *id.* (describing evolution in industry leading to an expanding requirement of unskilled labor).

country may start attracting interest in Foreign Direct Investment (FDI) targeted at these industries.¹⁶²

This initial development of a labor intensive, low-tech manufacturing and basic services economy is the first step, and brings with it an incremental level of prosperity and GDP growth.¹⁶³ These jobs also transfer fundamental skills, which increase the absorptive capacity of that country, and lay the groundwork for future innovative capabilities.¹⁶⁴ At this stage the country is a net importer of IP, and IPR are typically barebones, non-existent, or exist on paper but through lack of enforcement are largely irrelevant.¹⁶⁵ The lack of IPR, especially now that digital technology has all but eliminated barriers to the flow of public information, can enable industries to rapidly catch up through the free examination and practice of foreign patented subject matter or the unimpeded downloads of copyrighted works.¹⁶⁶

The lack of IPR also removes the cost of IP licenses and R&D from a product, often substantially lowering its price and increasing access and affordability of these goods on the domestic market.¹⁶⁷ Affordability of basic technology can start a self-reinforcing feedback loop.¹⁶⁸ For example, if weak IPR lowers the cost of a computer to

¹⁶² See CAPITAL MARKETS CONSULTATIVE GROUP, INTERNATIONAL MONETARY FUND, FOREIGN DIRECT INVESTMENT IN EMERGING MARKET COUNTRIES, 4 (2003) (highlighting the importance of free trade and economic stability to foreign direct investment in emerging market economies).

¹⁶³ See Rahul Anand et al., *Structural Transformation and the Sophistication of Production*, 11 (Feb. 2012), (unpublished working paper) (on file with Int'l Monetary Fund) (concluding export sophistication is a fundamental growth driver in developing economies).

¹⁶⁴ See Micheline Goedhuys et al., *Knowledge-Based Productivity in 'Low-Tech' Industries: Evidence from Firms in Developing Countries* 5 (United Nations University, Working Paper No. 2008-2007, 2008) (confirming that improving human skill sets increases absorptive capacity).

¹⁶⁵ See *id.* at 9 (cautioning that a lack of IP enforcement causes protection issues).

¹⁶⁶ See *id.* at 16 (implying that the availability of technology from foreign sources can assist firms in research and development of new IPR).

¹⁶⁷ See Margaret Kyle & Yi Qian, *Intellectual Property Rights and Access to Innovation: Evidence from TRIPS* 6 (Nat'l Bureau of Econ. Research, Working Paper No. 20799, Dec. 13, 20140) (discussing how IPRs, particularly in the pharmaceutical industry, force patent holders to reduce the costs of their pharmaceuticals making them more financially accessible).

¹⁶⁸ See Simon den Uijl et al., *Managing Intellectual Property Using Patent Pools: Lessons from Three Generations of Pools in the Optical Disc Industry*, 55(4) CAL.

the point where the general population can afford it, there is now a wealth of free knowledge resources that can be easily accessed legally on the internet, from Wikipedia to downloadable podcasts from elite universities.¹⁶⁹ One could theoretically achieve an advanced knowledge of almost any topic by effectively utilizing these free resources.¹⁷⁰

This first wave of industrialization sets the stage for a transition period, the timeline and specifics of which are highly dependent on the individual country.¹⁷¹ One common archetype is a more open pathway to development, one which places an emphasis on free trade with more developed nations, and promotes policies designed to encourage FDI and to build an export driven economy.¹⁷² This is often achieved by a mix of domestic trade legislation, usually targeted at specific trade partners or industries, and accession to various international treaties (e.g. Paris Convention, TRIPS), standards and procedures (e.g. PCT), or trade organizations (e.g. OECD or WTO).¹⁷³ This strategy brings in foreign capital, but also continues to encourage technology transfer and absorption from the firms and government of more advanced nations.¹⁷⁴

Increased governmental revenue from economic growth can then be used to invest in basic infrastructure and state run education, which supports further development.¹⁷⁵ These resources also facili-

MGMT. REV. 31, 34 (2013) (explaining how the “self-reinforcing feedback loop” can be achieved if individual patent holders charge royalties that are genuinely reasonable in price).

¹⁶⁹ See *1150 Free Online Courses from Top Universities*, OPEN CULTURE, archived at <http://perma.cc/2TKY-5Q5J> (representing examples of knowledge resources that could be easily accessed online).

¹⁷⁰ See *id.* (encouraging the use of free knowledge resources).

¹⁷¹ See PETER BUXMANN ET AL., *THE SOFTWARE INDUSTRY* 160 (Springer-Verlag Berlin Heidelberg 2013) (explaining central role new technology plays in industrialization).

¹⁷² See BELA BALASSA, *TRADE BETWEEN DEVELOPED AND DEVELOPING COUNTRIES: THE DECADE AHEAD 17-18* (1980) (emphasizing how trade liberalization will lead to an increase in developed countries’ exports).

¹⁷³ See *id.* at 17 (achieving advances in imports).

¹⁷⁴ See *id.* at 18 (discussing how the strategy has economic advancement for both capital and developed countries).

¹⁷⁵ See WORLD INTELLECTUAL PROPERTY ORGANIZATION, *WORLD INTELLECTUAL PROPERTY REPORT: THE CHANGING FACE OF INNOVATION* 3, 7 (2011) [hereinafter *THE CHANGING FACE OF INNOVATION*] (explaining how the innovation and increased revenue can be contributed to economic and social development).

tate access to consultants who can start to transfer organizational, marketing, design and logistical innovations and best practices¹⁷⁶ to companies and governments.¹⁷⁷ Many successful countries are strategic in their investments, and select certain target industries to focus development on.¹⁷⁸ Careful selection of target industries based on a strategic fit with the countries natural resources, existing and planned infrastructure, talent, and the industries growth prospects, can be a key determinate of developmental success going forward.¹⁷⁹ As the absorptive capacity of the country continues to increase, incremental innovation will start to take place.¹⁸⁰ This often starts with the adaptation of foreign goods for local markets.¹⁸¹ The adaptations can be as simple as more culturally relevant cosmetic designs or, as innovation capacity increases, complete redesigns of sophisticated equipment such as Magnetic Resonance Imaging (MRI) machines to meet local needs and price points.¹⁸²

This stage is where a more robust IP regime starts to take shape and countries struggle to balance various competing interests.¹⁸³ As GDP grows Multinational Corporations (MNCs) in more developed countries will start to monitor the local business environment, as both a source of competition and as a potential marketplace for their products.¹⁸⁴ If the industry is one that relies heavily on IPR, the MNCs will take notice of the IP environment in the developing country, and if the company perceives a lack of IPR as a threat to

¹⁷⁶ See *id.* at 9-10 (explaining best innovation strategies and collaborative practices including working with market intermediaries).

¹⁷⁷ See *id.* at 9 (illustrating by showing the U.S GDP. and domestic company growth).

¹⁷⁸ See *Manufacturing in a Two-Speed World*, KNOWLEDGE@WHARTON (Feb 10, 2011), archived at <http://perma.cc/8QK3-RF9J> (suggesting that successful countries are strategic in their investments).

¹⁷⁹ See *id.* (providing China as an example).

¹⁸⁰ See *id.* (explaining how the capacity to grow is necessary for innovation).

¹⁸¹ See *id.* (illustrating reconstruction of networks to serve local markets).

¹⁸² See *id.* (analyzing market data to understand consumer buying habits).

¹⁸³ See Don Mayer & Ruth Jebe, *The Legal and Ethical Environment for Multinational Corporations*, in GOOD BUSINESS 13, 159, 161 (James O' Toole et al. eds., 2010) (arguing the benefits of MNCs in regards to human rights and governance).

¹⁸⁴ See Rafael Lucea & Jonathan Doh, Article, *International Strategy for the Non-market Context: Stakeholders, Issues, Networks and Geography*, 14 BUSINESS AND POLITICS 1, 21 (2012) (laying out a 4 step process which MNCs tend to follow in the process of localization).

them, start to pressure their own governments to take action.¹⁸⁵ These foreign governments will in turn put pressure on developing countries to adopt additional IP laws, or to more adequately enforce laws already on the books.¹⁸⁶ This pressure can come in the form of trade and economic sanctions or, if the country has joined major trade organizations or international treaties, through enforcement mechanisms within these channels.¹⁸⁷ If the less developed country is reliant on aid from, or commerce with, the country threatening action it will be at a major disadvantage in these negotiations, a reality that will limit their practical options in terms of a response.¹⁸⁸

The next transition can be an awkward one, often certain industries within the country benefit from having relaxed IP standards, while the country simultaneously seeks to develop other industries and attract FDI that is more reliant on strong IPR.¹⁸⁹ Lawmakers may be very hesitant to do anything that could hurt economic sectors that have brought them to their current level of prosperity, but simultaneously desire to adopt policies to move towards a more knowledge based economy.¹⁹⁰ Each country wrestles with this transition in its own way.¹⁹¹ A common theme is the appeasement of foreign nations by agreeing to demands in principle, often to avoid disciplinary action, and then subsequently underperforming on those obligations or

¹⁸⁵ See Lanjouw & Lerner, *supra* note 88, at 22 (demonstrating American manufacturing's interest in strong IPRs through a sample study taken from six different industries).

¹⁸⁶ See CORPORATE SOCIAL RESPONSIBILITY AND GOVERNANCE: THEORY AND PRACTICE 155 (Samuel O. Idowu et al. eds., 2015) [hereinafter CORPORATE SOCIAL RESPONSIBILITY AND GOVERNANCE] (describing a positive effect of international development).

¹⁸⁷ See *id.* at 170-71 (highlighting specific rules through which sanctions are implemented).

¹⁸⁸ See Steve Kapfer, *Multinational Corporations and the Erosion of State Sovereignty* 1 (Apr. 7, 2006) (unpublished paper) (on file with Illinois State University Library system) (recognizing the bargaining power MNCs have over developing countries).

¹⁸⁹ See Lanjouw & Lerner, *supra* note 88, at 22 (highlighting the strengths that FDI's seek in foreign host countries).

¹⁹⁰ See TOWARDS A KNOWLEDGE BASED ECONOMY? 78 (Michael Kuhn et al. eds., 2006) (focusing on incentives of creating knowledge based economies).

¹⁹¹ See *id.* (explaining that lawmakers take their countries' current economic status into consideration when adopting new policies).

implementing some form of an IP resistance strategy.¹⁹² Further complicating this transition is the sophistication of courts and judges who may have received limited formal legal education¹⁹³ and have minimal experience and established doctrine to draw on.¹⁹⁴ This can lead to situations in which IP related decisions are seen as divergent and unpredictable, while the judiciary slowly learns to grapple with the complexity of these kinds of cases.¹⁹⁵

During this phase the government may start to fund R&D activities in universities and Public Research Organizations (PRO), in an effort to start a transition towards a knowledge based economy.¹⁹⁶ As the country develops an internal capacity for research and development (R&D), domestic IP generating activity will increase.¹⁹⁷ This trend is sometimes measured by the ratio of patents granted to domestic as compared to foreign nationals.¹⁹⁸ This metric can be misleading however, if the amount of foreign entities pursuing patents is small due to the perception that the value of owning patents in the country is low.¹⁹⁹

Even with treaties and international trade organizations, there are ultimately a limited number of tools in the enforcement

¹⁹² See Robert C. Bird & Daniel R. Cahoy, *The Emerging BRIC Economies: Lessons from Intellectual Property Negotiation and Enforcement*, 5 NW. J. TECH. & INTELL. PROP. 400, 405-06 (2007) (summarizing IP strategy negotiations between United States and China).

¹⁹³ See Eric W. Orts, *The Rule of Law in China*, 34 VAND.J.TRANSNAT'L L. 43, 65 (2001) (stating “[o]nly about one-fifth of all lawyers in China have law degrees, and an even lower percentage of judges have formally studied law at a university”).

¹⁹⁴ See *id.* at 65-66 (concluding that lack of legal experience and precedent handicaps Chinese legal jurisprudence).

¹⁹⁵ See *id.* at 100-01 (inferring that complex legal issues such as IP rights must have developed law in order to remain stable in China).

¹⁹⁶ See Gregory Tasse, *Policy Issues for R&D Investment in a Knowledge-Based Economy*, 29 J. TECH. TRANSFER 153, 153 (2004) (noting “the analysis of Federal R&D investment strategies . . . must recognize the full range of public and private technology assets constituting a national innovation system”).

¹⁹⁷ See Rod Hunter, *Why India needs stronger IPR*, BUS. STANDARD (Aug. 22 2015), archived at <http://perma.cc/A2QR-9AKH> (analyzing correlation between research and development and IP generation).

¹⁹⁸ See *id.* (demonstrating the vertical correlation between countries with higher patent filings and R&D investments).

