



INTELLECTUAL PROPERTY IN THE AGE OF TECHNOLOGY: WEAKNESSES IN THE EXISTING LAW AND ECONOMICS APPROACH TO PATENT, COPYRIGHT AND TRADEMARK LAW

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“THE QUESTION IS NOT WHETHER COPYRIGHTS, PATENTS AND TRADE SECRETS PROVIDE INCENTIVES FOR THE PRODUCTION OF ORIGINAL WORKS OF AUTHORSHIP, INVENTIONS AND INNOVATIVE BUSINESS TECHNIQUES. OF COURSE THEY DO. RATHER, WE SHOULD ASK THE FOLLOWING QUESTIONS: DO COPYRIGHTS, PATENTS AND TRADE SECRETS INCREASE THE AVAILABILITY AND USE OF INTELLECTUAL PRODUCTS MORE THAN THEY RESTRICT THIS AVAILABILITY AND USE? IF THEY DO, WE MUST THEN ASK WHETHER THEY INCREASE THE AVAILABILITY AND USE OF INTELLECTUAL PRODUCTS MORE THAN ANY ALTERNATIVE MECHANISM WOULD.”

EDWIN C. HETTINGER¹

BACKGROUND

With the techno-revolution ebbing and a ubiquitous technological way of life arriving in its stead, the world we inhabit today is a vastly different place from when property rights were first articulated under the Magna Carta. It is no surprise, then, that commentators have increasingly decried the use of the term “intellectual property” to describe patent, copyright and trademark laws. Foremost amongst their concerns is the reality that sustained analogies with traditional notions of property – however well these analogies fared in the brick-and-mortar era – can no longer hold in the face of technological advance. A second cause for worry is how these three disparate bodies of law – each with its own unique subject matter and public policy concerns – are frequently lumped together for discussion, by both laypersons and practitioners. More than ever with the advent of technology, it is argued, the differences inherent between (and *within*) these three frameworks have gone into sharp relief. Resting next-generation policy formulation

¹ Edwin C. Hettinger, *Justifying Intellectual Property*, 18(1) PHILOS. & PUBL. AFF. 31 (1989) at 49.

on a scholarship of general “intellectual property” will inevitably result in solutions that are untailored and inefficient.

This paper proposes a new way of approaching the normative exercise of intellectual property policy. While the law and economics school of analysis did much to aid in the understanding of traditional intellectual property objects such as copyrighted books and mechanical patents, a proper account taking into consideration the effects of technology has long been overdue. Technology is important: by removing the need for fixation,² it enables the marginal costs of production³ to be driven down to virtually zero. Technology also allows for greatly reduced transaction costs in the production and distribution of informational goods (for example, media content and pharmaceutical drugs). Further, it permits consumer search costs – particularly through the medium of the Internet – to be drastically reduced. Taken all together, the cumulative effects of technology on patent, copyright and trademark law cannot be overstated.

By applying economic analysis to the new technological *zeitgeist* in informational goods, this paper will show that (i) assumptions employed in justifying traditional intellectual property have even less reason to survive today; (ii) while patent, copyright and trademark law are tied together by certain fundamental economic precepts, they each require tailored legislative responses in order to maximize social welfare; and (iii) despite the language of intellectual property “rights”, nothing should be taken for granted in a body of law that has as its end result the grant of monopoly rights to only select stakeholders in society.

The fundamental economic assumption

The two questions posed by Professor Edwin C. Hettinger in the introductory excerpt above are crucial; unfortunately, they are also difficult ones to answer. What is clear is that there are no across-the-board answers to either question.⁴ Professor Hettinger cites the example⁵ of movies and academic writing: clearly, production of the former category of works is far more dependent on robust copyright protection than the latter category. Likewise, patent protection for individual inventors and small, innovative firms would make more sense than patent protection for large corporations, since these corporations are active in competitive markets and being first to put a particular product on the market may be incentive enough.⁶ What these examples make clear is the simple fact that it

² For example, where once stories had to be contained in tangible books and music in tangible compact discs, both these forms of content can now exist in digital formats, free of limiting physical containers.

³ Namely, the cost of producing the (n+1)th unit of an item.

⁴ *Ibid.* at 50.

⁵ Hettinger at 50.

