

# HOW TO SEE A JAR OF PEANUT BUTTER: EVALUATING EMPIRICAL STUDIES OF PATENTS AND PATENT LAW

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## INTRODUCTION

**W**HEN I STUDIED ABROAD IN EUROPE for a semester as an undergraduate in college, one of the most wonderful discoveries I made was at a small grocery store near the San Lorenzo piazza in Florence, Italy. Along one of the narrow aisles, on a shelf amidst jars of every imaginable flavor of jam and jelly, was a jar of peanut butter. And not just any peanut butter, but my favorite brand: Skippy. Fumbled by the joy of my discovery, my initial reaction was a bit presumptuous: “Well, of course, it’s a jar of Skippy,” I thought. “Skippy is the best.”

I tell you this story because a year later, when I entered law school and began to study patent law, I encountered the same presumptuous reasoning. The theoretical justifications argued by the majority of legal scholars for the existence and structure of current patent law seemed to boil down to something of an ultimatum: “We must have our patent laws because they are the best and only line of defense against the anarchical cessation of scientific innovation and human productivity.”

In my opinion, this was the same absurd, circular reasoning as that of my initial reaction at finding a jar of peanut butter in Europe. Simply because I find a jar of Skippy peanut butter on a shelf in a Florentine grocery store does not mean that Skippy peanut butter is the best and only brand of peanut butter to buy. Rather, it means that Skippy peanut butter is the only brand to buy at that store at that particular time; there are other peanut butter brands available at other stores around the world, and at various times, depending upon distribution schedules and local tastes.<sup>1</sup>

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<sup>1</sup> I will not inquire into the possibility that the lone jar of peanut butter was misplaced and usually sold in another aisle. The possibility of misplaced peanut butter implies the possibility of misapplied patent law and, consequently, the malpractice and flawed jurisprudence of innumerable legal scholars and practitioners, which is an implication beyond the power and scope of this article. I assumed upon finding the jar of peanut butter that it was where it was supposed to be, so this article assumes that patent law, whatever it may be, is practiced and functions in the way it is supposed to be practiced and to function.

Similarly, simply because current patent law exists and functions in the manner that it does, whatever that manner is, this does not and should not imply that it is the best and only means to protect and to promote scientific innovation and human productivity. There may be other ways to accomplish such an objective, such as ceremonies that award honors and recognition to inventors, or perhaps more essentially, global treaties that promote peace and free trade, thereby allowing people to live in peace and to exchange both goods and ideas. Inventors would be hard pressed to invent in situations where they are taking shelter from war and as a result, are cut off from knowledge of innovations elsewhere around the world that could enrich their own ideas. However, considering that most legal scholars as well as economists interested in the subject of patents have devoted their efforts to studying and debating current patent law, little effort has been devoted to acknowledging, developing, articulating, studying, and debating alternatives.

If any legal scholars wish to persist in their belief that the current existence and structure of patent law is the best means to protect and to promote scientific innovation and human productivity, then they should prove their belief not with circular arguments, but with hard facts founded in empirical studies. Unfortunately, it has proven extremely difficult to study accurately and empirically the effects of patent law and the relationships between patents, scientific innovation, and human productivity in the form of overall economic progress. Some studies have been conducted, but their conclusions are in many instances, limited, misinterpreted, and contradictory.

This article examines and evaluates a broad but hopefully representative sample of such empirical studies, ranging from the first primitive but frequently cited studies, to the more recent but perhaps lesser known studies. To do so, this article attempts to determine the validity of these studies, that is, what exactly the studies allegedly prove and whether they actually prove it. In addition, this article discusses what the validity of those studies says about the effectiveness of current patent law in satisfying the purposes of patent law.

In more colloquial terms, we learn how to see a jar of peanut butter: if it is the only jar on the grocery store shelf, does this mean that it is the best brand of peanut butter, or does it mean that it is simply the only one currently available? As discussed in brief above, common sense concludes that the answer is the latter, but in the context of patents and

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However, even when a law operates exactly the way it is designed to operate, it sometimes tends to have unforeseen opposite, alternative, or indirect effects which deviate from the law's original purpose. Therefore, the question this article explores is, does the operation of current patent law satisfy effectively the alleged purposes of patent law?

patent law, this article aims to come to the same conclusion through a more formal discussion.

In Section I, we begin our formal discussion by understanding exactly what we are supposed to be empirically studying: that is, what patents are and the theoretical justifications for patent law. We also explore whether current patent law officially acknowledges and articulates these theoretical justifications as purposes for the law itself, and if not, what silence may say about the law's effectiveness.

In Section II, we use these justifications, regardless of the extent to which patent law officially acknowledges and articulates them or not, to examine and evaluate a broad sample of empirical studies of patents and patent law. If these studies empirically prove what they conclude with respect to the theoretical justifications for patent law, that is, that patents encourage scientific innovation and economic progress, then it can be said that current patent law is effective in satisfying its purpose, to the extent that the purpose embodies the major theoretical justifications for patent law. If, on the other hand, these studies fail to empirically prove their conclusions with respect to the relationship between patent law and the theoretical justifications for that law, then their conclusions are possibly misguided, and the current existence, structure, and operation of patent law should be re-evaluated and not taken for granted.

## I. A GENERAL INTRODUCTION TO PATENTS

**B**EFORE WE CAN EVALUATE EMPIRICAL STUDIES of patents, we must understand the concept of a patent and determine the standard for evaluation. In this Section, we first define a patent using various sources, such as dictionaries, legal texts, national legislation, and international conventions. Second, we articulate the theoretical justifications for patent law that are most commonly argued by legal scholars and economists. If these justifications are acknowledged and articulated in patent law, particularly in international patent conventions, as official purposes for the laws those conventions promulgate, then they will be the appropriate standards by which we can evaluate empirical studies of patents and patent law.

### A. Defining a Patent

The definition of a patent is relatively straightforward and consistent among various sources.<sup>2</sup> Linguistically, the *Canadian Oxford*

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<sup>2</sup> In this article, I use various sources to define a patent because variations in definitions reflect and imply the level of uncertainty to the understanding of a

*English Dictionary*<sup>3</sup> defines a “patent” as a right or title that is conferred by “a government authority to an individual or organization [...]. The sole right to make, use, or sell some invention [...]”<sup>4</sup> Similarly, the *American Heritage College Dictionary* defines a “patent” as “a grant made by a government that confers upon the creator of an invention the sole right to make, use, and sell that invention for a set period of time.”<sup>5</sup>

From a legal perspective, a patent reflects these linguistic definitions; in both international conventions and national legislation, a patent is an exclusive right granted by a government to an individual to protect “a new and useful idea.”<sup>6</sup> For instance, the 1883 *Paris Convention for the Protection of Industrial Property* defines patents as “industrial property” determined by national legislation:<sup>7</sup>

Industrial property shall be understood in the broadest sense and shall apply not only to industry and commerce proper, but likewise to agricultural and extractive industries and to all manufactured or natural products, for example, wines, grain, tobacco leaf, fruit, cattle, minerals, mineral waters, beer, flowers, and flour.<sup>8</sup>

Similarly, the *United States Code* grants patents for the invention or discovery of “any new and useful process, machine, manufacture, or

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word and concept, and consequently its effects in the real world. If the meaning of a word and concept possesses significant variations from one source to another, then it becomes more difficult to study the concept accurately and empirically in the real world. Conversely, if the meaning of a word and concept is for the most part similar from one source to another, then it becomes easier to study the concept accurately and empirically in the real world.