¹⁹⁹ See *id.* (suggesting that people do not want to invest in R&D in India due to their poor reputation with IP law).

toolbox.²⁰⁰ It is consequently very difficult to unilaterally force a country to adopt and enforce IPR that the country feels are not in its best interest or otherwise threaten its sovereignty.²⁰¹ Real change only comes when the country reaches a tipping point, where domestic industries reliant on IP reach a critical mass, and domestic firms start to produce IP of their own that they demand to be protected.²⁰² The determination of when this tipping point occurs is an inexact calculus that involves weighting of a variety of factors including: structures of key industries, economic and development goals, pressure from the international community, domestic capabilities, the value to the domestic economy of uncompensated IP transfers (piracy), and the perceived limiting effects of current IP policy on tech transfer, FDI, foreign trade partners and cooperation from MNCs.²⁰³

Once this tipping point is reached and IP reform becomes a priority, the country will look for high profile opportunities to signal this to the international community.²⁰⁴ These signaling events are meant to foster a more innovation friendly climate.²⁰⁵ Ideally, this climate will then lead to increased investment and technology transfer, as international firms gain increased confidence in the security of the local business environment.²⁰⁶ A combination of foreign and domestic investment will continue to increase education and absorptive capacity that, over time, will allow a country to catch up to the “state of the art” in key target industries.²⁰⁷ Once this level is reached

²⁰⁰ See Ronald J. T. Corbett, *Protecting and Enforcing Intellectual Property Rights in Developing Countries*, 35 INT’L LAW. 1083, 1086 (2001) (discussing the lack of enforcement abilities in international IPR).

²⁰¹ See *id.* at 1092 (stating that there are multiple reasons why developing countries resist incorporating international IPR laws).

²⁰² See *id.* at 1093 (illustrating that in developing countries, private parties must petition the government for protection if their country has yet to adopt IPR laws).

²⁰³ See *id.* (listing reasons why developing countries decide to enact IPR).

²⁰⁴ See Gibbons, *supra* note 117, at 933 (mentioning that once a country has reached its tipping point, they will want to be seen as a respected player in the global IP industry).

²⁰⁵ See Gibbons, *supra* note 117, at 933-34 (implying that these countries try to reinvent themselves as a safe-haven for intellectual property).

²⁰⁶ See Gibbons, *supra* note 117, at 933-34 (discussing international firm’s research and development within local economies).

²⁰⁷ See Gibbons, *supra* note 117, at 932-33 (exploring possible advancements through foreign investments).

the country is positioned to start to produce its own incremental, and eventually, disruptive innovations within the industry.²⁰⁸

The ability to execute on this potential is closely tied to the establishment of a healthy business environment, including appropriate IP protections and mechanisms to enforce IPR.²⁰⁹ This business environment makes it possible for firms to get the financing required to make the larger, more risky, and longer term investments, necessary to advance the state of the art.²¹⁰ As a country continues to mature, they typically move backward in the innovation and R&D process, toward more basic types of research.²¹¹ Universities and PROs will also take on more importance in advancing innovation, by providing the training and talent to feed a mature knowledge based economy, and performing fundamental research.²¹²

There will always be exceptions and special cases deviating from this paradigm as a result of the unique set of circumstances in each country.²¹³ A global theme is that development is now more knowledge driven than it has ever been in the past.²¹⁴ A recent World Intellectual Property Organization (WIPO) publication astutely points out that “the easy availability of millions of patent documents to anyone connected to the Internet has arguably created new catch-up opportunities for technologically less developed economies.”²¹⁵

²⁰⁸ See Gibbons, *supra* note 117, at 933 (concluding that innovation leads to more industrialized countries).

²⁰⁹ See Gibbons, *supra* note 117, at 951 (demonstrating how a healthy business environment leads to innovation).

²¹⁰ See Gibbons, *supra* note 117, at 945 (expanding on idea of a healthy business environment and innovation).

²¹¹ See Gibbons, *supra* note 117, at 933 (exposing degenerated process of innovative industrialization).

²¹² See THE CHANGING FACE OF INNOVATION, *supra* note 175, at 9, 14 (acknowledging roles that universities and PROs play in innovation).

²¹³ See THE CHANGING FACE OF INNOVATION, *supra* note 175, at 17 (recognizing variations in each country’s IP development).

²¹⁴ See THE CHANGING FACE OF INNOVATION, *supra* note 175, at 7 (acknowledging recent trend of knowledge-driven development).

²¹⁵ See THE CHANGING FACE OF INNOVATION, *supra* note 175, at 12 (discussing the possible upside in markets where internet is less developed and utilized).

Paradigm in Practice: Current Examples from Developed and Developing Nations

United States

The development of the largest economy in the world (as measured by GDP²¹⁶) is an example that demonstrates the use of IP law as an economic tool, and the clear relationship between the implementation of IP policy, and mechanism of economic development.²¹⁷ The basis for the United States (US) intellectual property system is somewhat unique in that it was unambiguously etched into the central founding document; in Article I, Section 8, Clause 8 of the United States Constitution congress is explicitly delegated the power, “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.”²¹⁸ Although congress quickly used that power to draft the patent act of 1790, the United States did not start off with anything that resembles the expansive and far reaching IPR regime it has today.²¹⁹

The US started its economic growth by deliberately and strategically absorbing and imitating technology from Europe without compensation (i.e. pirating).²²⁰ The US made no secret about its preference for domestic inventors, by charging a lower fee at the patent office for citizens than non-citizens.²²¹ By absorbing and imitating this technology, the US quickly climbed the technological learn-

²¹⁶ See WORLD BANK GROUP, WORLD DEVELOPMENT INDICATORS 2015, 1 (2015) (ranking countries by sale of gross domestic product (GDP)).

²¹⁷ See William Daley, *In Search of Optimality: Innovation, Economic Development, and Intellectual Property Rights*, in GSDR PROTOTYPE BRIEF 1-2 (2014) (focusing on relationship between IP policy and economic development).

²¹⁸ See U.S. CONST. art. I, § 8, cl. 8 (discussing the Copyright Clause of the United States Constitution).

²¹⁹ See Edward C. Walterscheid, *Charting a Novel Course: the Creation of the Patent Act of 1790*, 25 AIPLA Q. J. 445, 448 (1997) (demonstrating results of Patent Act of 1790).

²²⁰ See Gibbons, *supra* note 117, at 931 (examining IP advancements through piracy).

²²¹ See PETER DRAHOS, THE GLOBAL GOVERNANCE OF KNOWLEDGE: PATENT OFFICES AND THEIR CLIENTS 19 (2010) (noting United States’ preference to domestic inventors).

ing curve, and in short order started to emerge as a leader in industrial innovation.²²² Illustrative of the links between IPR regimes and economic development, the US quickly developed a modern patent system, vesting patentees with significant rights that courts had broad power to enforce,²²³ while simultaneously neglecting less economically important forms of IP such as copyright.²²⁴ The development of the patent system in this case appeared to be strategic and implemented in lockstep with economic progress.²²⁵ Consistent with the developmental paradigm, the US had relaxed IPR enforcement in its early stages after the revolution, when such a policy was beneficial to the country.²²⁶ However, once the US became an industrial leader the patent regime quickly evolved into one that was liberal in the rights granted to inventors, and open to a much wider range of the population compared to the patent regimes of England and France.²²⁷

By having lower fees, centralized processing and examination, and making specifications of patents available to the public, the US gave birth to the first modern patent system.²²⁸ The structure succeeded in enabling access to the patent system for a much wider range of individuals than its European counterparts.²²⁹ This helped to speed the diffusion of ideas and inventions, and to decouple the task of innovation from that of commercialization.²³⁰ In Europe, high fees and other practices made it difficult for those without access to

²²² See Gibbons, *supra* note 117, at 932 (demonstrating how U.S. became a leader in industrial innovation).

²²³ See B. ZORINA KHAN, *THE DEMOCRATIZATION OF INVENTION: PATENTS AND COPYRIGHTS IN AMERICAN ECONOMIC DEVELOPMENT 1790-1920* 283 (2005) (explaining rights the courts are able to enforce).

²²⁴ See *id.* (providing an example of neglected forms of IP).

²²⁵ See Gibbons, *supra* note 117, at 931 (describing the connection between economic development and intellectual property rights).

²²⁶ See Gibbons, *supra* note 117, at 933-34 (explaining the post-industrial revolution approach to the balancing of intellectual property rights).

²²⁷ See Gibbons, *supra* note 117, at 943-44 (setting out the development of the American "industrial powerhouse" founded on European intellectual labor).

²²⁸ See Gibbons, *supra* note 117, at 942-46 (examining the characteristics of the modern patent system).

²²⁹ See Raymond J. Keating, *Patent Reform: Protecting IP, Enabling Innovation, & Bolstering Entrepreneurship*, in *SMALL BUSINESS & ENTREPRENEURSHIP COUNCIL PATENT REFORM* 15 (2008) (discussing the PTO impact upon patent growth in the United States and comparing it to rates in Europe and Japan).

²³⁰ See *id.* at 7 (stressing the importance of commercialization to patent growth).

wealth or power to utilize the patent system.²³¹ This not only alienated many inventors, but the same lack of connections and resources that precluded access to the patent system also made it difficult for these inventors to successfully commercialize their inventions.²³²

Conversely, the American patent system readily provided these innovators with a mechanism to register their inventions, and then transfer their rights to individuals and entities with the proper skill sets, connections, and resources needed to commercialize the technology by achieving the production of salable products and delivering them to the marketplace.²³³ This mechanism promoted more efficient markets by allowing the resources and skills needed for invention and commercialization to be independent of one another.²³⁴ This key innovation helped America quickly gain prominence as a technological leader, and helped to develop and foster an innovation friendly culture.²³⁵ As a counterpart the US simultaneously developed a strong legal doctrine relating to enforcement.²³⁶ This system experienced fairly consistent levels of patent litigation in the early years, with 1-3%²³⁷ of patents being the subject of litigation, a number

²³¹ See *High Fees Could Destabilize the European Patent System, Warn Lawyers*, POLICY REVIEW (May 2015), archived at <http://perma.cc/3CT2-KUPV> (stressing that setting high fees for European Unitary Patents could send message that Europe is uncompetitive).

²³² See *id.* (discussing Article 12(2) of the EU Regulation No. 1257/2012, which addresses several aspects of UP implementation, and reiterating that high fees could hurt Europe's competitiveness).

²³³ See Daniel Fisher, *The Real Patent Crisis is Stifling Innovation*, FORBES (Jun. 18, 2014), archived at <http://perma.cc/AH7Q-KK3Q> (recalling the original purpose of the patent American system, created in 1787).

²³⁴ See Maskus, *supra* note 135, at 473 (highlighting the two economic objectives for a system of intellectual property, one of which being the goal to encourage rights holders to place ideas and inventions on the market).

²³⁵ See David Goldstein, *Innovations and Free Markets in America*, SWITCHBOARD (Sept. 28, 2012), archived at <http://perma.cc/YV8D-7RTX> (portraying America as having the most innovation-friendly economy in the world).

²³⁶ See Mark Lemley & Carl Shapiro, *Probabilistic Patents*, 19 J. ECON. PERSP. 75, 82 (2005) (finding that both patent reformers and courts push for limits of continuations).

²³⁷ See Thomas H. Adolph, *Some Current Patent Infringement Case Statistics*, MARTINDALE.COM (Nov. 10, 2006), archived at <http://perma.cc/4W NX-4Z62> (noting that in 2004, only about 3.2% of patent litigation cases were resolved by trial).

which is remarkably close to the 1.5% probability of litigation for an issued patent today.²³⁸

What is interesting about the early leadership position in the field of patent law is that the US simultaneously had, by European standards, very underdeveloped copyright laws.²³⁹ Furthermore, the copyright laws the US did have on the books were applied disproportionately towards protecting domestic works.²⁴⁰ This state of affairs persisted throughout the 19th and 20th centuries, with the US refusing to participate in the Berne Convention for the Protection of Literary and Artistic Works until 1988.²⁴¹ The American reluctance to adopt and enforce copyright, in sharp contrast to patents, can most easily be reconciled by the observation that Europe had a very rich history in literature, arts, music and other forms of expression covered by copyrights; much more advanced than anything the US was producing in its early days.²⁴² During this period American artists, writers, and thinkers enjoyed relatively free access to materials that were subject to strict copyright laws in Europe.²⁴³ Through the same mechanisms of absorption and imitation, the US eventually developed its own rich arts and entertainment culture, and not surprisingly also began to take copyright law more seriously.²⁴⁴ This series of events illustrates how the early decision of the US to focus on industrial innovation, as a

²³⁸ See Lemley & Shapiro, *supra* note 236, at 75, 79 (recognizing the small amount of patents which are up for litigation).

²³⁹ See KHAN, *supra* note 223, at 283 (discussing copyright laws in their infancy and progressive development).

²⁴⁰ See ROBERT A. BARON, COPYRIGHT & FAIR USE THE GREAT IMAGE DEBATE 106 (Helen E. Roberts et al. eds., 2005) (describing historical protections of copyright laws in the United States prior to 1988).

²⁴¹ See Berne Convention Implementation Act of 1988, Pub. L. No. 100-568, 102 Stat. 2853 (1988) (overturning 102 years of American copyright law and implementing a system to protect the copyrights of literary works).

²⁴² See Barbara A. Ringer, *The Role of the United States in International Copyright – Past, Present and Future*, 56 GEO. L. J. 1050, 1051 (1968) (addressing the United States' hesitancy to join the Berne Convention, based upon concerns with both moral rights and copyright formalities).

²⁴³ See *id.* at 1065 (discussing the restricted access to copyrighted material in Europe compared to the U.S. and the need for uniformity).