⁶ Fritz Machlup, *Production and Distribution of Knowledge in the United States* (Princeton: Princeton University Press, 1962) at 168-169.

might be dangerous, without more, to lump patents, copyrights and trademarks (and the subcategories within these frameworks) into the singular concept of “intellectual property”. As Richard Stallman puts it quite concisely:

The term “intellectual property” also leads to simplistic thinking. It leads people to focus on the meagre commonality in form that these disparate laws have – that they create artificial privileges for certain parties – and to disregard the details which form their substance: the specific restrictions each law places on the public, and the consequences that result. This simplistic focus on the form encourages an “economistic” approach to all these issues. Economics operates here, as it often does, as a vehicle for unexamined assumptions. These include assumptions about values, such as that amount of production matters while freedom and way of life do not, and factual assumptions which are mostly false, such as that copyrights on music supports musicians, or that patents on drugs support life-saving research.⁷

Whether any commonality may be found between the three disparate bodies of intellectual property remains to be seen; however, we would do well to heed Stallman’s exhortation that economic analysis should not be used as a “vehicle for unexamined assumptions”. Indeed, the only defensible economic assumption about any *raison d’etre* for intellectual property law is closely related to what Professor Hettinger has already intimated: *that extant intellectual property frameworks should exist only to the extent to which they are more efficient than alternative systems at incentivizing the production of informational goods*, be they books, music, trade signs or drugs. It is not enough that an incentive framework is in place; the framework has to be one that achieves the most utility for society, by optimising production, minimising costs, or a combination of both.

The difficulty with this fundamental economic assumption, however, is the issue of measurement. As the jurist and economist Richard Posner writes:

Property rights can limit the distribution of intellectual property and can draw excessive resources into the creation of intellectual property, and away from other socially valuable activities, by the phenomenon of rent seeking. Striking the right balance, which is to say determining the optimal scope of intellectual property rights, requires a comparison of these benefits and costs – and ... nothing more. The problems are not

⁷ Richard M. Stallman, *Did You Say “Intellectual Property”? It’s a Seductive Mirage* (2010), available at <http://www.gnu.org/philosophy/not-ipr.html> (last accessed 20 June 2013). Stallman, who pioneered the concept of “copyleft”, is currently the President of the Free Software Foundation.

conceptual; the concepts are straightforward. The problems are entirely empirical. They are problems of measurement.

In addition, we do not know how much intellectual property is in fact socially useful, and therefore we do not know how extensive a set of intellectual property rights we should create. For all we know, too many resources are being sucked into the creation of new biotechnology, computer software, films, pharmaceuticals, and business methods because the rights to these different forms of intellectual property have been too broadly defined.⁸

Indeed, it is hard enough for observers to gauge the already abstract performance of the existing intellectual property framework. Should we look at the number of patents issued worldwide per year, or the number of new books published annually? Add to this the seemingly impossible task of isolating and forecasting the efficacy of alternatives – for example, via the private ordering of intellectual property via technological controls or contractual agreements – and it becomes clear that Professor Hettinger’s queries will take some answering.

Regardless, the fundamental economic assumption is a valuable one, especially given the shifting backdrop of rapid technological change. If the law does indeed need to change, it no longer has the luxury of time to go about its business.

Ways of thinking about intellectual property

The term “intellectual property” is itself relatively new⁹ and was coined only in 1967 when the United Nations decided to establish the World Intellectual Property Organization. The umbrella phrase brought together the three categories of patent, copyright and trademark law, which up until then had been treated separately. Each category has its own distinctive characteristics and comprises a different market for a particular informational good. Patent law protects inventions both fixed and unfixed; copyright law protects creative works of authorship; and trademark law protects symbols. At their core, however, intellectual property rights are “rights in ideal objects, which are distinguished from the material substrata in which they are instantiated”.¹⁰

⁸ Richard A. Posner, *The Law and Economics of Intellectual Property*, DAEDALUS 5 (Spring 2002) at 12.

⁹ Stewart E. Sterk, *What’s In a Name?: The Troublesome Analogies Between Real and Intellectual Property*, CARDOZO L. LEGAL STUD. RESEARCH PAPER NO. 88 (2004) at 1.

¹⁰ Tom G. Palmer, *Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects*, 13 HARV. J.L. & PUB. POL’Y, NO. 3 817 (1990) at 818.

Largely because they are precepts created by man, intellectual property rights are more susceptible to conflicting interpretations than traditional forms of tangible property. While intellectual property does share some characteristics with brick-and-mortar property rights, it is debatable whether the commonalities outstrip the differences. The right to exclude, implied in both intellectual and traditional property contexts, is a core element of any property right; it protects the interests of rightholders by entitling them to an injunction (or damages) prohibiting (or punishing) the infraction of those rights. But beyond this fundamental right to exclude, the idea of *property* in intellectual property faces various challenges. To begin with, the legal protection provided by intellectual property rights is circumscribed in both time and scope, whereas traditional property lasts forever. After the expiry of pre-set monopoly durations, intellectual works and inventions fall into the *public domain* for free, non-excludable use by third parties. Needless to say, there is no corresponding concept in the domain of real property.