<sup>3</sup> *The New Shorter Oxford English Dictionary* is frequently used by the World Trade Organization Appellate Body in its panel decisions for determining the plain meaning and legal definition of words. See Raj Bhala, *International Trade Law: Theory and Practice*, 2d ed. (Kansas: Matthew Bender, 2000) at 981-986.

<sup>4</sup> *The Canadian Oxford English Dictionary* (Canada: Oxford University Press, 2004) at 1138.

<sup>5</sup> *The American Heritage College Dictionary*, 4th ed. (Boston: Houghton Mifflin Company, 2002) at 1020.

<sup>6</sup> Kamil Idris, *Intellectual Property: A Power Tool for Economic Growth*, 2d ed. (2003) at 9, online: WIPO <[http://www.wipo.int/export/sites/www/freepublications/en/intproperty/888/wipo\\_pub\\_888\\_1.pdf](http://www.wipo.int/export/sites/www/freepublications/en/intproperty/888/wipo_pub_888_1.pdf)>.

<sup>7</sup> *Paris Convention for the Protection of Industrial Property*, 20 March 1883, 21 U.S.T. 1583, art. 1(4).

<sup>8</sup> *Ibid.*, art. 1(3).

composition of matter, or any new and useful improvement thereof,”<sup>9</sup> so long as the invention, discovery, improvement is also “non-obvious.”<sup>10</sup>

While consistent with each other, the significance of these linguistic and legal definitions is that they do not explicitly state, or even remotely imply, that a patent is a natural, inherent right in the scientific innovation to which it attaches. A patent is itself an invention, an artificial and arbitrary right created and granted by a government. In general, to acquire a patent, an individual files an application with his or her local government, explaining the invention and detailing how it differs from other inventions.<sup>11</sup> The government reviews the application extensively and grants the patent only if the invention meets its criteria for being new and useful.<sup>12</sup> Afterwards, the owner of the patent is not required to use the patented invention, but he or she can enjoin others from using it without permission.<sup>13</sup> While it appears from the investigatory nature of these general procedures that creating and granting a patent for an invention is not arbitrary, it has the potential to be; governments can always choose not to create or grant patents or even to promulgate patent law.<sup>14</sup> Governments may operate under the presumptuous reasoning that they must grant patents and promulgate patent law in order to stimulate scientific innovation, but as will be discussed in further detail in Section I.B, they do not have to.

Their choice is the same as ours when we walk down a narrow grocery store aisle and decide not to buy a jar of peanut butter either because we do not like the taste of peanut butter in general, or we do not feel like buying it at the moment for any given reason. It may simply not be necessary; there may be things that we can buy other than peanut butter, such as something similar, like hummus, or something completely different, like toilet paper. Even if we change our minds and choose to buy the jar for whatever reason, substantial or trivial, the point is, we do not have to make the purchase.

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<sup>9</sup> 35 U.S.C. § 101 (2007).

<sup>10</sup> *Ibid.*, § 102-103.

<sup>11</sup> Adam B. Jaffe & Josh Lerner, *Innovation and Its Discontents* (New Jersey: Princeton University Press, 2004) at 3.

<sup>12</sup> *Ibid.*

<sup>13</sup> *Ibid.*

<sup>14</sup> William Pretorius, “TRIPS and Developing Countries: How Level is the Playing Field?” in Peter Drahos & Ruth Mayne, eds., *Global Intellectual Property Rights* (USA: Palgrave, 2002) at 184. For example, the Indian government has recently begun a movement to protect certain yoga practices from being patented in other countries by instead cataloguing it as traditional knowledge. See Suketu Mehta, “Can you patent wisdom?” *International Herald Tribune* (7 May 2007) Editorials.

## B. Justifications for Patent Law

Concluding that a patent is generally an exclusive right created arbitrarily and granted by a government for a limited time to make, use, or sell some useful, new, and non-obvious mechanical or scientific process or invention, or at least to stop others from doing so, we now articulate the justifications for patent law. In particular, we focus on the theoretical justifications that are most commonly argued by legal scholars and economists: to encourage innovation and to ensure public disclosure.

Surprisingly, however, these justifications are rarely acknowledged or articulated in international patent conventions as official purposes for the laws those conventions promulgate. This ambiguity and silence opens a Pandora's box of implications: Do absolutely no purposes exist for patent law, or do none exist on which the signatories to the conventions could agree? If it is the case that the signatories simply could not agree at least on acknowledging or articulating the two major theoretical justifications for patent law, which many legal scholars and economists argue and support, why is this so? Are those theories in practice insufficient to justify current patent law? Is the empirical evidence too weak to support the theories, and if so, does that invalidate them as justifications for patent law? What does all this say about the purpose and effectiveness of current patent law, that law being allegedly based on unsupported, unacknowledged, and unarticulated theoretical justifications? These questions will be discussed in further detail in Section II. For now, we must first understand the theoretical justifications themselves, valid or not.

### 1. Theoretical Justifications

Justifications are derived from the motivations of the people interested in receiving, possessing, or using patents. Everybody has ideas; thus, anybody can invent. Across the world, in even the poorest countries, "there are people with the capacity to invent and create, some at a world-class level."<sup>15</sup> Such people range

from "knowledge workers" in labs and garages, in university spin-off companies, to executives in medium-size technology firms and multinational corporations [... who operate] between the extremes of personal achievement and uncompensated fame on the one hand,

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<sup>15</sup> Robert M. Sherwood, "Human Creativity for Economic Development: Patents Propel Technology" (2000) 33 Akron L. Rev. 351 at 352.

and faceless but comfortable [...] fortune on the other:]<sup>16</sup> At one point on the [...] continuum from the first technical application of a basic scientific discovery to commercial empire is the lone scientist problem-solver of lore, for whom financial incentives in the form of patent royalties may be utterly meaningless [...]. At another is the modern technological firm, for which innovation through commercialization of new inventions is primarily a source of shareholder confidence sustaining thousands or tens of thousands of well-paying jobs [...].<sup>17</sup>

Most legal scholars argue that the issue of whether an individual's scientific innovation "is mobilized for national economic development, or wasted, is largely a function of the availability of [patent] protection [...]."<sup>18</sup> Laws establishing, protecting, and regulating patents are designed to avoid what is called the "inventor's paradox," where inventors cannot sell their creations for fear of their ideas and knowledge being taken and used commercially without them receiving fair compensation, and where buyers will not invest in new inventions about which they know nothing.