²⁴⁴ See IAN BROWN, FOUNDATION FOR INFORMATION POLICY RESEARCH, IMPLEMENTING THE EU COPYRIGHT DIRECTIVE, 9 (2001) (suggesting motives behind United States implementation of copyright law).

means of economic development, is directly reflected in its development of corresponding IPR regime.²⁴⁵

South Korea

South Korea is a remarkable model for how rapid economic development can be in the right circumstances.²⁴⁶ The pace of development was so striking that it has earned the nickname “The Miracle on the Han River,” referring to the rapid industrialization and revitalization of the capital Seoul.²⁴⁷ Following the Korean War, South Korea was one of the poorest nations on earth with an annual GDP per capita of just \$80.²⁴⁸ Within the lifespan of a single generation, only 50 years, the GDP per capita has skyrocketed to over \$33,200 in 2011,²⁴⁹ and despite its relatively small size South Korea had the world’s 13th largest economy (as measured by GDP).²⁵⁰ This rapid development is all the more impressive when the plight of its neighbor to the north is considered.²⁵¹ Despite having access to much of the same resources, North Korea has pursued a set of policies which have failed to make even moderate economic progress in this same time period.²⁵² To this day North Korea remains in extreme poverty,

²⁴⁵ See *id.* (portraying timeline of US industrial innovation as well as IPR development).

²⁴⁶ See Marcus Noland, *Six Markets to Watch: South Korea*, FOREIGN AFFAIRS (Jan. 2014), archived at <http://perma.cc/T87K-AHCC> (displaying South Korea’s rapid economic development under certain circumstances).

²⁴⁷ See Gookjin Jeong, *Miracle on the Han River: A Regression Analysis of the Effect of Chaebol Dominance on South Korea’s Economic Growth* (Apr. 9, 2015) (unpublished honors thesis, University of Colorado, Boulder) (on file with the University of Colorado CU Scholar) (discussing South Korea’s rapid economic growth which earned it the nickname “Miracle on the Han River”).

²⁴⁸ See Ji-Hyun Park, *South Korea*, in INTELLECTUAL PROPERTY IN ASIA: LAW, ECONOMICS, HISTORY AND POLITICS 271 (Paul Goldstein et al. eds., 2009) (referencing South Korea’s low GDP during 1960 after the Korean War).

²⁴⁹ See *South Korea*, THE WORLD FACTBOOK (Sep. 24, 2015), archived at <https://perma.cc/6Y66-HCD4> (listing South Korea’s GDP at \$33,200 in 2012).

²⁵⁰ See *id.* (indicating South Korea’s position in a list of countries ranked by GDP).

²⁵¹ See *North Korea*, THE WORLD FACTBOOK (Sep. 24, 2015), archived at <https://perma.cc/3FY6-KRA5> (noting North Korea’s economic problems).

²⁵² See *id.* (describing the issues North Korea has faced, such as natural disasters, causing their disastrous economic problems).

with a GDP per capita \$1800 in 2011, trailing some of the least developed countries, such as Sudan and Cambodia.²⁵³

South Korea has benefited from a long term strategic vision to become a developed, knowledge based economy.²⁵⁴ The country was also small and nimble enough to constantly tweak its IP and economic policy in order to stay on this path.²⁵⁵ In keeping with the developmental paradigm outlined in this paper, South Korea's initial growth relied heavily on absorbing technology from outside its borders' and applying it in a targeted industry, the shipbuilding and automobile manufacturing sector.²⁵⁶ The fruits of this labor drove a strong export economy, and the government used this influx of foreign capital to invest in infrastructure that would position it well for the digital age.²⁵⁷ South Korea's rapid rise in economic status can be attributed to its early recognition of the importance of telecommunications infrastructure in the economy of the future.²⁵⁸ This insight lead to early adoption of fiber optics technology, a network South Korea began to build as early as the 1980s.²⁵⁹ This investment paid off, and South Korea status as one of the world's most wired coun-

²⁵³ See *id.* (comparing North Korea's GDP per capita to that of the rest of the world).

²⁵⁴ See JOONGHAE SUH ET AL., KOREA AS A KNOWLEDGE ECONOMY: EVOLUTIONARY PROCESS AND LESSONS LEARNED, 4 (Derek H. C. Chen ed., 2006) (explaining how Korea moved from financial collapse to a knowledge-based economy).

²⁵⁵ See Taegi Kim & Keun-Yeob Oh, *The Effects of the Patent System on Innovation and Productivity: Evidence From Korea's Firm Level Data*, in THE ECONOMICS OF INTELLECTUAL PROPERTY IN THE REPUBLIC OF KOREA 77 (World Intellectual Property Organization) (focusing on South Korea's ability to expand and develop under any circumstances).

²⁵⁶ See *id.* (expanding on South Korea's initial growth and how it was accomplished).

²⁵⁷ See *id.* (showing foreign capital investment as a major part of being successful in the digital age).

²⁵⁸ See Alexandre Y. Mansourov, *Information Technology Revolution in the Republic of Korea: Rise of the Knowledge-Based Society*, in BYTES & BULLETS: INFORMATION TECHNOLOGY REVOLUTION & NATIONAL SECURITY ON THE KOREAN PENINSULA 23 (2005) (emphasizing the importance of South Korea's telecommunication infrastructure).

²⁵⁹ See *Telecommunication Infrastructure*, MOGIT, archived at <http://perma.cc/NS3L-QPAM> (demonstrating South Korea's adoption of fiber optics in the early 1980s).

tries,²⁶⁰ has facilitated its emergence as a leader in the electronics and technology industries.²⁶¹

South Korea went through the development paradigm so quickly that it is difficult to pinpoint all the discrete steps.²⁶² In the early 1980s, as South Korean growth accelerated, MNCs from more developed nations started to see South Korean firms as competitive threats.²⁶³ When South Korean competitors emerged, US firms started to take note and complain about insufficient IPR protection and piracy.²⁶⁴ This trend led the US in 1985 to formally launch a Section 301 investigation²⁶⁵ against South Korea, to determine if trade sanctions for insufficient IP laws and enforcement were appropriate.²⁶⁶ The threat of trade sanctions led to a series of consultations with the South Korean government, in which South Korean officials quickly agreed to patent and copyright reforms implemented in 1987.²⁶⁷

In line with the paradigm, these laws were strong on paper, but the South Korean government initially struggled with enforcement issues that would gradually improve over time.²⁶⁸ By 1999 knowledge based industries accounted for 45.6% of the South Ko-

²⁶⁰ See Tim Hornyak, *Getting Online in Super-Wired South Korea*, CNET (July 16, 2012), archived at <http://perma.cc/3X89-BAVE> (characterizing South Korea as the most wired country in the world).

²⁶¹ See *id.* (illustrating South Korea's status as one of the technological world leaders).

²⁶² See YOUNG-LOB CHUNG, *SOUTH KOREA IN THE FAST LANE: ECONOMIC DEVELOPMENT AND CAPITAL FORMATION* 13 (2007) (exploring major five major stages of economic development in South Korea during the 1980s).

²⁶³ See ANTHONY P. D'COSTA, *AFTER DEVELOPMENT DYNAMICS: SOUTH KOREA'S CONTEMPORARY ENGAGEMENT WITH ASIA* 126-27 (2015) (providing examples of South Korea's competitive presence in the economic market).

²⁶⁴ See *id.* at 89-90 (exposing weak IPR protection and piracy in United States).

²⁶⁵ See Trade Act of 1974, Pub.L. 93-618, 88 Stat. 1978, (1975) (codified as amended at 19 U.S.C. § 2411 (1996)) (providing the official public law on Section 301 in the Trade Act of 1974).

²⁶⁶ See Matthew K. Dames, *History of the Special 301 Report*, THE PIRACY PARADIGM (May 2, 2012), archived at <http://perma.cc/26QD-9W9X> (detailing whether the development of the U.S. government's trade sanctions against South Korea are appropriate).

²⁶⁷ See *Korea 301 Record of Understanding on Intellectual Property Rights*, TRADE COMPLIANCE CENTER, archived at <http://perma.cc/ML8L-9FU4> (discussing the Korean government's swift approval of patent and copyright reforms in 1987).

²⁶⁸ See *id.* (summarizing how South Korean government handled enforcement issues better over time).

rea's annual GDP growth.²⁶⁹ This economic growth from knowledge based industries would set the stage for IP reforms.²⁷⁰ In 2002 the International Intellectual Property Alliance (IIPA) found that "piracy levels are excessively high across the board, causing an estimated \$572 million in (annual) losses to U.S. copyright owners."²⁷¹ This would culminate in 2003 with major revisions to copyright law and the formation of a "Standing Inspections Team" that had broad policing power to conduct raids and enforce IPR.²⁷² The dramatic imagery of an armed unit conducting raids and seizing counterfeit goods was clearly an attempt to signal to the international community that South Korea was ready to take IPR enforcement more seriously.²⁷³ Despite this move South Korea continues to be targeted for a high degree of music piracy²⁷⁴ and, much like the United States in the early and middle stages of development, South Korean leadership in more technical industries like semiconductors, has shifted the focus of IPR legislation and enforcement towards patent rather than copyright law.²⁷⁵

During the early part of the millennium South Korea began to transition from an imitation and reverse engineering model of technology transfer, to an innovation one, based on explicit agreements and licenses of patents.²⁷⁶ This theme signaled to the international business community that South Korea was making progress in pro-

²⁶⁹ See Park, *supra* note 248, at 272 (stating the annual growth of South Korea's GDP).

²⁷⁰ See Park, *supra* note 248, at 272 (stating how the GDP growth from knowledge based industries set the stage).

²⁷¹ See INT'L. INTELLECTUAL PROP. ALLIANCE, INTERNATIONAL INTELLECTUAL PROPERTY ALLIANCE 2003 SPECIAL 301 REPORT: SOUTH KOREA 288 (2003) [hereinafter SPECIAL 301 REPORT: SOUTH KOREA] (discovering the excessively high piracy levels and how this is causing copyright owners over half a billion dollars annually).

²⁷² See *id.* (explaining the creation of new mechanisms to enforce the copyright laws in South Korea).

²⁷³ See INT'L. INTELLECTUAL PROP. ALLIANCE, HISTORICAL SUMMARY OF SELECTED COUNTRIES' PLACEMENT FOR COPYRIGHT-RELATED MATTERS ON THE SPECIAL 301 LISTS 42 (2012) (noting that South Korea made meaningful improvements in an effort to stop piracy).

²⁷⁴ See *id.* (discussing the serious economic damage caused by piracy).

²⁷⁵ See *id.* (describing how South Korea established a Copyright Protection Center and a Standing Inspection Team).

²⁷⁶ See KIM, *supra* note 137, at 4-5 (characterizing Korea's evolution of technology transfer).

protecting patented IP.²⁷⁷ A safer environment for patent related IP helped to attract more FDI and an increased willingness on the part of MNCs to work with, and transfer knowledge to, South Korean individuals and firms.²⁷⁸ By this point South Korea's knowledge based economy had reached the tipping point.²⁷⁹ A virtuous cycle of domestic innovations and continued FDI in high-technology industries is rapidly completing the transition of South Korea to a knowledge based economy.²⁸⁰ Flagship companies, such as Samsung, in core industries, like smartphones, are seeing businesses increasingly build models that are reliant on a developed IP regime.²⁸¹ It is worth noting that as recently as 2009 South Korea continues to be criticized for a high amount of digital internet based copyright piracy.²⁸² This can be accounted for by the observation that the South Korean economy is heavily weighted towards hardware design and manufacturing, as opposed to software and entertainment.²⁸³

The recent smartphone patent wars between Samsung (a South Korean firm), and American firms Motorola and Apple, are representative of the South Korean business environment with respect to patentable IP.²⁸⁴ Domestic firms (like Samsung) view patents as a core strategic asset to support and defend their business model.²⁸⁵ It is reported that as of 2012 Apple and Samsung are engaged in over

²⁷⁷ See KIM, *supra* note 137, at 5 (introducing Korea's significant patent activity over time).

²⁷⁸ See KIM, *supra* note 137, at 18 (concluding that "a lack of IPR protection may deter FDI to developing countries").

²⁷⁹ See SUH, *supra* note 254, at 8 (referencing the 1997 Korean financial crisis that lead to economic downturn).

²⁸⁰ See SUH, *supra* note 254, at 80 (stating Korea's goal of a knowledge based economy, which was accomplished through investment in information and communication technology).

²⁸¹ See Lohr, *supra* note 57 (explaining how the purpose of patents was to incentivize innovation).

²⁸² See SPECIAL 301 REPORT: SOUTH KOREA, *supra* note 271, at 288 (arguing that South Korea's policies against piracy should be stricter).

²⁸³ See Alan McGlade, *Why South Korea Will Be The Next Global Hub for Tech Startups*, FORBES (Feb. 6, 2014), archived at <http://perma.cc/K2NE-H8CY> (describing South Korea's success in manufacturing and design).

²⁸⁴ See Lohr, *supra* note 57 (discussing Samsung's failure to verify patents).

²⁸⁵ See SPECIAL 301 REPORT: SOUTH KOREA, *supra* note 271, at 291 (listing improvements Korea has made to focus on patent protections).