Intellectual property also does not exhibit the rivalrous nature of traditional forms of property. Informational resources do not suffer from scarcity the way tangible resources do. If I copy your book, you still have your book (*a fortiori* in the case of an electronic book); but if I plant cacti in your garden, you no longer have a useful garden to speak of. This absence of rivalry means that intellectual property law does not face any of the allocative challenges faced by laws governing physical property. As such, a large chunk of the rhetoric justifying intellectual property law appears to require supplementation.

Finally, while real property rules are fashioned to allocate rights in scarce, pre-existing subject matter, intellectual property legislation seeks to encourage human endeavour that would lead to the generation of informational goods. The framework is inherently *ex ante*, in stark contrast to real property laws which seek largely only to manage the use of existing resources *ex post*. This tension between dynamic incentivization (stimulating creation) and static optimisation (managing extant assets) exists only in the realm of intellectual property law; and because there are two sets of criteria, finding the correct way forward becomes that much more complex.

Given the myriad issues transpiring from the creation of rights over intangible subject matter, what ought to be the proper way for us to think about intellectual property rights? There are a few axes along which we can answer this question.

1. Positive analysis versus normative prescription

Very little issue can be taken with a merely positive exposition of intellectual property law. Such a project would describe, without fear or favour, the state of the global intellectual property framework today – for example, how the patent regime came about,

how trademark searches are carried out and so on and so forth.¹¹ But such an account would prove to be of little use to policymakers and stakeholders in shaping better intellectual property laws for tomorrow. A normative approach would give this much needed direction, but the question would then be this: What is the preferred criterion for judging the viability of a particular piece of intellectual property legislation?

The law and economics school has proposed the criterion of “efficiency”: should a particular method be *more efficient* in incentivizing creation and optimising the use of existing intellectual resources, such method should be adopted to the extent of its superiority. The difficulty, as we have seen, is one of measurement. In the first place, *what is being maximized?* Utility is difficult to measure, let alone compare: and thus economists from time immemorial have resorted to second-best substitutes such as wealth.¹² But even with this stopgap in place, two key concerns remain. First: what is the *geographical* area over which utility maximization is to be calculated? Intellectual property rights are no longer exclusively national in nature. Increasingly, decisions have to be made about the proper balance to be struck by intellectual property regimes between utility maximization for the developed world and for the rest of the world, in particular third-world countries. The concept of diminishing returns is applicable here: an additional dollar profit for a first world conglomerate will not yield as much societal utility as an additional dollar spent on producing a generic drug for consumption in a developing nation that is buying for medication. The inevitable issue that arises, however, is what the exact exchange rate should be between these two prescriptions.

Secondly: what is the *chronological* period over which utility is to be maximized? Dynamic efficiency, as alluded to earlier, seeks to maximize wealth over a significant period of time¹³ – incentivizing the creation of works in Time Period 1, for instance, for enjoyment of the same in Time Period 2. But the dictates of dynamic efficiency often come up against that which static efficiency – the optimal allocation of informational goods in the *short* term – requires. Originally, informational goods were not scarce and did not require allocation – they were non-rival and could be produced and consumed at whim. But with the advent of intellectual property protection, informational goods have been made artificially scarce. The problem is that enforcing creative monopolies frequently leads to a *dip* in incentives for the production of informational goods for the next time period. After all, if one is guaranteed a return through monopoly via state

¹¹ An excellent *positive* analysis (and history) of intellectual property law in the digital age may be found in Niva Elkin-Koren and Eli M. Salzberger, *The Law and Economics of Intellectual Property in the Digital Age: The Limits of Analysis* (Oxford: Routledge, 2013) at 225-250.

¹² Wealth maximization ultimately is still a second best measure since it ignores the decreasing marginal utility of wealth (each additional dollar to a wealthy person gives rise to less utility when compared with a corresponding dollar given to a poor person). See generally Nicholas Kaldor, *Welfare Propositions in Economics and Interpersonal Comparisons of Utility*, 49 THE ECON. J. NO. 195 549 (1939).

¹³ See 7 above.

sanction, wherefore the motivation for further innovation? This cycle has repeated itself with numerous real-world incumbents. It was Microsoft's complacency that led to Apple's resurgence,¹⁴ and Apple's predominance that resulted in Samsung's rise.¹⁵

Importantly as well, in this networked age of electronic production and distribution, inventions and works that are created and sealed off from mainstream access today will be barred from consideration in the creation of tomorrow's works. Given the dramatic paradigm shift in which content is increasingly being produced in the technological age – namely, through peer production and cooperative collaborations¹⁶ – the costs of an aging intellectual property regime will arguably snowball as the years (or even weeks) pass us by.