Any potential buyer, of course, will not pay a high price, or perhaps any price at all, unless sufficient details are disclosed. The inventor, however, does not want to disclose too much, for fear the would-be buyer will instead become an independent producer of the invention's commercial embodiment, and a competitor of the true inventor. The inventor's paradox may be solved by a patent, which gives the inventor the freedom to disclose without fear of self-induced competition.<sup>19</sup>

As a result, a patent is a "policy instrument," or perhaps more colloquially, a security blanket, designed to build confidence and to create a balance between all these competing interests, in order to encourage scientific innovation that both the inventor and the public will put to practical use.<sup>20</sup> Most legal scholars and economists therefore

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<sup>16</sup> Graeme B. Dinwoodie *et al.*, *International and Comparative Patent Law* (Ohio, LexisNexis, 2002) at 51.

<sup>17</sup> *Ibid.* at 50-51.

<sup>18</sup> Sherwood, *supra* note 15 at 352.

<sup>19</sup> Donald S. Chisum *et al.*, *Principles of Patent Law*, 2d ed. (USA: Foundation Press, 2001) at 66.

<sup>20</sup> Organisation for Economic Co-Operation & Development, "Compendium of Patent Statistics" (2005) at 41, online: OECD <<http://www.oecd.org/dataoecd/60/24/8208325.pdf>> [OECD Compendium].

argue two theoretical justifications for laws protecting and regulating patents: first, to encourage the innovation of new technology, and second, to ensure public disclosure of the new technological information.<sup>21</sup>

#### a. To Encourage Innovation

This first category of theoretical justifications for patent laws—encouraging the introduction of new technology—provides two private incentives to the patent owner: “an incentive to *invent* and an incentive to *invest*.”<sup>22</sup> The interaction of these two incentives is demonstrated by the careers of Thomas Edison, Alfred Nobel, Chester Carlson, Edwin Land, and other 19<sup>th</sup> and 20<sup>th</sup> century inventor-entrepreneurs who “built great commercial enterprises on the success of their patented inventions.”<sup>23</sup> It is a continuous, self-feeding cycle: royalties from patented inventions pay for further research and the development of newer, better inventions and technologies, which are then patented and commercialized, earning more royalties which pay for more research and development.

From a micro-economic perspective, a patent is a sort of “shelter from the forces of market competition” for the individual possessing the patent<sup>24</sup>:

The shelter is limited to the precise terms of the claims of the patent, but it is sturdy and durable for many years. The premise of the patent [...] is that this shelter and the resulting competitive advantage encourage invention because inventors know that they can reap a financial reward from their ingenuity.

The patent system also promotes technological and business competition because patent holders must disclose the details of their inventions in exchange for the specified period during which they have exclusive rights over their exploitation. As a result, both they and their competitors race to improve those inventions and to use the technology to create new ones [...].<sup>25</sup>

Encouraging the introduction of new technology also provides a public incentive. From a macro-economic perspective, patents stimulate

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<sup>21</sup> Dinwoodie *et al.*, *supra* note 16 at 49.

<sup>22</sup> *Ibid.* at 50 (emphasis in original).

<sup>23</sup> *Ibid.*

<sup>24</sup> Idris, *supra* note 6.

<sup>25</sup> *Ibid.*



a nation's economic growth, in four main ways. First, they facilitate technology transfer and investment. Second, they encourage and facilitate research and development at universities and research centers. Third, they lead to new technologies and businesses. Fourth, they generate revenue for businesses that accumulate and use patents in licensing, joint ventures, and other revenue-generating transactions.<sup>26</sup>

Using patents for economic growth requires a patent policy structured to promote economic growth.<sup>27</sup> A patent policy "should be designed to promote patent licensing, joint ventures and strategic alliances, as these can encourage invention at the national level as well as [at the private, individual level]."<sup>28</sup> These can also encourage research and development in universities and research centers.<sup>29</sup> "Handled properly, patents are efficient drivers of national innovation, [research and development], product creation and business transactions that have beneficial macro and micro economic effects."<sup>30</sup>

#### **b. To Ensure Public Disclosure**

The second category of theoretical justifications for patent law is ensuring public disclosure of new technological information. Indeed, public disclosure is perhaps the most significant aspect of creation and invention, for what good is an idea if not known or realized? An idea in the mind of one person is well and good, but an idea spread among the masses inarguably has greater influence and strength. Therefore, the more important justification and purpose of patent law is public disclosure, as "[t]he history of intellectual property is essentially the emergence of recognition that a community benefits when it encourages its creative and inventive people by honoring the products of their minds."<sup>31</sup>

However, while the social value of public disclosure "is rarely questioned,"<sup>32</sup> the belief that government action is required to ensure it is not universally accepted. Many legal scholars and economists generally believe that government intervention, through promulgation of patent law, is needed to create a balance between the competing interests of inventors and the public, but some dissenters argue that "government action of any kind, including the awarding of [...] patents, is

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<sup>26</sup> *Ibid.* at 10.

<sup>27</sup> *Ibid.* at 17.

<sup>28</sup> *Ibid.*

<sup>29</sup> See *ibid.*

<sup>30</sup> *Ibid.*

<sup>31</sup> Sherwood, *supra* note 15 at 354.

<sup>32</sup> Dinwoodie *et al.*, *supra* note 16 at 51.

unnecessary” to stimulate scientific innovation.<sup>33</sup> These dissenters argue that the private and public economic incentives, articulated above, are enough, and that mandatory public disclosure of new technological information is unnecessary to justify the existence of patent law.<sup>34</sup> Other dissenters entirely reject the theory that patent law, by providing exclusive rights to new technologies, ensures public disclosure of new technological information; instead, these groups emphasize the preservation of “traditional cultural values and beliefs”<sup>35</sup> and the inherent and predominant right of the public to free access to all intellectual property.<sup>36</sup>

## 2. Justifications Declared in International Patent Conventions

While “the trend of [national] legislatures and courts in developed nations over the past three decades has been favorable to [...] stronger patent protection,”<sup>37</sup> surprisingly, the theoretical justifications discussed above are rarely acknowledged or articulated in international patent conventions as official purposes for the current existence, structure, and operation of patent law. Instead, most of the conventions seem to adopt a “Because I Said So” attitude.

For the past 130 years, the majority of international patent conventions, even when amended, have remained silent on the purposes for the patent laws that they promulgate. For instance, the 1883 *Paris Convention for the Protection of Industrial Property*, the 1925 *Hague Agreement Concerning the International Deposit of Industrial Designs*, the 1968 *Locarno Agreement Establishing an International Classification for Industrial Designs*, the 1970 *Patent Cooperation Treaty*, the 1977 *Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure*, the 1999 *Geneva Act of the Hague Agreement Concerning the International Registration of Industrial Designs*, and the 2000 *Patent Law Treaty* all remain silent regarding justifications either for the international patent laws they promulgate or for the national patent laws that they attempt to harmonize internationally.

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<sup>33</sup> Stanley M. Besen & Leo J. Raskind, “An Introduction to the Law and Economics of Intellectual Property” in Keith E. Maskus, ed., *The WTO, Intellectual Property Rights and the Knowledge Economy* (Northampton: Edward Elgar Publishing Ltd., 2004) at 123-124.

<sup>34</sup> Dinwoodie *et al.*, *supra* note 16 at 49.

<sup>35</sup> *Ibid.*; see also Katie Lula, “A New Idea of Copyright” (May 2007) (unpublished manuscript, on file with author).