50 lawsuits spread over 10 countries,²⁸⁶ and are asking for damages as high as \$2.5 Billion.²⁸⁷ As a greater portion of the South Korean economy constructs business models that rely on IP, South Korea increasingly finds itself as an advocate for stronger IPR in other Asian nations.²⁸⁸ Recently it has started to take on leadership roles, opening copyright offices in countries such as the Philippines²⁸⁹ and providing training on IP practices to China.²⁹⁰

India

Unlike many other Asian economies, India had a more advanced departure point for its IP doctrine due to its legacy as a British colony.²⁹¹ When India achieved independence in 1947, it also inherited many aspects of the then current British patent system.²⁹² In a reoccurring theme the world's largest democracy moved slowly to address the issue.²⁹³ Only after a full decade did the government commission a report designed to take a serious look at the patent sys-

²⁸⁶ See Nikhil, *Apple & Samsung CEOs to Meet on May 21 & May 22 – Will it End the Patent War?* IPHONE HACKS (Apr. 29, 2012), archived at <http://perma.cc/NB2C-3GF8> (discussing recent legal actions between Apple and Samsung).

²⁸⁷ See Mueller, *supra* note 66 (explaining the remedy received by Apple).

²⁸⁸ See MINXIN PEI, ASIA BUSINESS COUNCIL, INTELLECTUAL PROPERTY RIGHTS: A SURVEY OF THE MAJOR ISSUES 5 (2005) (identifying advocates of stronger IPR protection, such as South Korea).

²⁸⁹ See Maricel Estavillo, *Amid “Korean Wave,” South Korea Opens IP Office In The Philippines*, INTELLECTUAL PROP. WATCH (May 14, 2012), archived at <http://perma.cc/5967-GCP4> (discussing in detail how South Korea opened intellectual property offices in the Philippines).

²⁹⁰ See Maricel Estavillo, *South Korea Lends IP Training Support to China*, INTELLECTUAL PROP. WATCH (Oct. 19, 2012), archived at <http://perma.cc/7HRB-GY8J> (summarizing the intellectual property training South Korea is providing to China).

²⁹¹ See Max Fisher, *Was British Colonialism Good or Bad for India?*, THE WIRE (Nov. 17, 2010), archived at <http://perma.cc/6MR4-8E2Z> (suggesting that India benefitted from British influence).

²⁹² See V.K. Unni, *Indian Patent Law and TRIPS: Redrawing the Flexibility Framework in the Context of Public Policy and Health*, 25 PAC. MCGEORGE GLOBAL BUS. & DEV. L. J. 324-25 (2012) (describing how India came to use British patent law).

²⁹³ See *id.* at 325 (illustrating the reason why India was so slow to focus on intellectual property rights).

tem.²⁹⁴ After delivery of the report it took over another decade to finally start implementing the recommendations.²⁹⁵ However, India eventually decided that the British system was not serving their national interests, after finding in 1958 that greater than 90% of the patents it granted were owned, at least in part, by foreigners.²⁹⁶ This finding is not particularly surprising because India was a nation in the earliest stages of the developmental paradigm, but had comparatively mature legacy British legal traditions.²⁹⁷ India's domestic inventors mostly did not have the skills or resources to produce and commercialize innovations, and India needed to reverse course and find policies to guild it through the imitation and absorption phases of development.²⁹⁸ India finally responded with IP reforms in The Patents Act of 1970.²⁹⁹ This made patents more difficult to get by, among other things, completely eliminating composition of matter patents, shorting the patent terms for inventions relating to manufacture of food and medicine, and adding provisions for compulsory licensing.³⁰⁰ By watering down the scope and strength of IPR, India would have a better chance to play catch up, and develop an innovation based culture of its own.³⁰¹

Economic development in India has also been a very slow process.³⁰² Economists point to poor central planning, inefficient government, and protectionist importation restrictions, as some of the

²⁹⁴ See *id.* at 327 (discussing the importance of the Ayyangar Report which produced a report evaluating the current patent system).

²⁹⁵ See *id.* 327-28 (mentioning that after delivery of the report it took the Indian government years to enact laws the report recommended).

²⁹⁶ See *id.* at 327 (stating more than 90% of Indian granted patents were owned by foreigners).

²⁹⁷ See *id.* at 323-24 (concluding that India developed slowly as a nation, but utilized British traditions in its development).

²⁹⁸ See Unni, *supra* note 292, at 325 (pointing out why India needed to reform its patent system policies).

²⁹⁹ See Unni, *supra* note 292, at 327-28 (highlighting that The Patents Act of 1970 was created to reform India's IP laws).

³⁰⁰ See Unni, *supra* note 292, at 334 (describing the effect the 2002 Amendment on The Patents Act of 1970 had on inventors' ability to get patents).

³⁰¹ See Unni, *supra* note 292, at 342 (inferring that the rest of the IP world is waiting to see the strength of India's new intellectual property rights).

³⁰² See John Williamson, Keynote Address at The History Institute for Teachers Seminar: The Rise of the Indian Economy (March 11-12 2006), (transcript archived at <http://perma.cc/PQ4C-WLFK>) (stating that the economy of India was on an economic decline for nearly 40 years).

reasons for this.³⁰³ Throughout the early stages India managed to resist international pressure to reform its intellectual property regime.³⁰⁴ This ended when an extended financial crisis in the early 1990s gave the international community, led by the US, enough political capital to strong arm India into intellectual property reforms.³⁰⁵ India's need for international assistance, in the form of a bailout from the International Monetary Fund (IMF), maintenance of foreign aid, and preferential tariff treatment for exports under the General Agreement on Tariffs and Trade agreement (GATT), eventually culminated in the signing of the TRIPs agreement.³⁰⁶

As with most policies forced upon a country, the problem did not simply end with the signing of a treaty.³⁰⁷ India's form of IPR resistance has instead simply been to move as slow as possible to live up to the agreements.³⁰⁸ India missed several deadlines to implement legislation to comply with the TRIPS requirements.³⁰⁹ India finally did so in March of 1999, by passing an emergency legislation, after the deadline had been extended by the US on three separate occasions.³¹⁰ Despite this international pressure, the law still did not extend protections to many software, agricultural and pharmaceutical

³⁰³ See Tanuja Garde, *India*, in *INTELLECTUAL PROPERTY IN ASIA: LAW, ECONOMICS, HISTORY AND POLITICS* 81 (Paul Goldstein et al. eds., 2009) (illustrating the cause of India's slow economic development).

³⁰⁴ See *India: June 2002*, WORLD TRADE ORGANIZATION (Jun. 21, 2002), archived at <https://perma.cc/KJ6X-CHPQ> (listing the steps India took to improve intellectual property rights).

³⁰⁵ See George K. Foster, Comment, *Opposing Forces in a Revolution in International Patent Protection: The U.S. and India in the Uruguay Round and Its Aftermath*, 3 *UCLA J. INT'L L. & FOR. AFF.* 283, 316 (1998) (detailing that the United States and other developed nations forced India to implement reforms).

³⁰⁶ See *id.* at 316-17 (stating that the main reason India signed the TRIPs agreement was because of a lack of funding that they had previously received).

³⁰⁷ See *id.* at 317 (inferring that India's economic difficulties and economic status was due to pressure by the United States).

³⁰⁸ See *id.* at 315 (describing instances in which India had taken more time than necessary to slow down the implementation of regulations required by the TRIPs agreement).

³⁰⁹ See John T. Materson, Jr., *Overview of Intellectual Property Rights and the TRIPs Agreement*, U.S. DEPT. OF COMMERCE (Aug. 12, 2002), archived at <http://perma.cc/BSY9-8HDP> (listing multiple legislative acts that were not implemented as required by TRIPs).

³¹⁰ See Bird & Cahoy, *supra* note 192, at 409-10 (stating that India had finally passed legislation complying with the TRIPs agreement).

products.³¹¹ This situation persisted until more reform legislation was passed in 2005, but India still struggles with a weak legal framework for copyright, inefficient patent office practices with a large backlog of patent, narrow subject matter protection for patents, and enforcement issues.³¹² As a result India remains on the United States Trade Representative (USTR) Special 301 Priority Watch List into 2014,³¹³ a designation that theoretically qualifies India for economic sanctions.³¹⁴

While the Indian economic engine has taken a long time to get started, it is finally showing promising signs and GDP has more than tripled in the past decade.³¹⁵ India's early focus on service exports, such as outsourced call centers, rather than manufacturing and tangible goods, did not produce the same investment in physical infrastructure that other countries saw.³¹⁶ This trend is gradually correcting itself, and as the government sees its revenue grow it has started investing more heavily in these areas.³¹⁷

One emerging industry for India has been in generic pharmaceuticals.³¹⁸ The business model of this industry is one that fits well strategically in furthering the progression through the developmental

³¹¹ See *Patents Bill: Govt Takes Left on Board*, REDIFF.COM (2005), archived at <https://perma.cc/KFF2-F9RZ> (listing different patent products that were affected by international pressure).

³¹² See Unni, *supra* note 292, at 330-31 (addressing continued complications with India's IPR despite legislative intent to correct such problems).

³¹³ See MICHAEL B. G. FROMAN, OFFICE OF THE U. S. TRADE REPRESENTATIVE 2014 SPECIAL 301 REPORT, EXECUTIVE OFFICE OF THE PRESIDENT 2 (Apr. 2014) (noting that "[i]n 2014, 10 countries are on the Priority Watch List and 27 countries are on the Watch List. Several countries, including Chile, China, India, Indonesia, Thailand, and Turkey, have been listed every year since the Report's inception").

³¹⁴ See *id.* at 59 (acknowledging that India has met requirements for economic sanctions).

³¹⁵ See *India*, THE WORLD BANK, archived at <http://perma.cc/6HCV-NWNV> (providing specific figures indicating India's increase in GDP over last decade).

³¹⁶ See William Greene, *The Emergence of India's Pharmaceutical Industry and Implications for the U.S. Generic Drug Market* 19 (U.S. Int'l Trade Comm'n, Office of Econ., Working Paper No. 2007-05-A) (comparing India's focus on service export to other more developed countries).

³¹⁷ See Beryl Menezes, *Indian IT services exports seen growing 12-14% in year ahead*, LIVE MINT, archived at <http://perma.cc/DMP9-M875> (demonstrating India IT growth in service exports).

³¹⁸ See Unni, *supra* note 292, at 325 (providing one example of an emerging industry in India).

paradigm.³¹⁹ Production of generic pharmaceuticals is an activity well suited for the absorption and imitation stage.³²⁰ By focusing on producing generic copies of existing drugs, India can start to build a high tech manufacturing sector as well as a skilled labor force.³²¹ Because patent protection for many of these drugs has expired overseas, Indian firms can also freely export their products to high income countries at higher profit margins than can be achieved domestically.³²² Indian firms have also benefited from their own underdeveloped patent regime.³²³ These firms have been known to manufacture generic copycat versions of drugs still subject to patent protection in the US, EU and Japan, and then sell these drugs domestically and internationally to other low income countries.³²⁴ This controversial practice was highlighted by recent seizures of unauthorized generics by Dutch authorities in transit.³²⁵ In addition this has had the benefit of improving public health in India, by providing cheap pharmaceutical drugs to the domestic population.³²⁶

In a recent high profile case, India issued a compulsory license to a local generic firm Natco, to manufacture the Bayer cancer

³¹⁹ See Vikas Bhadoria et al., *India Pharma 2020: Propelling Access and acceptance, realizing true potential*, MCKINSEY & COMPANY, at 31 (2015), archived at <http://perma.cc/V75K-WRCL> (exemplifying India's business model and progression through development).

³²⁰ See Greene, *supra* note 316, at 17 (discussing where the production of pharmaceuticals fits in India's development).

³²¹ See Dev Nathan, *The Way Forward for Manufacturing in India: Institutions, Relative Factor Prices, and Innovation*, INSTITUTE FOR HUMAN DEVELOPMENT, archived at <https://perma.cc/YQ9J-XP2L> (recognizing how India's production of generic pharmaceuticals can lead to further development).

³²² See Unni, *supra* note 292294, at 328 (expounding on the idea of India achieving a higher profit margins by exporting products to higher income countries).

³²³ See Unni, *supra* note 292294, at 341 (stating that India benefits from its' patent regime).

³²⁴ See Greene, *supra* note 316, at 19 (discussing how India produces generically copied drugs and sells them to lower income counties).

³²⁵ See *Right to health: seizure of generic drugs in transit to Brazil in European ports*, CONECTAS HUMAN RIGHTS (Sep. 14, 2011), archived at <http://perma.cc/A9TK-9A6Q> (identifying an instance where India's generic pharmaceuticals were unauthorized and seized).

³²⁶ See Unni, *supra* note 292, at 341 (explaining how India's patent laws aim at lowering costs of medicine for their citizens).

drug, Nexavar.³²⁷ Natco had previously applied for a voluntary license from Bayer, and when it could not reach favorable terms, decided to pursue a compulsory license.³²⁸ Bayer would challenge this grant in Indian courts, a battle which was ultimately lost.³²⁹ While permissible under its own law, and international treaties such as TRIPS, these actions are seen by some as an abuse of the compulsory license mechanism, and carry significant risks associated with the reaction of the international business community.³³⁰ The Indian government in turn argues that utilizing this mechanism will instead incentivize foreign firms to ensure sufficient access to their drugs throughout patient populations in India.³³¹ However, as many domestic firms seek to move up the value chain and produce innovator (rather than just generic) products, they naturally look to more established innovator pharmaceutical firms from the west for resources and guidance.³³² Aggressive compulsory licensing is a negative signal to these firms, and may dissuade them from transferring knowledge, investing resources, or forming partnerships in the country, for fear their innovations may be the subject of future compulsory licenses or other questionable IPR practices.³³³

³²⁷ See Shobhika Puri, *The Compulsions and Repercussions of Compulsory Licensing*, ZEENEWS (Oct. 12, 2012), archived at <http://perma.cc/KQU4-JMJA> (stating the details of when India gave its first compulsory license to Natco Pharma).