<sup>36</sup> See *ibid.*

<sup>37</sup> *Ibid.* at 52.

In contrast, the 1967 *Convention Establishing the World Intellectual Property Organization* (“WIPO Convention”), the 1971 *Strasbourg Agreement Concerning the International Patent Classification* (“the *Strasbourg Agreement*”), and the 1994 *Agreement on Trade-Related Aspects of Intellectual Property Rights* (“TRIPs”) imply purposes for patent laws, but they contain no language specifically referencing the theoretical justifications discussed above.

For instance, the preamble to the *WIPO Convention* speaks of a desire “to encourage creative activity” and “to promote the protection of intellectual property throughout the world,”<sup>38</sup> but there are a variety of ways to accomplish these objectives without necessarily promulgating patent laws. For example, the basic purpose of the Scientific and Technical Awards of the Academy of Motion Picture Arts and Sciences is to recognize and honor the “ingenuity, efficiency and economy” of “[a]ny device, method, formula, discovery, or invention of special and outstanding value to the arts and sciences of motion pictures.”<sup>39</sup> These awards strive to accomplish the same purpose as the *WIPO Convention*, that is, the promotion of creativity around the world, but without the creation and granting of patents and the promulgation of patent law.

Similarly, the preamble to the *Strasbourg Agreement* states that the patent law that it promulgates “is in the general interest.”<sup>40</sup> However, what is the “general interest”? In the balancing act between inventors and the public, which patent law is intended to negotiate, the general interest could be either one of the two categories of theoretical justifications discussed above. That is, the “general interest” in the *Strasbourg Agreement* could be either to encourage the introduction of new technology, thereby favouring the general interest of inventors in excluding others from making, using, or selling their inventions, or to ensure public disclosure of the new technological information, thereby favouring the general interest of the public’s welfare.

To complicate matters further, the *Strasbourg Agreement* could, by using the word “general,” be referring to the interests of *both* inventors and the public. The *Strasbourg Agreement* therefore acknowledges, through one interpretation or another, the theoretical justifications of patent law. On the other hand, its vague choice of words fails to sufficiently articulate those justifications. Such ambiguity could mean indecision, uncertainty, and doubt on the part of the drafters’ and signatories’ own beliefs in the theoretical justifications of the law they

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<sup>38</sup> *Convention Establishing the World Intellectual Property Organization*, 14 July 1967, 21 U.S.T. 1749, pmbl.

<sup>39</sup> Academy of Motion Picture Arts and Sciences, “Scientific and Technical Awards”, online: Academy of Motion Picture Arts and Sciences <<http://www.oscars.org/scitech/index.html>>.

<sup>40</sup> *Strasbourg Agreement Concerning the International Patent Classification*, 24 March 1971, 26 U.S.T. 1793, pmbl.

were promulgating. Why is it that drafters were unable to agree on articulating more clearly the two major theoretical justifications for patent law, which many legal scholars and economists strongly support? Are those theories in practice insufficient to justify current patent law? Their ambiguity and doubt on the matter in turn strengthens our own doubts and questions about whether the theoretical justifications are in practice insufficient, whether patent law, in its current existence, structure, and operation, does indeed have the practical purpose it is believed to have, and whether it can effectively satisfy this purpose. In sum, the *Strasbourg Agreement* promulgates international patent law that attempts to harmonize national patent law, neither for which it provides adequate justification or purpose.

Justifications set out in *TRIPs* fare slightly better, but by saying more, the agreement in fact says less. Like the *Strasbourg Agreement*, *TRIPs* acknowledges the major theoretical justifications for patent law, but in its attempt to articulate them, its language becomes contradictory. Its preamble introduces “the need to promote effective and adequate protection of [patent] rights” and “the need for new rules and disciplines concerning [...] the provision of adequate standards and principles concerning the availability, scope and use” of patents.<sup>41</sup> However, it does not explain why there exist such “needs.” A “need” is “something required [...] a necessity; [an] obligation.”<sup>42</sup> A “need” is arguably too strong a word for *TRIPs* to use, in saying that we “need” to protect and regulate patents, particularly when in fact patents are themselves inventions, artificial and arbitrary rights created and granted by governments, as discussed above in Section I.A.

Furthermore, without providing any logical reasoning or explanation, *TRIPs* simply declares that patents are “private rights,”<sup>43</sup> which seems to imply that an inventor’s interest in excluding others from making, using, or selling their inventions, takes precedence over the public’s interest in its welfare, which depends upon public disclosure of new technological information. Yet in the same breath, *TRIPs* acknowledges “underlying public policy objectives of national systems for

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<sup>41</sup> *Agreement on Trade-Related Aspects of Intellectual Property Rights [TRIPs]*, Annex 1C to the *Marrakesh Agreement Establishing the World Trade Organization*, 15 April 1994, 319 at 320; *General Agreement on Tariffs and Trade—Multilateral Trade Negotiations (The Uruguay Round): Agreement on Trade-Related Aspects of Intellectual Property Rights, Including Trade in Counterfeit Goods* 33 I.L.M. 81 (1994) at 84. While the preamble in *TRIPs* refers to “trade-related intellectual property rights” and not specifically patents, Part II ss. 5 and 6 of *TRIPs* do include specific references to and provisions regulating patents. Therefore, by implication, patents are trade-related intellectual property rights and within the scope of the preamble.

<sup>42</sup> *The American Heritage College Dictionary*, 3d ed. at 912.

<sup>43</sup> *TRIPs*, *supra* note 41.

the protection of intellectual property, including developmental and technological objectives.”<sup>44</sup>

However, *TRIPs* does not adequately explain what developmental and technological “public policy objectives” are; if anything, provisions within the agreement contradict one another. Article 7 attempts to define such “objectives”:

The protection and enforcement of [patent] rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations.<sup>45</sup>

On the other hand, Article 8, entitled “Principles,” states that nations may adopt laws “necessary to protect public [welfare] and to promote the public interest in [... their] socio-economic and technological development [...]”<sup>46</sup> If *TRIPs* intends to promulgate laws ultimately to serve these purposes stated in Article 8, then it may do so with any kind of law, not simply patent law. For instance, laws prohibiting war<sup>47</sup> or promoting free trade<sup>48</sup> all protect and promote public welfare and development. *TRIPs* may also serve the purposes stated in Article 8 by simply not existing itself, considering that human civilization has endured for millennia without the existence of modern patent laws.<sup>49</sup>

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<sup>44</sup> *Ibid.*

<sup>45</sup> *Ibid.*, art. 7.

<sup>46</sup> *Ibid.*, art. 8.

<sup>47</sup> For example, the United Nations prohibits war for the obvious reason, “to save succeeding generations from the scourge of war,” for a less obvious but equally important reason, “to employ international machinery for the promotion of the economic and social advancement of all peoples,” and for other humanitarian reasons. See *Charter of the United Nations*, 26 June 1945, Can. T.S. 1945 No. 7, pmb.

<sup>48</sup> For example, the *General Agreement on Tariffs and Trade* promotes free trade in order to promote global public welfare and development, which it refers to in economic terms, as “raising standards of living, ensuring full employment and a large and steadily growing volume of real income and effective demand, developing the full use of the resources of the world, and expanding the production and exchange of goods.” See *General Agreement on Tariffs and Trade*, 30 October 1947, 58 U.N.T.S. 187, Can T.S. 1947 No. 27 (entered into force 1 January 1948) at pmb. [*GATT 1947*].

<sup>49</sup> In the 4<sup>th</sup> century B.C., Aristotle recorded the first reference to the concept of patents and patent law as “a system of rewards to those who discover things useful to the state,” but he condemned the concept as “likely to lead to instability.” See Robert P. Merges *et al.*, *Intellectual Property in the New*

Even if we conclude that the vague language contained in the *WIPO Convention*, the *Strasbourg Agreement*, and *TRIPs* is an adequate articulation of purposes for patent law, those purposes, which are the same theoretical justifications that legal scholars support, are still not completely persuasive. If we accept the dissenters' argument, discussed above, that private economic incentives are enough<sup>50</sup> to encourage innovation without governmental intervention in the form of establishing, granting, protecting, and regulating patents to inventions, then patent law is "unnecessary."<sup>51</sup> The converse is also true: if private incentives, economic or otherwise, are not enough to stimulate scientific innovation, then patent law alone cannot be an effective substitutable stimulant. It over-indulges unworthy inventors and causes allocative inefficiency:

[First, i]n a winner-take-all system like that governing patents, competition to get the patent (and thus control over future innovations based on that patent) may result in an excessive amount of resources being devoted to obtaining the prize. In fact, the combined expenditures of two firms seeking the same patentable invention in a patent race may not only be larger than that of a single firm, but their combined expenditures may be greater than is socially optimal [...]. [Second, p]roviding incentives for the creation of many new works may encourage resources to be devoted to innovative activity. However, if the new innovations are not widely used, the system may be less beneficial than one with less creativity, but where the materials created are more broadly disseminated [...]. [Third, t]he less that innovation depends on the resources invested and the potential economic rewards, the more

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*Technological Age*, 2d ed. (USA: Aspen Publishers, 2003) at 123. His condemnation seemed to be accepted as universal common sense, because the concept of patents and patent law disappeared for almost a millennium, while human civilization continued to develop and progress, even through the "dark" ages. See Jean Gimpel, *The Medieval Machine: The Industrial Revolution of the Middle Ages* (New York: Holt, Rinehart, and Winston, 1976). The first modern patent legal regime originated in Venice in the fifteenth century; soon afterwards, the concept of patents and patent law gained popularity through the growth of trade and the spread of ideas throughout Europe and the rest of the world. See *Merges et al.*, *ibid.* at 125.

<sup>50</sup> Dinwoodie *et al.*, *supra* note 16 at 49.

<sup>51</sup> Besen & Raskind, *supra* note 33.

limited is the case for granting substantial rights to creators.<sup>52</sup>

In the context of our peanut butter analogy, neither public incentives nor any amount of colorful marketing schemes or sales promotions can induce us to consume a jar of peanut butter if we do not have our own private incentive to do so. Admittedly, a familiar brand name, a fancy advertising slogan, a coupon, or a discount may induce a temporary craving and persuade us to purchase a jar, but when we return home, if we have no true desire to eat the peanut butter, either because we are not hungry, we do not feel like eating it, we suddenly develop an allergy to it, or any other reason, then the jar remains unopened and wasted. Furthermore, the money we spent to buy the jar, as well as the energy expended to earn the money to buy the jar, is wasted. We ourselves must already have a true personal desire for the jar of peanut butter in order for it to be resourcefully purchased and consumed.

## II. EVALUATING EMPIRICAL STUDIES OF PATENT LAW

**W**HILE IT IS ONE THING TO ARGUE a theory or idea, it is something entirely different to empirically study it. For instance, we could theorize that promulgating patent law in “the developing countries will boost the creation and application of new technology, as it has in the developed countries, with consequent economic growth and increased public welfare benefit,” but few developing countries have promulgated patent law to such an extent that will provide sufficient empirical information to support an empirical study of that theory.<sup>53</sup>

Even if there were sufficient empirical information available to study, we must determine the standards by which to judge what the information indicates. In many instances, patent statistics are increasingly manipulated to indicate a nation’s level of innovation and rate of technological progress.<sup>54</sup> Meanwhile, claims regarding innovation

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<sup>52</sup> *Ibid.* at 125-126. However, with respect to the first point, it is uncertain whether patent races are common or just theoretical. Again, empirical studies clarifying this issue are few and limited.

<sup>53</sup> *Ibid.*

<sup>54</sup> World Intellectual Property Organization, “WIPO Patent Report: Statistics on Worldwide Patent Activities” (2006) at 4, online: WIPO <[http://www.wipo.int/ipstats/en/statistics/patents/pdf/patent\\_report\\_2006.pdf](http://www.wipo.int/ipstats/en/statistics/patents/pdf/patent_report_2006.pdf)>. [“WIPO Patent Report”]; see also Chisum *et al.*, *supra* note 19 at 59.

and technological process are generally presumed to be accurate.<sup>55</sup> For example, “many government agencies regularly interpret the number of patents or patent applications held by domestic firms and individual inventors as a measure of their nation’s technological prowess.”<sup>56</sup> To improve upon this method, legal scholars and economists consider the possibility of weighing patents by their importance or value, and generating value-weighted patent counts.<sup>57</sup>

By manipulating patent statistics, many legal scholars and economists assume that patent law, by “providing a legal framework for protecting inventions,” stimulates innovation and thereby increases productivity and technological progress.<sup>58</sup> It is assumed that patents indicate the inventive performance and productivity of nations, regions, industries, and firms, the diffusion of knowledge across regions and industries, the level of research and development of specific industries and technologies, and other economic developments.<sup>59</sup> Four rationales attempt to explain this assumption. First, “patents cover a broad range of technologies on which there are sometimes few other sources of data.”<sup>60</sup> Second, “the contents of patent documents are a rich source of information,”<sup>61</sup> although there is no consensus on what that information means.<sup>62</sup> Third, “patent data are readily available from patent offices.”<sup>63</sup> Fourth, “patents have a close link to inventions,”<sup>64</sup> but this rationale is exactly the sort of flawed, circular reasoning discussed in the Introduction to this article. Colloquially, it is like reasoning that the chicken comes from the egg because the egg comes from the chicken. With patents, it is not credible to reason that patent law stimulates invention because invention is linked to the granting of patents—at least, not without hard empirical evidence that clarifies the link between the two, and as will be discussed in further detail below, there is a lack of empirical evidence available to sufficiently prove this.

There remains “no [empirical] consensus as to the impact of patent [law] on the growth of technology,” or on other issues relevant to the existence of patent law and its effects on nations,<sup>65</sup> because the

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<sup>55</sup> See Dietmar Harhoff, Frederic M. Scherer & Katrin Vopel, “Citations, Family Size, Opposition and the Value of Patent Rights” (2003) 32 Res. Pol. 1343 at 1344.

<sup>56</sup> *Ibid.*

<sup>57</sup> *Ibid.*

<sup>58</sup> OECD Compendium, *supra* note 20 at 41.