³²⁸ See *id.* (providing details of when Natco first applied for a license).

³²⁹ See Alexander Gaffney, *Landmark Ruling Clears Way for Use of Compulsory License in India*, REGULATORY AFFAIRS PROFESSIONALS SOCIETY (Sep. 18, 2012), archived at <http://perma.cc/F6UR-5V3B> (providing details about Bayer's legally challenging India's grant).

³³⁰ See Jerome H. Reichman, *Compulsory Licensing of Patented Pharmaceutical Inventions: Evaluating the Options*, 37 J. L., MED. & ETHICS 247, 248 (2009) (discussing arguably unfavorable conditions under which a compulsory license is granted).

³³¹ See *id.* at 254 (asserting drug companies holding patents are not incentivized to negotiate in the absence of legal sanctions).

³³² See William Greene, *The Emergence of India's Pharmaceutical Industry and Implications for the U.S. Generic Drug Market* 19 (U.S. Int'l Trade Comm'n, Office of Econ., No. 2007-05-A, 2007) (explaining how India's launch of generics paralleled Western innovator companies).

³³³ See Reichman, *supra* note 330, at 259 (cautioning governments against possible negative outcomes of aggressive compulsory licensing).

This situation, combined with ongoing and costly quality issues from generic firms,³³⁴ and questions about the narrow patent protections offered to pharmaceuticals,³³⁵ could mean that India's attractiveness as an R&D, as opposed to manufacturing destination, will remain limited for the time being.³³⁶ Investors and MNCs may perceive this as a sign that starting companies and launching products in India, in addition to the high technical risk associated with research and development, and market risks, also carry significant political risks.³³⁷ Because pharmaceutical firms in general are ill-equipped to manage political risks, these resources and investor dollars could be diverted elsewhere until reforms are made and a stronger commitment to IPR is demonstrated.³³⁸

China

Unlike India who has a longstanding IPR legal tradition, IP laws are relatively new to China.³³⁹ The Chinese did not have any IP laws on the books prior to 1978 and it wasn't until the early 1980s that a basic framework was installed for all the traditional forms of

³³⁴ See Rumman Ahmed, *Ranbaxy: To Share Part of Profits from Generic Lipitor Sales with Teva*, WALL ST. J., (Nov. 30, 2011), archived at <http://perma.cc/DDT2-SNPR> (exemplifying quality issues with generic firms, specifically how the launch of Lipitor was delayed due to quality issues); see also *Ranbaxy Settlement with FDA Goes to Court*, BBC NEWS (Jan. 26, 2012), archived at <http://perma.cc/W53W-ZA3Z> (detailing legal proceedings).

³³⁵ See *Taking Pains; Indian Patent Rules Infuriate Big Pharma*, THE ECONOMIST (Sep. 8, 2012), archived at <http://perma.cc/UE2V-9Y6Q> (noting India's failure to recognize patents for over three decades).

³³⁶ See Neena Bedi et al., *Patenting and R&D in Indian Pharmaceutical Industry: Post-TRIPS Scenario*, 18 J. INTELL. PROP. RTS. 105, 107-08 (2013) (emphasizing that India spends very little on R&D, and spends more on processing costs).

³³⁷ See Namrata Singh, *MNCs revisit geopolitical risk in India*, ECON. TIMES (Nov. 29, 2008), archived at <http://perma.cc/B68H-HVAR> (noting the various political threats present in India).

³³⁸ See Holger Kraemer, *India's Lawless War on Intellectual Property*, WALL ST. J. (Mar. 23, 2014), archived at <http://perma.cc/7UL7-ZL7S> (opining that India should conform to global intellectual-property norms).

³³⁹ See Gillian Kassner, *China's IP Reform: State Interests Align with Intellectual Property Protection (Again)*, JOLT DIGEST (Apr. 24, 2012), archived at <http://perma.cc/G8QW-U6BH> (demonstrating China's comparatively recent implementation of IP laws).

IP.³⁴⁰ This transition started with trademark and copyright protection, largely at the behest of western nations, and in 1984 the first western style patent act was passed³⁴¹ by Chinese law makers.³⁴² While having a structure familiar to most observers, there were major limitations. For example the exclusion of commonly patentable subject matter, such as pharmaceuticals and chemicals.³⁴³

In the early 1990s China started to make attempts to improve its reputation for IP and international trade protections, by moving towards harmonization with international standards.³⁴⁴ In July 1992 China joined the Berne convention, and in January 1993 China adopted the UCC provisions.³⁴⁵ Shortly after that, in January of 1994, China became a member of the PCT helping to streamline the process for MNCs wishing to obtain patents in China.³⁴⁶ Most recently, in 2007, China joined the WIPO World Copyright Treaty (WCT) and Performances and Phonograms Treaty (WCCT).³⁴⁷

While these are positive first steps, their full impact has yet to be seen, and as one observer commented, “In general, China's IP laws already have a lot of strength on paper. The problem and challenge of most companies that are active in China is that these laws are insufficiently enforced on the ground.”³⁴⁸ Without any IP tradition to

³⁴⁰ See *id.* (outlining history of implementation of Chinese IP laws).

³⁴¹ See *id.* (highlighting composition of nation's first western-style patent act).

³⁴² See *id.* (recognizing Chinese law makers as authoritative body who passed first patent legislation in 1984).

³⁴³ See HUAIWEN HE & PING ZHANG, WIPO, IMPACT OF THE INTELLECTUAL PROPERTY SYSTEM ON ECONOMIC GROWTH: COUNTRY REPORT - CHINA 1, 3 (2007) (describing 1984 Chinese Patent Act's limits on patentability).

³⁴⁴ See *id.* at 1 (demonstrating China's attempt to conform with international IPR standards).

³⁴⁵ See Feng Jianhua, *From Beijing to Berne*, BEIJING REVIEW (July 26, 2007), archived at <http://perma.cc/E39T-VU5F> (illustrating China's timeline of its involvement with the Berne Convention and adoption of the UCC).

³⁴⁶ See Sun Di, *China Celebrates 30th Anniversary of Patent Law*, LUNG TIN INTELLECTUAL PROPERTY AGENT LTD. (Apr. 10, 2015) archived at <http://perma.cc/3G3Z-MMSF> (discussing the success of patent innovation since China joined PCT).

³⁴⁷ See HE & ZHANG, *supra* note 343, at 1 (stating China's continuing efforts to advance intellectual property through treaties).

³⁴⁸ See Charlotte Harrison, *Patent Watch*, NATURE REVIEWS DRUG DISCOVERY DISCOVERY (May 31, 2013), archived at <http://perma.cc/8W4T-D24D> (detailing China's frustration for their lack of adequately strengthening IP in the real world as opposed to on paper).

build on China has also struggled to setup enforcement mechanisms, and develop a consistent rule of law that investors, businessmen and lawyers can rely on.³⁴⁹ To further compound the problem, China has a lack of prominent established legal institutions³⁵⁰ capable of training lawyers and judges to develop and enforce more nuanced and abstract types of legal doctrines, such as IP.³⁵¹

The adoption of any IPR laws, even in the form of weak legislation with sparse enforcement, was very controversial in China.³⁵² The concern was both a cultural and an economic one.³⁵³ China's traditional culture and entrenched political leaders are still rooted in the communist belief system.³⁵⁴ The notion that private rights to an intangible idea should vest in an individual, and that this individual or entity should be able to obtain a limited monopoly and disproportionately profit from their idea, represents a radical departure from the communist point of view.³⁵⁵ There were also economic concerns, stemming from the reality that IPR were being forced on China by more developed nations, particularly the United States.³⁵⁶ This is reasonable in light of the developmental paradigm, and the concern was if stronger laws were adopted it could impede the country from going through the technology absorption and imitation stage.³⁵⁷

³⁴⁹ See HE & ZHANG, *supra* note 343, at 15 (emphasizing uncertainty China faced without a basis for their IP law).

³⁵⁰ See William P. Alford, *Chinese Law: Reform and Renovation*, ENCYCLOPEDIA BRITANNICA, archived at <http://perma.cc/4Y2X-HJ4A> (expanding on China's struggles in regards to IP law).

³⁵¹ See *id.* (demonstrating lack of education available to train professionals in field of IP law).

³⁵² See DONALD C. CLARKE, CHINA: CREATING A LEGAL SYSTEM FOR A MARKET ECONOMY 1, 5-6 (2007) (depicting controversies that arose in relation to China's law).

³⁵³ See *id.* at 13 (indicating what concerns came about as a result of controversies that arose).

³⁵⁴ See *id.* at 5 (emphasizing how China's culture and leaders are still influenced by deep-rooted communist belief system).

³⁵⁵ See SUSAN V. LAWRENCE & MICHAEL F. MARTIN, CONGRESSIONAL RESEARCH SERVICE, UNDERSTANDING CHINA'S POLITICAL SYSTEM 11 (2013) (comparing new private property protection laws to older Communistic ideologies).

³⁵⁶ See KA ZENG, TRADE THREATS TRADE WARS 169 (2004) (describing economic concerns brought on by U.S. interference with China's IPR).

³⁵⁷ See ALAN COX & KRISTINA SEPETYS, INTELLECTUAL PROPERTY RIGHTS PROTECTION IN CHINA: LITIGATION, ECONOMIC DAMAGES, AND CASE STRATEGIES

From a xenophobic point of view, China would be stuck in the earliest stages of development, as simply a source of cheap labor, with any incremental increases in wealth flowing directly out of the country in the form of profits to foreign IPR holders.³⁵⁸

It is probably due to these concerns, the dominance of state run companies, and its history as a protectionist nation, that China has taken a less open and more internally developed path to cultivating high-technology industries.³⁵⁹ Instead of relying exclusively on foreign company FDI and technology transfer, the Chinese government aggressively invests in R&D, mostly in state run companies.³⁶⁰ In 2011 the government of China spent the US equivalent of \$153.7 billion³⁶¹ to fund research, second globally only to the US³⁶² and dwarfing the Indian government expenditure of \$36.1 billion.³⁶³ Because of the IP and overall business environment, foreign firms have also been reluctant to transfer sensitive IP, especially trade secrets, to Chinese firms.³⁶⁴ As a result, in many cases Chinese firms must “re-invent the wheel” to catch up to the state of art, and technological

11.404 (2006) (drawing concerns regarding implementation of stronger IP laws in China).

³⁵⁸ See HE & ZHANG, *supra* note 343, at 15 (analyzing China’s inability to further economic development).

³⁵⁹ See JERRY HARRIS, EMERGING THIRD WORLD POWERS: CHINA, INDIA AND BRAZIL 2 (2005) (explaining why China has chosen a more internalized approach in furthering development).

³⁶⁰ See HE & ZHANG, *supra* note 343, at 15 (explaining effects of domestic R&D investment on revenues).

³⁶¹ See Martin Grueber & Tim Studt, *2011 Global R&D Funding Forecast: Stability Returns to R&D Funding*, R&D MAGAZINE (Dec. 15, 2010), archived at <http://perma.cc/4WFY-PQ5C> (stating that China spent \$153.7 billion in U.S. dollars in 2011).

³⁶² See NAT’L SCIENCE FOUND., SCIENCE AND ENGINEERING INDICATORS 2012 4-41 (2012), (addressing how the Chinese government is only second to the U.S. globally in reference to money spent on R&D).

³⁶³ See *id.* (addressing how the Chinese government trumped the Indian government’s spending amount for research).

³⁶⁴ See U.S. INT’L TRADE COMM’N, CHINA: INTELLECTUAL PROPERTY INFRINGEMENT, INDIGENOUS INNOVATION POLICIES, AND FRAMEWORKS FOR MEASURING THE EFFECTS ON THE U.S. ECONOMY (Inv. No. 332-514, Pub. 4199 (amended)) xix, 4-6 (2010) [hereinafter U.S. INT’L TRADE COMM’N, 2010] (reporting how foreign firms were unwilling to transfer sensitive IP and trade secrets for security concerns).

progress is not as quick as it could be.³⁶⁵ By taking this route China is betting on its longer term ability to organically grow cutting edge innovation capacity domestically.³⁶⁶

One particularly interesting Chinese firm BGI (formally called the Beijing Genomics Institute), a large genomics company that has received considerable Chinese state support.³⁶⁷ The company has managed to develop a very impressive technical capacity for DNA sequencing by purchasing state of the art sequences (from the American firm Illumina)³⁶⁸ and recruiting an army of technicians, many without college degrees and whom they pay low wages.³⁶⁹ However, BGI has shown a limited ability to carry out cutting edge research internally.³⁷⁰ It is not for a lack of tools, but for a lack of thought leaders and expertise in the ability to manage and execute sophisticated experimental design.³⁷¹ The company has looked to overcome this by forming a wide range of partnerships and research collaborations.³⁷² BGI themselves in many ways still remain more of the “muscle” rather than the “brain,”³⁷³ in a situation analogous to China’s role as a manufacturer of complex high-tech equipment and

³⁶⁵ See *id.* (inferring that China’s lack of technological progress may be due in part to foreign firms’ reluctance to produce their innovations in China because of their ineffective IP protection laws).