<sup>59</sup> *Ibid.*

<sup>60</sup> *Ibid.*

<sup>61</sup> *Ibid.*

<sup>62</sup> See Besen & Raskind, *supra* note 33 at 126.

<sup>63</sup> OECD Compendium, *supra* note 20 at 41.

<sup>64</sup> *Ibid.*

<sup>65</sup> Besen & Raskind, *supra* note 33 at 128.



standards by which to judge what the empirical information indicates remains ambiguous:

[P]atents are subject to certain drawbacks: a) the value distribution of patents is skewed as many patents have no industrial application (and hence are of little value to society) whereas a few are of substantial value; b) many inventions are not patented because they are not patentable or inventors may protect the inventions using other methods, such as secrecy [...] c) the propensity to patent differs across countries and industries; d) differences in patent regulations make it difficult to compare counts across countries; and e) changes in patent law over the years make it difficult to analyse trends over time.<sup>66</sup>

Josh Lerner, who has extensively studied empirical data on patents and patent law, identified three “key lessons” that he learned from studying nations’ policy shifts in patent law. First, patent law and any significant amendments to the law, reflecting shifts in patent policy, “emerged only after long and contentious debates, often cast in moral, rather than economic, terms.”<sup>67</sup> Second, the law and amendments were promulgated permanently, without any “legislative provisions for the review or evaluation of the changes.”<sup>68</sup> Third, “while each of the changes had an apparently substantial impact on patenting activity, the impact on innovation was much less certain.”<sup>69</sup> In other words, governments promulgate patent law for allegedly moral purposes, but legal scholars might feel more comfortable practicing law that is justified economically. However, without any legislative standards or guidelines to review or evaluate the effect of the patent law, there is no way to economically justify the law.

If international patent conventions fail to acknowledge the major theoretical justifications for patent law and to articulate them clearly as official purposes for the patent law they promulgate, then there is no accurate standard by which we can empirically study the positive or negative effects of that law. On the other hand, if international conventions acknowledge, however vaguely, the theoretical justifications for patent law that are so adamantly argued by the majority of legal scholars and economists, through the *Strasbourg Agreement* and *TRIPs*,

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<sup>66</sup> OECD Compendium, *supra* note 20 at 41.

<sup>67</sup> Josh Lerner, “Patent Policy Innovations: A Clinical Examination” (2000) 53 *Vand. L. Rev.* 1841 at 1843.

<sup>68</sup> *Ibid.*

<sup>69</sup> *Ibid.*

for example, then there is at least some standard by which empirical studies may prove patent law effective or ineffective in satisfying such purposes and justifications. By any standards, however, there remain few empirical studies on the effects of patent law.<sup>70</sup>

In this Section, this paper examines and evaluates a broad but hopefully representative sample of empirical studies, which I will label (A) hypotheses and primitive studies, (B) misinterpreted studies, and (C) limited studies. These studies have attempted to determine whether the relationship between patent law, innovation, and economic growth and development, if one exists, is a positive correlation, a negative one, or a causation. If these studies empirically prove what they theoretically claim with respect to the justifications for patent law, that is, that patents encourage scientific innovation and economic progress, then the studies are valid, and current patent law can be said to be effective in satisfying its purpose, to the extent that the purpose embodies the major theoretical justifications for patent law. If, on the other hand, these studies fail to empirically prove their conclusions with respect to the relationship between patent law and the theoretical justifications for that law, then their conclusions are possibly misguided, and the current existence, structure, and operation of patent law should be re-evaluated.

#### **A. Hypotheses and Primitive Studies**

In the early twentieth-century, Austrian-American economist Joseph Schumpeter became the first person to formally theorize that innovation causes technological and economic progress and to imply that patent law, by providing exclusive property rights to inventions, encourages innovation and therefore progress. He explained that the insertion of new technology is the driving economic force behind the displacement of mature industries by newer ones; in turn, this displacement spurs economic development.<sup>71</sup> Schumpeter theorized further that while widespread competition benefits short-term social welfare, regulated and controlled competition benefits technological innovation and economic progress<sup>72</sup>:

[C]apitalist economies are characterized by a continuous process of “creative destruction,” in which innovative technologies and organizational structures constantly threaten the status quo [...]. [T]echnological innovation provides the opportunity for temporary monopoly profits

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<sup>70</sup> See Sherwood, *supra* note 15 at 355.

<sup>71</sup> *Ibid.* at 356.

<sup>72</sup> Robert P. Merges, “Commercial Success and Patent Standards: Economic Perspectives on Innovation” (1988) 76 Calif. L. Rev. 805 at 843.

[derived under patent law], and the pursuit of these profits has spurred the tremendous growth of the Western economies [...].<sup>73</sup>

The argument is thus made that if patent law existed to protect and to regulate innovation, then, provided it was designed appropriately, patent law could thereby be an effective tool in controlling the competition of innovation and contributing to long-term economic development, progress, and social welfare.

In 1957, Robert Solow reviewed the productivity of the U.S. economy from 1909 to 1949 and “found that the three classic factors of production, that is, money, labor, and natural resources, accounted for barely half of the nation’s economy over that period.”<sup>74</sup> Future economists and legal scholars, such as Robert M. Sherwood, theorized that the unexpectedly sizeable “residual” was the introduction of new, patented technology into the economy.<sup>75</sup>

In 1987, Edwin Mansfield empirically tested this theory by investigating the social welfare gains from new technology:

In a series of studies, he and colleagues measured welfare benefits gained from the introduction of new technology into the American economy. He showed high rates of public return to investment in scientific and technical research [...]. [Therefore, Mansfield] theorized that by increasing the private rate of return to investment in research through strengthened [patent] protection, the public welfare benefit would rise as well. [However, h]e was shy about predicting the effect in developing countries [...].<sup>76</sup>

The weakness of Schumpeter’s, Solow’s, Sherwood’s, and Mansfield’s theoretical explanations of the anomalies in their empirical studies is that they lack effective empirical backing. While they may have empirically studied the relationship between innovation and economic growth and development, their studies only proved a theoretical positive correlation between innovation and economic growth and development. They did not empirically prove any actual relationship or correlation, much less causation, between patent law, innovation, and economic growth and development.

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<sup>73</sup> *Ibid.*

<sup>74</sup> Sherwood, *supra* note 15 at 355.

<sup>75</sup> See *ibid* at 356.

<sup>76</sup> *Ibid.*

The weakness of these theories may be explained by the lack of empirical information available on patent law, as well as the lack of sophistication of patent law, at the time. In recent years, however, patent statistics have become more accessible<sup>77</sup>; therefore, empirical studies on the effects of patent law and the relationship between patent law, innovation, and economic growth and development should be more feasible.

### **B. Misinterpreted Studies**

A common mistake found in empirical studies on the effects of patent law on innovation and economic growth and development is that, without proving any direct causation, these studies conclude that patent statistics indicate a nation's level of innovation and rate of technological progress.<sup>78</sup> In reality, however, they cannot decisively conclude that patent laws positively encourage innovation and economic growth and development; rather, they can conclude only that patent laws are simply followed. Empirical information that is, for the most part, merely accounting information (i.e. patent applications, patent grants themselves, patent litigation financial figures), only proves that the institutions and procedures that patent laws establish are used.

For example, empirical studies of patent litigation reveal “the power of applicants to affect the value of a patent through their efforts to refine their applications.”<sup>79</sup> Patent litigation is extremely expensive, “often involving millions of dollars in attorneys’ fees and other costs.”<sup>80</sup> Do litigation expenses prove that patent law encourages innovation and ensures public disclosure of new technology and scientific information? No. It simply proves that using the procedures provided by patent law is expensive, and such expense is transferred to the cost and value of the patented invention. Patent litigation is not an inherent proportion of the value of the invention itself, but instead an artificial and arbitrary increase to the overall value of the invention, much as a patent is an artificial and arbitrary right granted by a government to an individual or organization to control the production and use of the invention. As such, patent litigation should not be interpreted empirically as an inherent value of the invention, but rather as an artificial and arbitrary factor of the invention's value that varies depending on the specific procedures of the patent law of the jurisdiction in which the invention resides.

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<sup>77</sup> See OECD Compendium, *supra* note 20 at 41.

<sup>78</sup> See WIPO Patent Report, *supra* note 54 at 4; see also Chisum *et al.*, *supra* note 19 at 59.

<sup>79</sup> James Bessen & Michael J. Meurer, “Lessons for Patent Policy from Empirical Research on Patent Litigation” (2005) 9 *Lewis & Clark L. Rev.* 1 at 2.

<sup>80</sup> Jaffe & Lerner, *supra* note 11 at 4.

Many empirical studies make this mistake. The Organization for Economic Cooperation and Development's Compendium of Patent Statistics, published in 2005 ("the OECD Compendium"), "provides the latest available internationally comparable data on patents. Patent indicators presented in this publication are specifically designed to reflect recent trends in innovative activities across a wide range of [...] countries."<sup>81</sup> Echoing the assumption that patent statistics "reflect the inventive performance of countries, regions, firms, as well as other aspects of the dynamics of the innovation process,"<sup>82</sup> the OECD Compendium attempts to prove this assumption with empirical information. However, the OECD Compendium simply studies the number of patent applications examined, the number of patents granted by different patent offices, the amount of foreign and domestic ownership of patented inventions, and other statistical data.<sup>83</sup> This empirical information only proves that patent law is used, based upon statistics from the institutions and procedures that patent law establishes.

Similarly, the *WIPO Patent Report: Statistics on Worldwide Patent Activities* ("the *WIPO Report*") provides an overview of the trends in worldwide patent filings for the past twenty years.<sup>84</sup> Its most important findings include: first, that the total number of patent applications filed around the world increased steadily since 1995<sup>85</sup>; and second, that this increase was due to an increase in non-resident patent filings in a small number of countries—primarily Japan, the United States, the large industrialized European states (joined together by the European Patent Office), the Republic of Korea, and China.<sup>86</sup> While these nations' patent offices accounted for seventy-five percent of all patents filed in 2004,<sup>87</sup> the United States granted the largest number of patents.<sup>88</sup>

However, the *WIPO Report's* conclusions are arguably misguided and contradictory. The *WIPO Report* claims that the increase in the number of patent applications filed around the world is "not unexpected, given the general increase in economic activity in the same period"<sup>89</sup> and that the "increases in patent applications closely follow global increases in research and development spending."<sup>90</sup> However, it later admits that there may be other reasons:

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<sup>81</sup> OECD Compendium, *supra* note 20 at 3.

<sup>82</sup> *Ibid.*

<sup>83</sup> See *ibid.* at 4.

<sup>84</sup> *WIPO Patent Report*, *supra* note 54 at 6.

<sup>85</sup> See *ibid.*

<sup>86</sup> See *ibid.*

<sup>87</sup> See *ibid.*

<sup>88</sup> See *ibid.* at 32.

<sup>89</sup> *Ibid.* at 6.

<sup>90</sup> *Ibid.* at 17.

[The] differences in the use of the patent system across countries may account for some of the differences in numbers of patent filings. Therefore, differences in patent filings per population, [gross domestic product,] or research and development expenditure *do not necessarily mean that one country is more inventive than another* or more efficient in its allocation of expenditure [and productivity].<sup>91</sup>

The *WIPO Report* further admits its weaknesses, recognizing that the increasing number of patents granted represents only

*the number of patent rights established each year [...].* [C]hanges in the number of patents granted can be due to the changing capacity of patent offices to examine and grant patents, or to changes in time limits or examination practices, rather than an underlying trend in inventive activity.<sup>92</sup>

Some legal scholars also recognize these alternative reasons for increases in the number of patent applications filed and the number of patents granted. For instance, “[t]he weakening of examination standards and the increase in patent applications have led to a dramatic increase in the number of patents granted in the United States.”<sup>93</sup> This increase does not reflect an increase in innovation, but rather an increase in patents “of dubious merit[.]”<sup>94</sup>

This [...] is confirmed by international comparisons, which show that the number of inventions of U.S.-origin with confirmed worldwide significance grew in the 1990s at a rate less than half that of domestic U.S. patent office grants. It is also confirmed by reference to particular patents granted by the PTO for “inventions” that are not new or are trivially obvious.<sup>95</sup>

In a private study, economist Keith E. Maskus and political scientist Mohan Penubarti also attempt to prove that patent law spurs innovation and therefore economic progress, but they make the same mistake as the OECD Compendium and the *WIPO Report*. Specifically,

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<sup>91</sup> *Ibid.* at 14.

<sup>92</sup> *Ibid.* at 31 (emphasis added).

<sup>93</sup> Jaffe & Lerner, *supra* note 11 at 11-12.

<sup>94</sup> *Ibid.*

<sup>95</sup> *Ibid.*

they attempt to prove that patent law influences international trade<sup>96</sup> and, consequently, that “patent protection directly affects growth through inducements to innovation.”<sup>97</sup> Upon analyzing empirical information and patent statistics, Maskus and Penubarti conclude that “exporting firms discriminate in their sales decisions across export markets, taking account of local patent laws.”<sup>98</sup> In other words, businesses and industries will invest more in foreign nations where stronger patent law exists to protect their inventions and to regulate competition. However, this conclusion is weak; rather, Maskus and Penubarti’s study only proves that businesses and industries feel more confident to conduct business in areas where there will be less competition, as limited, or even eliminated, by protective patent law. Even Maskus and Penubarti have themselves expressed doubt:

[W]e cannot conclude that [our study] means that stronger and more harmonized global levels of patents [and patent law] would generate more innovation without considering also other determinants of profits and international technology diffusion.<sup>99</sup>

Returning to the narrow aisle of a grocery store, where we find a lone jar of Skippy peanut butter on a shelf amidst the jams and jellies, we again ask, if it is the only jar on the shelf, does this mean that it is the best brand of peanut butter, or does it mean that it is simply the only one currently available? Common sense concludes that the answer is the latter. Simply because we find a lone jar of Skippy peanut butter does not mean that Skippy peanut butter is the best and only brand of peanut butter to buy. Rather, it means that Skippy peanut butter is the only brand to buy at that store at that particular time; there are other peanut butter brands available at other stores around the world, and at various times, depending upon distribution schedules and local tastes. If we want to prove that Skippy peanut butter is the best brand of peanut butter and the only one we should buy, then we cannot prove it simply by counting one jar. We must find other, more accurate empirical means to prove this.