³⁶⁶ See THE WORLD BANK, DEV. RESEARCH CENTER OF THE STATE COUNCIL, CHINA, CHINA 2030: BUILDING A MODERN, HARMONIOUS, AND CREATIVE SOCIETY 159 (2013) (explaining how China’s industries are cutting edge and need to rely on productivity gains to grow).

³⁶⁷ See Christina Larson, *Inside China’s Genome Factory*, MIT TECH. REV. (Feb. 11, 2013), archived at <http://perma.cc/A77M-ZQDM> (stating that BGI acquired financial support from China Development Bank).

³⁶⁸ See *id.* (highlighting BGI’s purchase of 128 DNA sequencing machines); see also Wilson Gabriel, *BGI Purchases 128 Illumina HiSeq 2000 Sequencing Systems*, ILLUMINA, INC. (Jan. 12, 2010), archived at <http://perma.cc/8BDP-SL38> (noting that the units were purchased from Illumina, Inc.).

³⁶⁹ See *id.* (providing the average monthly salary for BGI employees is \$1,500).

³⁷⁰ See Larson, *supra* note 367 (recognizing criticism of BGI’s mass production and inability to conduct research).

³⁷¹ See Larson, *supra* note 367 (surmising that BGI has great tools, but lack creativity).

³⁷² See Gabriel, *supra* note 368 (referring to BGI’s goal of building global partnerships and collaborations).

³⁷³ See David Shukman, *China Cloning on an ‘Industrial Scale’*, BBC NEWS (Jan. 14, 2014), archived at <http://perma.cc/A8TX-KRWK> (inferring that BGI is effective in mass production, but the company lacks innovation).

electronics rather than designer.³⁷⁴ However, by pursuing this strategy in the longer term, BGI is putting itself in a good position to eventually learn (through imitation and absorption) how to design and execute cutting edge scientific research internally.³⁷⁵ The rate limiting step in the strategy is their ability to find partners willing to work with them and transfer their know-how.³⁷⁶

China departs a bit from the developmental paradigm due to the sheer size of its resources, labor force, and aggregate economic output. This has given it the muscle it needs to resist foreign political and economic pressure to a certain extent and rebuff threats of economic sanctions.³⁷⁷ As a result China has adopted its own unhurried timeline to enforce IPR in compliance with international standards; and outside nations (US, European) or trade organizations (WTO) have been at a loss for mechanisms to deal with it.³⁷⁸ However, combined with a very powerful, authoritarian, and opaque central government this behavior has not been without economic consequence.³⁷⁹ Despite significant development China is still seen in many industries as a manufacturer as opposed to a research outsourcing destination, with their primary asset being cheap labor and a growing domestic market.³⁸⁰ Most of the FDI is still in the form of low to mid technology manufacturing, and MNCs are sometimes reluctant to invest in R&D or share proprietary high-technology

³⁷⁴ See Venessa Wong, *China's New Focus On Design*, BLOOMBERG BUS., (Sept. 30, 2009), archived at <http://perma.cc/8FPZ-W7F9> (arguing China lacks "design thinking" compared to Western countries).

³⁷⁵ See Larson, *supra* note 367 (reporting recent changes BGI made to advance research).

³⁷⁶ See Larson, *supra* note 367 (describing initiatives to partner with foreign research centers).

³⁷⁷ See U.S. INT'L TRADE COMM'N, CHINA: EFFECTS OF INTELLECTUAL PROPERTY INFRINGEMENT AND INDIGENOUS INNOVATION POLICIES ON THE U.S. ECONOMY, (Inv. No. 332-519, Pub. 4226) 213 (2011) [hereinafter U.S. INT'L TRADE COMM'N, 2011] (arguing other countries have difficulty imposing sanctions on China).

³⁷⁸ See *id.* at 216 (stating other nations are unable to push China into developing stronger IPR to comply with international standards).

³⁷⁹ See *id.* at 123 (pointing out the downside to China's dominance in the global marketplace).

³⁸⁰ See Society for Human Resource Management, *Evolution of Work and the Worker*, THE ECONOMIST INTELLIGENCE UNIT LIMITED (Feb. 2014), archived at <http://perma.cc/BF96-YWBR> (discussing the conflict between economical labor preferences and labor rights).

knowledge with Chinese companies.³⁸¹ Consequently, advanced high-technology trade still remains a small part of the overall economy.³⁸² In some cases the lack of trust has lead companies to develop strategies to outsource manufacturing piecemeal within the country.³⁸³ By having various component manufactured at different places, by different vendors and assembled by yet another vendor (or outside of the country), MNCs avoid sharing all the knowledge that would be needed to replicate the process with a single Chinese firm.³⁸⁴

Much like India, China has also developed a method of resistance to combat foreign pressure to implement and enforce IPR.³⁸⁵ So common is this sequence of events that some observers have labeled it the “China cycle” or as one author put it the “cycle of futility.”^{386 387} The typical scenario starts with a Chinese firm infringing the IPR of a US firm.³⁸⁸ Unable to get adequate redress in the Chinese legal system, these firms turn to appropriate governmental chan-

³⁸¹ See RAVI SRINIVAS, RESEARCH AND INFORMATION SYSTEM FOR DEVELOPING COUNTRIES, CLIMATE CHANGE, TECHNOLOGY TRANSFER AND INTELLECTUAL PROPERTY RIGHTS 19 (2009) (stating that there is a substantial part of the economy which has not advanced technologically as steadily as the surrounding territories).

³⁸² See *China Becomes No 3 Trading Nation*, ASIA TIMES (Jan. 12, 2005), archived at <http://perma.cc/Z5GR-X952> (indicating that despite China’s best efforts, high-technology trade is a small part of their economy).

³⁸³ See SRINIVAS, *supra* note 381, at 22 (discussing the uses of IPR to control rather than to promote transfer and diffusion of technology).

³⁸⁴ See GLOB. INTELLECTUAL PROP. CTR, INTELLECTUAL PROPERTY PROTECTION AND ENFORCEMENT MANUAL: A PRACTICAL AND LEGAL GUIDE FOR PROTECTING YOUR INTELLECTUAL PROPERTY RIGHTS 11 (KPMG eds., 2012) (recognizing strategies MNCs take in order to prevent replication of products).

³⁸⁵ See Peter K. Yu, *Still Dissatisfied After All These Years: Intellectual Property, Post-WTO China, and the Avoidable Cycle of Futility*, 34 GA. J. INT’L & COMP. L. 143, 144–146 (2005) (detailing China’s ability to resist foreign pressures).

³⁸⁶ See Peter K. Yu, *From Pirates to Partners (Episode II): Protecting Intellectual Property in Post-WTO China*, 55 AM. U. L. REV. 901, 904 (2006) (characterizing the “cycle of futility”).

³⁸⁷ See Peter K. Yu, *From Pirates to Partners: Protecting Intellectual Property in China in the Twenty-First Century*, 50 AM. U. L. REV. 131, 135 (2000) (offering different names for China’s methods of resistance to foreign pressure).

³⁸⁸ See Gregory S. Feder, Note, *Enforcement of Intellectual Property Rights in China: You can Lead a Horse to Water, but You Can’t Make It Drink*, 37 VA. J. INT’L L. 223, 250-251 (1996) (outlining how the “cycle of futility” begins).

nels for help.³⁸⁹ This results in an investigation, and if the claims are substantiated, the US will threaten economic sanctions on China.³⁹⁰ When dealing with many of the smaller developing nations, the story often ends here.³⁹¹ The developing country will typically appease the US or WTO rather than risk what can be devastating economic sanctions, or cuts to foreign aid.³⁹² China on the other hand departs from the typical narrative here by simply countering and threatening to impose its own round of sanctions that would have a negative impact on US businesses.³⁹³ Bickering and fighting typically ensue and some artificial deadline is set by both sides for the implementation of trade sanctions.³⁹⁴ At the last minute the two parties will reach a new agreement to address the issue.³⁹⁵ These agreements will be initially enforced but over time enforcement wanes.³⁹⁶ The events will then repeat themselves in a constant cycle.³⁹⁷

³⁸⁹ See *id.* at 253 (demonstrating China's lack of a legal system and inability to provide remedies for foreign governments).

³⁹⁰ See *id.* at 249-50 (describing the process the United States takes when seeking redress from piracy).

³⁹¹ See Emmanuelle Auriol et al., *Intellectual Property Rights Protection in Developing Countries*, (European Trade Study Group, Working Paper No. 396 2012) (suggesting that smaller countries are often willing to respect IPR, thus legal action is typically not necessary).

³⁹² See Peter Drahos, *Developing Countries and International Intellectual Property Standard-setting* 5-16 (Comm'n on Intellectual Prop. Rights, Study Paper No. 8) [hereinafter Drahos, Study Paper No. 8] (discussing the reasons that developing countries do not have the power to coerce the United States or World Trade Organization regarding intellectual property).

³⁹³ See Ellen Nakashima, *U.S. developing sanctions against China over Cyberthefts*, THE WASHINGTON POST (Aug. 30, 2015), archived at <https://perma.cc/WAX6-FQXS> (explaining why U.S. sanctions against China do not have a high success rate).

³⁹⁴ See Seth Faison, *Sanctions on Trade With Beijing Begin As Deadline Passes*, THE NEW YORK TIMES (Feb. 26, 1995), archived at <http://perma.cc/EH3R-WWXR> (stating how negotiations with China and the United States over trade sanctions went into effect in order to avoid a trade war for a deadline that was set three week prior). Trade negotiators from both China and the United States continued to work together in Beijing even though sanctions were set in place after both countries missed the trade deadline, ensuing a "trade war." *Id.*

³⁹⁵ See *id.* (inferring that the United States would develop a strategy to work with China if agreements were not made the specified time). In the past, American and Chinese officials have used various negotiation methods to conclude trade negotiations even minutes before a trade deadline. *Id.*

³⁹⁶ See Ellen Nakashima & Steven Mufson, *The U.S. and China agree not to conduct economic espionage in cyberspace*, THE WASHINGTON POST (Sept. 25, 2015),

The latest case involves the Chinese company Sinovel Wind Group (Sinovel) and American Superconductor Corp. (AMSC).³⁹⁸ The facts are particularly egregious, as Senator John Kerry put it “[t]his isn't a commercial misunderstanding, it's a mugging in broad daylight and a real test of China's commitment to the rule of law.”³⁹⁹ In 2011 AMSC discovered pirated software running in Sinovel wind turbines, software that Sinovel had contracted to purchase from AMSC and then refused to accept, presumably because they had already stolen it by paying off an ex-AMSC employee.⁴⁰⁰ The ex-AMSC employee who gave Sinovel the source code, has subsequently cooperated with the investigation, admitted to what happened, plead guilty, and served jail time in his native Austria for the crime.⁴⁰¹ Additionally, investigators have found incriminating digital transcripts of online conversations, involving the ex-employee and the Sinovel VP of research, detailing the transaction and explicitly stating their intentions.⁴⁰²

At a loss for a mechanism to respond to this situation AMSC has decided to take a direct approach by litigating the case very publicly in the Chinese courts.⁴⁰³ The facts are so troubling that the relevant US governmental authorities as well as international business community have taken notice, and major mainstream media outlets, such as Forbes and the Wall Street Journal, are covering the

archived at <https://perma.cc/S8WE-5XPZ> (implying that although the United States entered into an agreement with China, the United States will wait to see if the agreement is actually upheld by China with evidence of improved international relations). The current issue for the United States is being able to verify that China has indeed lived up to the agreement then imposing consequences on China if necessary. *Id.*

³⁹⁷ *See id.* (recalling that last year, the threat of sanctions by the United States on China have persuaded Chinese officials to enter into agreements with the United States but there have been significant issues with their relationship).

³⁹⁸ *See* Keith Johnson, *China Court to Weigh Corporate-Spy Case*, THE WALL STREET JOURNAL (Oct. 25, 2012), *archived at* <http://perma.cc/UF77-2AXM> (describing parties involved in most recent corporate spy case).

³⁹⁹ *See id.* (quoting Senator John Kerry's thoughts regarding the corporate spy case).

⁴⁰⁰ *See id.* (detailing the allegations pertaining to the corporate-spy case).

⁴⁰¹ *See id.* (describing the punishments impressed upon the ex-AMSC employee).

⁴⁰² *See id.* (discussing the incriminating evidence found in regards to AMSC's ex-employee and his exploits).