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<sup>96</sup> See Keith E. Maskus & Mohan Penubarti, “How Trade-Related Are Intellectual Property Rights?” in Keith E. Maskus, ed., *The WTO, Intellectual Property Rights and the Knowledge Economy* (Northampton: Edward Elgar Publishing Ltd., 2004) at 494.

<sup>97</sup> *Ibid.*

<sup>98</sup> *Ibid.* at 510.

<sup>99</sup> *Ibid.*

### C. Limited Studies

Fortunately, other recent empirical studies recognize that innovation and economic growth and development may not depend upon patent law. These studies recognize the limits of the hard empirical evidence currently available on patents and patent law. For instance, David M. Gould and William C. Gruben emphasize that the relationship, if any exists, between patent law, innovation, and economic growth and development is only a correlation; one element does not cause another:

Although the role of intellectual property rights in economic growth is not clear in recent theory, empirically, we find that stronger intellectual property rights protection corresponds to higher economic growth rates in a cross-country sample [...]. [However, a]lthough the statistical difference between trade regimes is small, and the results do not capture all market structure subtleties, the findings suggest that the linkage between innovation and intellectual property rights protection may play a weaker role in less competitive, highly protected markets. That is what one would expect if innovation adds less to a firms market share and profits in less competitive markets.<sup>100</sup>

Sadao Nagaoka also recognizes that the relationship between patent law, innovation, and economic growth and development is only a correlation, not a relationship of causation. While patent statistics may provide empirical information research, development and technology trade, Nagaoka suggests that patents and patent law, while important to innovation, are not essential for it. Based upon his study, which was limited to Japanese patents and patent law, Nagaoka found first, that businesses and industries often do not use many of their patented innovations, nor does licensing significantly increase the proportion of patented innovations used<sup>101</sup>; therefore, the number of patent applications examined or the number of patents granted by patent offices can be misleading and misinterpreted.<sup>102</sup>

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<sup>100</sup> David M. Gould & William C. Gruben, "The Role of Intellectual Property Rights in Economic Growth" in Keith E. Maskus, ed., *The WTO, Intellectual Property Rights and the Knowledge Economy* (Northampton: Edward Elgar Publishing Ltd., 2004) at 616-617.

<sup>101</sup> Sadao Nagaoka, "Patents and the other IPRs in use" *Institute of Innovation Research, Hitotsubashi University* (2003), online: WIPO <[http://www.wipo.int/patent/meetings/2003/statistics\\_workshop/en/presentation/statistics\\_workshop\\_nagaoka.pdf](http://www.wipo.int/patent/meetings/2003/statistics_workshop/en/presentation/statistics_workshop_nagaoka.pdf)>.

<sup>102</sup> *Ibid.* at 2.



Determining the effect of patent law and the relationship between patents, innovation, and economic growth and development is difficult, if not impossible, but “even slight improvements leading beyond the simple patent counts frequently used nowadays should be considered a success.”<sup>103</sup> Some legal scholars argue that:

[...] patent policy should be tailored to reflect [...] the different effects it has on different industries]. Certain strategic uses of patents are socially harmful; [for instance,] more empirical research is needed to quantify the social loss from anti-competitive and opportunistic patent litigation, and guide policies that will discourage anti-social litigation. Finally, more research is needed to identify when patent disputes will degenerate into lawsuits. This research is needed to guide reforms designed to contain the apparently high and growing social cost from patent litigation.<sup>104</sup>

Given the introduction of new technologies and changing economic conditions, such as the Internet and e-commerce, there is a need for a new form of patent law,<sup>105</sup> but we cannot know what kind of new form of patent law is needed unless we conduct, and more importantly, interpret accurately, empirical research to indicate and articulate the actual relationship between patent law, innovation, and economic progress. Even if we cannot do so, there may be ways, other than promulgating current patent law, to protect and to promote scientific innovation and human productivity. While most legal scholars as well as economists interested in the subject of patents have devoted their efforts to studying and debating current patent law, perhaps more effort in the future will be devoted to developing, articulating, studying, and debating alternatives. The overall point is, we should not take current patent law for granted by interpreting and manipulating the available but limited empirical evidence to support what we want to believe. We must take the evidence for what it is, not for what we want it to be.

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<sup>103</sup> Harhoff, Scherer & Vopel, *supra* note 55 at 18.

<sup>104</sup> Bessen & Meurer, *supra* note 79 at 27.

<sup>105</sup> Lerner, *supra* note 67 at 1842.

## CONCLUSION

**I**N THIS ARTICLE, WE SURVEYED AND EVALUATED both the major theoretical justifications for patent law and various empirical studies on the effects of patent law and the relationships between patents, scientific innovation, and economic progress. Finding that only a few international patent conventions acknowledge vaguely the major theoretical justifications for patent law, and that no international patent convention gives specific language adequately articulating those justifications as official purposes for patent law, we opened a Pandora's box of questions: Do absolutely no purposes exist for patent law, or do none exist on which the signatories to the conventions could agree? If it is the case that the signatories could not agree on acknowledging or articulating the two major theoretical justifications for patent law, which many legal scholars and economists argue and support, why is this so? Are those theories in practice insufficient to justify current patent law? Is the empirical evidence too weak to support the theories, and if so, does that mean the justifications are invalid? What does all this say about the purpose and effectiveness of current patent law, that law is allegedly being based on those unsupported, unacknowledged, and unarticulated theoretical justifications?

There are hints to the answers to these questions, but without hard facts and conclusive empirical studies, nothing is certain. The best we can do is keep to the guideline that has been repeated twice before in this article and will be repeated again: In the future, if empirical studies prove what they theoretically conclude with respect to the justifications for patent law, that is, that patents encourage scientific innovation and economic progress, then the studies are valid, and current patent law is effective in satisfying its purpose, to the extent that the purpose embodies the major theoretical justifications for patent law. If, on the other hand, these studies fail to empirically support their conclusions with respect to the relationship between patent law and the theoretical justifications for that law, then their conclusions are possibly misguided, and the current existence, structure, and operation of patent law should not be taken for granted, but rather, given a close examination.

If it is so difficult to empirically study the effects of patent law, then perhaps we should not govern ourselves by it. On the other hand, there may be no perfect empirical measure of patent law; therefore, current studies may be sufficient. Arguably, however, it is unwise to promulgate law, the effect of which is unknown and the purpose of which is not stated. In sum, I hope to see in the future the development and unambiguous articulation of a purpose in formal legal forums, such as international patent conventions, resulting in better justifications and empirical standards for the current existence and structure of patent law, or amendments to existing laws to better reflect known practices

and patterns of innovative and economic activity. In other words, I hope that we can see a lone jar of Skippy peanut butter found in a Florentine grocery store simply for what it is, not for what we think it is or for what we might like it to be.