⁴⁰³ *See id.* (revealing that the case between AMSC and Sinovel is going to be heard by China's Supreme People's Court).

case, with nervous investors watching from the sidelines.⁴⁰⁴ Many of the factual uncertainties present in other cases are not present in this one, and thus the proceedings could provide a lucid glimpse into the current state of Chinese IPR jurisprudence.⁴⁰⁵ The existence of a contract for the stolen IP makes the damages easier to determine, and the damages have the potential to be in the hundreds of millions of dollars.⁴⁰⁶ Ideally this case could demonstrate whether Chinese courts have the stomach to render a judgment of that size, for an international firm against a domestic firm, and effectively order a transfer of funds out of the country.⁴⁰⁷

The courts will be under pressure, due to the high profile of the case, to render a verdict that paints China as having a friendly international business environment that adheres to the rule of law.⁴⁰⁸ However, unlike judiciaries in the United States, the courts in China were never intended to serve as a balance to the executive power of the Chinese Communist Party (CCP).⁴⁰⁹ Rather, the courts transparently occupy a subservient position below the CCP, who may overturn and vacate any decision the courts make.⁴¹⁰ This structure, combined with the reality that many Chinese judges may have limited

⁴⁰⁴ See Joan Lappin, *American Superconductor Destroyed for a Tiny Bribe*, FORBES (Sep. 21, 2011), archived at <http://perma.cc/5BN9-GQK4> (examining the consequences ASMC faces due to Sinovel's theft of AMSC's intellectual property); see also Wayne Ma, *Sinovel Wind Group's Chairman Resigns, Citing Personal Reasons*, THE WALL STREET JOURNAL (Jul. 9, 2014), archived at <http://perma.cc/U665-4X7T> (citing major net losses by Sinovel, as well as The United States Department of Justice's involvement in this ongoing legal battle).

⁴⁰⁵ See ROBERT D. ATKINSON, INFO. TECH. & INNOVATION FOUND., ENOUGH IS ENOUGH: CONFRONTING CHINESE INNOVATION MERCANTILISM 36 (2012) (suggesting that there is not much faith in Chinese jurisprudence to enforce IPR).

⁴⁰⁶ See Andrew Lee, *AMSC and Sinovel Due in China's Supreme Court Over Wind IP*, RECHARGE (Oct. 24, 2012), archived at <http://perma.cc/2SHC-TW7F> (assessing AMSC's potential awards for damages).

⁴⁰⁷ See Justin Doom, *China Supreme Court Ruling Favors AMSC in Two Sinovel Suits*, BLOOMBERG (Feb. 19, 2014), archived at <http://perma.cc/RMM7-PN43> (questioning the future of the Chinese court judgments in favor of AMSC).

⁴⁰⁸ See Johnson, *supra* note 398 (discussing the importance of China's judiciary in the international business world).

⁴⁰⁹ See Dexter Roberts, *China's Communist Party Admits it Has a Big Corruption Problem*, BLOOMBERG (Jul. 10, 2014), archived at <http://perma.cc/NZF8-THTD> (noting that the reason for the CCP's power in China is because of the lack of checks and balances within the government).

⁴¹⁰ See LAWRENCE & MARTIN, *supra* note 355, at 17 (illustrating the power the CCP has over the judiciary).

legal training, has resulted in a tradition in which the penning of legal opinions to support decisions is potentially risky and consequently very uncommon, as doing so greatly increases the chances a judge might put forth a line of reasoning the CCP will disagree with.⁴¹¹ All of this naturally leads to a system which can be more easily influenced by political aspects of a case, such as personal, local, and national interests.⁴¹²

As of September 16th, 2014, the main AMSC trade secrets case against Sinovel, asking for damages of \$450 Million, has yet to have any substantive hearings.⁴¹³ Instead the case has been through a series of jurisdictional proceedings that has seen Sinovel in July of 2012 ask the Beijing No. 1 Intermediate People's Court to transfer the case to the Beijing Arbitration Commission, and in February 2014 when the court declined, a determined Sinovel unsuccessfully appealed the decision.⁴¹⁴ Despite losing the arbitration bid, Sinovel did successfully kick the can down the road for a total of two and a half years.⁴¹⁵ Two much smaller copyright cases, including claims for \$6 million and \$200,000, saw similar jurisdictional maneuvering.⁴¹⁶ However on September 15, 2014 the Beijing No. 1 Intermediate People's Court did hold its first substantive hearing on the \$6 Million dollar case.⁴¹⁷ Additionally, AMSC had been pursuing trade secrets in the U.S.⁴¹⁸ when it was discovered that wind turbines exported from China, by Sinovel, were sold back into the U.S., as close as 40 miles from the AMSC headquarters,⁴¹⁹ containing the stolen AMSC IP.⁴²⁰

⁴¹¹ See *id.* (inferring that the CCP's power over all branches of the Chinese government has led to the judicial system making decisions without explaining any legal reasoning).

⁴¹² See *id.* at 18 (describing the corruption within China's judicial system).

⁴¹³ See *AMSC Provides Update on Litigation With Sinovel Wind Group, Ltd.*, AMERICAN SUPERCONDUCTOR (Sept. 16, 2014), archived at <http://perma.cc/3RS7-8MLV> (addressing AMSC's requested amount for damages).

⁴¹⁴ See *id.* (explaining Court's reason for denying Sinovel's jurisdictional appeal).

⁴¹⁵ See *id.* (commenting on Sinovel's ability to prolong litigation).

⁴¹⁶ See *id.* (analogizing similarities between cases that experienced jurisdictional issues).

⁴¹⁷ See *id.* (noting when first hearing was held in regards to the corporate spy case).

⁴¹⁸ See *id.* (drawing attention to same case relating to stolen IP brought by AMSC in U.S).

⁴¹⁹ See *China's Sinovel Indicted in the United States for Stealing AMSC Trade Secrets*, AMERICAN SUPERCONDUCTOR (Jun. 27, 2013), archived at

Because of these unique pressures the outcome of the case will mark the outer bounds of the Chinese courts' appetite for enforcing IPR, rather than a representative median position; regardless it will be an interesting data point.⁴²¹ The decision could simply come down to the question of which option the Chinese courts and/or the Chinese government perceive to be least expensive, the immediate cost of the court ordered damages, or the long term reputational damage to the Chinese business environment.⁴²² Based on this research, one may speculate that the Chinese courts could continue to drag their feet with jurisdictional questions on the larger trade secret case.⁴²³ If the case goes on long enough and political pressure continues to be applied the Chinese court could ultimately rule in favor of AMSC, but simultaneously find ways to limit the damages awarded.⁴²⁴ This could allow the Chinese courts and government, to assert that they are serious about enforcing the laws on the books, but without giving the laws the kind of teeth capable of hurting domestic firms who benefit from loose IPR, and without inflicting meaningful damage on Sinovel, a company who is already struggling to pay the bills.⁴²⁵

Especially given an economic environment which, as of late, has seen low crude oil prices,⁴²⁶ a less satisfying scenario is also very

<http://perma.cc/5V54-85BJ> [hereinafter *China's Sinovel Indicted*] (establishing a foundation for AMSC's suit in the U.S.'s legal system).

⁴²⁰ See *id.* (acknowledging Sinovel's egregious and unlawful behavior).

⁴²¹ See Tim Smith et al., *Behind The AMSC/Sinovel Dispute: A Look At IP Law In The U.S. Vs. China*, NORTH AMERICAN WINDPOWER (Oct. 18, 2011), archived at <https://perma.cc/5F6L-4A85> (bringing IP infringement to light and setting precedent for IP enforcement in China).

⁴²² See *id.* (inferring that the Chinese courts weigh potential damages and threats to their reputation when rendering a decision).

⁴²³ See *China's Sinovel Indicted*, *supra* note 419 (surmising that Chinese courts are hesitant to render definitive decisions that pertain to jurisdictional issues).

⁴²⁴ See *Doom*, *supra* note 407 (suggesting that the position the Chinese courts will take in this case is unknown because there is no precedent).

⁴²⁵ See Brian Publicover, *Trading of Sinovel Shares halts on Shanghai stock exchange*, RECHARGE NEWS (Dec. 1, 2014), archived at <http://perma.cc/AA8V-HWGQ> (touching on Sinovel share trades being halted as a response to concerns from shareholders).

⁴²⁶ See Nina Chestney & Alister Doyle, *Low oil price threat and opportunity for renewables: U.N. Climate Chief*, REUTERS (Jan. 22, 2015), archived at <http://perma.cc/G58J-JTSR> (discussing that crude oil prices have fallen by sixty percent since June 2014, and could potentially impact for renewable energy sector).

possible in which alternative wind energy companies suffer and Sinovel continues a downward spiral into financial distress.⁴²⁷ In this scenario it is very possible that AMSC will face the dilemma of settling the claim for pennies, or fractions of pennies, on the dollar, or else litigate the case against a bankrupt firm in which case any sizable judgment will likely be unrecoverable or in the best case partially recoverable after additional years of bankruptcy proceedings in Chinese courts.⁴²⁸ Cynically it is possible, given the bankruptcy scenario, that the Chinese judiciary may be tempted to rule in favor of AMSC and even issue a sizeable judgment, all while knowing it will likely be unrecoverable and that the Chinese bankruptcy court will serve as an additional gate through which it is possible to avoid ordering a substantial transfer of funds out of the country.⁴²⁹

Conclusion

The analysis reveals a tendency to use the precious economic tools of IPR as a blunt instrument. The basic premise underlying the IP system, that companies and private actors must be given a form of exclusivity from the state in order to invest resources into the creation of specific intangible assets is one that should be carefully and continually evaluated.⁴³⁰ Even in cases where this basic premise is true, there should be limits on the scope of the protections that are in line with the underlying structure and business models in the industry.⁴³¹ In order to do this, a nuanced view of the industry economics and applicable IPR doctrine, needs be analyzed in the context of the current macroeconomic and investment climate.

⁴²⁷ See Mark Del Franco, *AMSC Charges Sinovel With IP Infringement In China*, NORTH AMERICAN WINDPOWER (Sep. 15, 2011), archived at <http://perma.cc/NAH9-MQAY> (noting that the wind power industry, and Sinovel alike, may experience a financial downfall given the current litigation).

⁴²⁸ See *id.* (arguing that any equitable remedy is unrealistic even if litigation is pursued).

⁴²⁹ See Doom, *supra* note 407 (pointing to a judicial outcome in favor of AMSC, but lack of a punitive remedy).

⁴³⁰ See Singham, *supra* note 17, at 363-64 (discussing the impact of a strong IP system on an economy in general).

⁴³¹ See Singham, *supra* note 17, at 368 (demonstrating an example of how limitations in regards to IP protection).

There are many moving parts to an IPR doctrine, and particularly in developing economies and rapidly evolving industries, the optimal mix of IPR is a moving target which legislatures and judiciaries struggle to hit.⁴³² The notion of strict scrutiny from constitutional law can be adapted, and applied as a best practice in engineering IPR policy.⁴³³ The scope and enforcement of IPR should be narrowly tailored to meet specific well defined goals in order to avoid unintended and often economically dysfunctional incentives for behavior.⁴³⁴

In light of this observation perhaps it is time for advanced economies, like the US, to consider more specialized structures for IPR in industries with widely divergent business models.⁴³⁵ The business models of the pharmaceutical and software industries represent two extremes, and there are many industries in between.⁴³⁶ Another wrinkle is the observation that industries are evolving at an ever increasing pace. Take the field of genomics for example; at its outset most closely resembled the pharmaceutical industry model, with the first genome taking 13 years to sequence at a cost of \$3 Billion.⁴³⁷ However, that time frame for full genome sequencing is now on the order of hours, at a cost of around \$1000,⁴³⁸ and both are continuing

⁴³² See Singham, *supra* note 17, at 391 (explaining difficulties businesses may have with a lack of IP regulation).

⁴³³ See Margaret Chon, *Intellectual Property and the Development Divide*, 27 CARDOZO L. REV. 2821, 2828 (2006) (analogizing the notion of strict scrutiny review from Constitutional Law to the idea of substantive intellectual property in an intellectual property system).

⁴³⁴ See *id.* (explaining the results of applying strict scrutiny principles in the context of intellectual property rights).

⁴³⁵ See Hagi & Yoffie, *supra* note 107, at 1 (arguing a necessity for improvements in IPR structures utilized by advanced economies).

⁴³⁶ See Harrison, *The App-titude Test*, *supra* note 33 (showing the business model of software production).

⁴³⁷ See Rebecca Boyle, *How it Works: The First Disposable, USB-Powered Genome Sequencer*, POPULAR SCIENCE (Apr. 4, 2012), archived at <http://perma.cc/G2JD-RG2U> (pointing to the sheer cost and effort put into the first human genome sequencing).

⁴³⁸ See Jennifer Abbasi, *The \$1,000 Genome, and the New Problem of Having Too Much Information*, POPULAR SCIENCE (Feb. 27, 2012), archived at <http://perma.cc/NQZ4-TZCP> (showing how face genome sequencing has come in eight years).

to decrease.⁴³⁹ This rapid shift means that the business model of genetic research firms going forward could start to look more like the electronics industry.⁴⁴⁰ With this shift the optimal balance of IPR protection necessary to incentivize research and ensure competition will also change, and relying on an outdated IPR structure could have negative effects on the development of the industry.⁴⁴¹

Compounding this problem for developing countries is pressure from more developed foreign governments to comply with their level of IPR standards.⁴⁴² Worse yet, domestic legislatures and judiciaries not accustomed to operating in such an environment often possess only a rudimentary understanding of the complexities inherent in crafting an IPR policy.⁴⁴³ The threat of economic sanctions and trade organization action, or concerns associated with sending negative signals to outside investors considering FDI, introduces additional variables into the equation.⁴⁴⁴ Governments are often put in a position where they must choose between the short term goal of maximizing current living standards (by keeping IPR weak and freeriding off more developed nations), and the long term goal of furthering the country along the path of economic development towards a knowledge based economy (by strengthening IPR and encouraging R&D).⁴⁴⁵ IPR regimes and doctrines are a means for economic development, which also reflect the culture, talents, goals, resources and development level of a country.⁴⁴⁶ Given a detailed and integrated recount of the IPR policy history, a careful observer might be able

⁴³⁹ See *id.* (showing a decrease in both time and cost of genome sequencing methods).

⁴⁴⁰ See LEHMAN, *supra* note 24, at 2 (predicting that pharmaceutical industry will implement a business model similar to that of electronics' industry).

⁴⁴¹ See Daley, *supra* note 217, at 3 (stressing importance of developing a new IPR structure and what negative results could occur for failing to do so).

⁴⁴² See Drahos, Study Paper No. 8, *supra* note 392, at 6 (acknowledging struggles faced by developing countries trying to adhere to a higher standard for IPR).

⁴⁴³ See Drahos, Study Paper No. 8, *supra* note 392, at 26 (demonstrating difficulties developing countries encounter when implementing new IPR policies).

⁴⁴⁴ See CORPORATE SOCIAL RESPONSIBILITY AND GOVERNANCE, *supra* note 186, at 170-71 (suggesting that additional concerns are considered when deciding to implement IPR policy).

⁴⁴⁵ See Lanjouw & Lerner, *supra* note 88, at 22 (analyzing various costs and benefits governments need to weigh when determining whether or not to implement stronger IPR).

⁴⁴⁶ See IDRIS, *supra* note 85, at 21 (discussing the ways in which the use of intellectual property rights can improve a nation's economy).

to offer insights with a striking degree of accuracy into the current development stage of the country, and even speculate on the identity or business model characteristics of core industries.⁴⁴⁷

South Korea is a standout example of the potential for countries to leverage advances in communication, and other technology, to achieve rapid industrialization and economic prosperity.⁴⁴⁸ Several best practices can be gleaned from this, including early identification of key industries and strategic investment in infrastructure.⁴⁴⁹ A unique feature of the South Korean plan was its early focus on developing telecom infrastructure.⁴⁵⁰ With the benefit of hindsight the decision may seem obvious, but if the digital revolution and the global economy had taken a different direction, or progressed at a slower pace, South Korea wouldn't be what it is today.⁴⁵¹ The South Korean government provided basic infrastructure and then facilitated heavy competition among communications providers, which kept prices low and enabled high access rates for the population.⁴⁵² This accelerated the learning curve and enhanced the technical absorption and imitative capacity of the country.⁴⁵³ The expeditious pace and particular mechanisms of development are unique to this new digital age, and South Korea was at the right place at the right time.⁴⁵⁴ The country also benefited from a smaller geography, and relatively homogeneous

⁴⁴⁷ See Lanjouw & Lerner, *supra* note 88, at 4-5 (discussing that likelihood of trial is based on accuracy of information).

⁴⁴⁸ See SUH, *supra* note 254279, at 4 (describing South Korea's rapid growth over the past four decades).

⁴⁴⁹ See SUH, *supra* note 254279, at 15 (listing the strategies South Korea used when developing their intellectual property rights).

⁴⁵⁰ See SUH, *supra* note 254279, at 81 (explaining how South Korea developed its telecommunications market).

⁴⁵¹ See SUH, *supra* note 254279, at 81 (revealing that the development of modern information infrastructure led to a demand for further development of that specific infrastructure).

⁴⁵² See SUH, *supra* note 254, at 81 (illustrating the way in which South Korea was able to boost the telecommunication industry).

⁴⁵³ See SUH, *supra* note 254, at 83 (discussing the way South Korea imitated the telecommunication markets of the U.S. and U.K. by introducing new competition to the public, creating the ability to support a higher capacity of users).

⁴⁵⁴ See SUH, *supra* note 254, at 173 (drawing attention to exclusive development that South Korea utilized in new digital age).

population, which allowed lawmakers to be nimble and highly responsive to a changing economic environment.⁴⁵⁵

While India and China have shown impressive advancements, and both face challenges related to making economic policy for an extremely large and heterogeneous population, they also face unique challenges.⁴⁵⁶ Despite early successes China faces significant challenges in the structure of their legal institutions and a culture with attitudes and behavior towards IP that are less compatible with western practices.⁴⁵⁷ China's business environment is also heavily influenced by the state, and foreigners looking to conduct business inside China face a very opaque legal and business environment that is heavily influenced by local politics and ad-hoc personal relationships.⁴⁵⁸

This current reality limits the type of knowledge a foreign firm will transfer and entrust to a Chinese business, and the type of projects that will be undertaken there.⁴⁵⁹ As previously discussed an open model of development, one that maximizes technology and knowledge absorption from global firms and institutions, is often the most efficient.⁴⁶⁰ Due to the degree of control the Chinese government maintains over all aspects of the economy, and their tendency towards authoritarian rules and censorship, economy development has proceed down a more closed and arguably less efficient path.⁴⁶¹ Until China addresses these issues, and is able to build confidence in the international business community, it will continue to struggle to

⁴⁵⁵ See Noland, *supra* note 246 (identifying benefits South Korea experienced from their changing economic environment).

⁴⁵⁶ See HARRIS, *supra* note 359, at 1 (depicting challenges unique to China's and India's economies despite their advancements made); see also THE WORLD BANK, *supra* note 366, at 80 (depicting challenges unique to China's economy despite their advancements made).

⁴⁵⁷ See HE & ZHANG, *supra* note 343, at 2 (differentiating between traditional Chinese economy and modern western practices their government has refused to adopt).

⁴⁵⁸ See U.S. INT'L TRADE COMM'N, 2010, *supra* note 364, at xxi (discussing the heavy influence China's government has on their business environment, specifically in regards to foreigners).

⁴⁵⁹ See U.S. INT'L TRADE COMM'N, 2011, *supra* note 377, at D-10 (suggesting limitations Chinese businesses experience as a result of government interference).

⁴⁶⁰ See COX & SEPETYS, *supra* note 357, at 11.404 (asserting most efficient form of development that can be utilized).

⁴⁶¹ See COX & SEPETYS, *supra* note 357, at 11.405 (describing economic development inefficiencies resulting from Chinese government's strict rules and regulations).

attract major outside investment in high technology research and development.⁴⁶² Instead aggressive Chinese governmental spending on R&D, especially in strategically targeted industries,⁴⁶³ may allow China to emerge as a competitive leader in these key spaces.⁴⁶⁴

Returning to the idea of IPR as the scaffolding for building a knowledge based economy, foreign firms should monitor the outcome of high profile business cases, such as the *Sinovel v. AMSC* case.⁴⁶⁵ By doing this they will gain better insight into the current developmental state of IPR rather than directly monitoring legislative activities, government press releases, or accession to international IP treaties.⁴⁶⁶ Ideally the resolution of the *Sinovel v. AMSC* case will provide pragmatic insight on how a foreign company can expect to have these laws interpreted, applied, and enforced on the ground.⁴⁶⁷

India in theory has an economic and legal structure that is much more open and compatible with more developed western nations.⁴⁶⁸ Instead, the country faces problems related to setting and adopting economic and regulatory policies to transition the country towards a knowledge driven economy.⁴⁶⁹ The status of the generic pharmaceutical industry is representative of the current state of In-

⁴⁶² See COX & SEPETYS, *supra* note 357, at 11.412 (demonstrating potential research and development issues China will face if it continues to refuse to strengthen intentional ties).

⁴⁶³ See Aileen Wang et al., *China eyes new strategic industries to spur economy*, REUTERS (Jul. 23, 2012), archived at <http://perma.cc/JK3K-8FJD> (suggesting Chinese policymakers are hoping that these strategically emerging industries will continue to develop China's domestic consumption).

⁴⁶⁴ See HE & ZHANG, *supra* note 343, at 16 (arguing China has ability to become one of the leading countries in foreign and domestic IP by spending more on R&D for products).

⁴⁶⁵ See Smith et al., *supra* note 421 (noting that the outcome of the case will set a precedent for future IP disputes of U.S. Companies and China).

⁴⁶⁶ See Smith et al., *supra* note 421 (characterizing the case outcome as important to other companies with international privacy rights doing business internationally).

⁴⁶⁷ See Smith et al., *supra* note 421 (demonstrating how outcome of legal precedent will dictate future application of Chinese laws against foreign companies seeking to do business with China).

⁴⁶⁸ See *India: June 2002*, *supra* note 304 (recognizing the connection between trade and economic growth).

⁴⁶⁹ See CARL DALHMAN & ANUJA UTZ, THE WORLD BANK, *INDIA AND THE KNOWLEDGE ECONOMY: LEVERAGING STRENGTHS AND OPPORTUNITIES 1-2* (2005) (providing an example of an economic and regulatory policy India adopted to further its development).

dia.⁴⁷⁰ While the Indian generic pharmaceutical industry is increasingly capable of manufacturing complex medications, they have had difficulty in transitioning to the discovery and development of these pharmaceuticals.⁴⁷¹ The Indian government has not pursued the aggressive level of state spending on research that the Chinese government has, and as such is much more dependent on private industry and FDI to fund R&D.⁴⁷² To make this transition India will need to overcome negative signaling to the business community associated with the threat of liberal granting of compulsory licenses, protectionist trade regulations, and narrow patentable subject matter protections for pharmaceutical drugs.⁴⁷³

An important lesson is that there is really only so much that international trade organizations and developed nations can do to protect IPR in developing nations.⁴⁷⁴ As long as developing nations perceive that their domestic industries and overall economy is benefiting from a weak IP environment they will likely develop some form of an IP resistance strategy, such as insufficient legislation, under enforcement, or stalling tactics.⁴⁷⁵ The only long term solution to achieving a stable marketplace for IP intensive products and services is for a country to develop its own domestic economy to the point where it is in its best interest to develop and enforce a strong IPR regime.⁴⁷⁶

This path is most effectively navigated utilizing rigorous business and economic driven decision making, rather than morally driven arguments based in equity.⁴⁷⁷ The reality for India and China

⁴⁷⁰ See Greene, *supra* note 316, at 27 (discussing evolution of India's pharmaceutical industry and its current status).

⁴⁷¹ See Greene, *supra* note 316, at 27 (highlighting India's strengths while still acknowledging their struggles of transitioning into a developed market).

⁴⁷² See Bedi et al., *supra* note 336, at 108 (examining differences between India and China's approaches to economic research and development).

⁴⁷³ See Bedi et al., *supra* note 336, at 106 (providing an alternative India can utilize to overcome the negative impact of Indian Patent Act, 1970).

⁴⁷⁴ See Corbett, *supra* note 200, at 1093 (exploring the limits of the effectiveness of international intellectual property laws).

⁴⁷⁵ See Corbett, *supra* note 200, at 1102 (detailing how India has been able to circumvent international intellectual property laws for their own benefit).

⁴⁷⁶ See Corbett, *supra* note 200, at 1103 (explaining the transitional nature of international intellectual property protections and the need for developing countries to develop domestic intellectual property protections).

⁴⁷⁷ See Gibbons, *supra* note 117, at 951-52 (explaining that a period of utilitarian intellectual property laws until the country reaches the level of a developed country may be the best choice for a developing country).

is that a large portion of the population still remains impoverished, beyond levels comparable to anything in the United States.⁴⁷⁸ The best path forward for everyone is to lift these people out of poverty, to the point where they represent a viable market for the type of high value industries, such as pharmaceuticals, smartphones, and high production entertainment, for which IPR represents a major portion of the product value.⁴⁷⁹ If getting these populations to this point faster means tolerating a certain level of IPR piracy, then this lost revenue can be viewed as an investment.⁴⁸⁰ Corporations however, are not charitable organizations, and the path forward requires the substantial participation of governments.⁴⁸¹ Ultimately this is not a zero sum game, once a country can afford to pay for these products, while arguably counterintuitive; it is in their best interest to do so in order to open up markets, encourage investment and technology transfer, as well as development of locally customized products.⁴⁸² While there are many points in this journey where countries and firms may lock horns, it is only once a country has progressed to the point where IP assets become important to core industries in the domestic economy that a sophisticated stable and reliable IPR regime is likely to emerge.⁴⁸³

⁴⁷⁸ See Williamson, *supra* note 302 (clarifying that the average person in India earns less than \$2 a day).

⁴⁷⁹ See Gibbons, *supra* note 117, at 932-35 (recommending how developed countries should assist the developing countries in uncompensated intellectual property technology).

⁴⁸⁰ See Gibbons, *supra* note 117, at 946 (predicting that if developed countries provide subsidies to developing countries, the developing countries will support strong intellectual property protection).

⁴⁸¹ See Kapfer, *supra* note 188, at 3-4 (summarizing how government participation needs to improve so that private aid does not cripple development by helping decrease government accountability).

⁴⁸² See Gibbons, *supra* note 117, at 927 (explaining how reducing the costs for developing countries, will promote economic development overall).

⁴⁸³ See Gibbons, *supra* note 117, at 933 (describing how a developing country becomes a responsible player in the “globally intellectual property regime” once it reaches a tipping point with intellectual property).