What the above concerns have made clear is that insofar as this present project is a normative one, its recommendations are only of value only to the extent that the assumptions – the fundamental economic assumption, among others – are reasonable. Regardless, it is submitted that a law and economics approach to intellectual property policy still has much to recommend it, in particular given how intellectual property law is composed of, to a large extent, the state approval of an economic monopoly.

2. *Dynamic versus static efficiency*

As has been alluded to already, striking the proper balance between these two competing efficiencies is one of the keys to the modern-day intellectual property puzzle. At the heart of this bargain is the normative idea that economic incentives are necessary to generate sufficient¹⁷ innovative activity. Informational goods are non-excludable and non-rival in nature, and therefore actors in an unregulated informational goods market would lack

¹⁴ Tim Worstall, *Microsoft Loses Its Advantage Over Apple's Operating Systems* (6 July 2012), available at <http://www.forbes.com/sites/timworstall/2012/07/06/microsoft-windows-loses-its-advantage-over-apples-operating-systems> (last accessed 20 June 2013).

¹⁵ Kenneth Rapoza, *Apple Losing Out to Rival Samsung* (26 April 2013), available at http://www.forbes.com/fdc/welcome_mjx.shtml (last accessed 20 June 2013).

¹⁶ In James Bessen and Eric Maskin, *Geistiges Eigentum im Internet: Ist alte Weisheit ewig gültig?*, (*Intellectual Property on the Internet: What's Wrong with Conventional Wisdom?*), in Bernd Lutterbeck, Robert A. Gehring, and Matthias Bärwolff (eds.), *Open Source Jahrbuch 2005: Zwischen Softwareentwicklung und Gesellschaftsmodell* (Berlin: Lehmanns Media, 2005) (English translation available at <http://www.researchoninnovation.org/iippap2.pdf> (last accessed 20 June 2013)), the authors highlight the example of the Online Guitar Archive (OLGA), which hosts guitar tablature submitted by and for guitarists. They argue that “in a world like the Web where interactive users add unique value, [the recording company that shut down the website,] EMI[,] seems short-sighted.” See also generally Yochai Benkler, *Designing Cooperative Systems for Knowledge Production: An Initial Synthesis from Experimental Economics*, in Mario Biagoli, Peter Jaszi and Martha Woodmansee (eds.), *Making and Unmaking Intellectual Property*, (Chicago: The University of Chicago Press, 2011).

¹⁷ Given the limits of normative prescription, it is difficult to directly answer the question, “How much is sufficient?” However, economic analysis permits us to find obvious inefficiencies in the existing intellectual property framework. By getting rid of these deadweight losses, society as a whole will naturally take a step closer towards the “optimal” or “sufficient” level of incentives.

sufficient incentives to invest in their development. The *non-excludability* of informational goods would lead to free riders (non-paying users) enjoying them without permitting the creator to recoup his costs; while the *non-rivalry* characteristic means that an allocatively efficient distribution of the good,¹⁸ where the price equals to the marginal cost of zero (since each marginal unit costs nothing to produce in the case of an informational good), would result in no one wanting to produce an unprofitable good in the future. There would be undersupply in the market.

The economics literature assumes that without governmental intervention to rectify the shortfall in production of public informational goods, the investment in works of creation and invention will be sub-optimal, and humankind's progress, whether in the science or in the arts, will be retarded as a result.¹⁹ Another assumption is that property rights are the cheapest and most effective way for society to proffer these incentives for creation. Much ink has been spilt on both of these assumptions to justify the existing global intellectual property regime.²⁰ The debate has been framed as one requiring the balancing of two valid but opposing forces – the good that comes from distributing a particular informational good to as large a demographic as possible (static allocative efficiency, or *access*) on one hand, and the benefits that accrue from granting property rights to creators, thus allowing them to properly exploit and manage their intellectual property in the face of non-excludability (dynamic efficiency, or *incentives*) on the other.

A simple illustration will make this incentives-access (or dynamic-static) trade-off clearer. Earlier, this paper spoke about *geographical* and *chronological* factors²¹ that ought to – but presently do not – influence the utility calculus that informs global intellectual property policy today. Revisiting the chronological aspect of things, we find that different time units for utility maximization will have a marked impact on the cost-benefit analysis of the propertization of informational resources. If these utility-maximization calculations are conducted in the *moment* or on a short-term basis, we find that most intellectual property ought to be in the public domain: the price of life-sustaining pharmaceuticals, for example, should be at their marginal cost since over such short time periods the

¹⁸ *Allocative efficiency* is where resources in an economy are optimally distributed such that producers produce only those types of goods and services that are in high demand. A good or service is produced in an allocatively efficient quantity where the marginal cost and the marginal benefit (reflected by the good or service's price) are equal. At this point, producing one unit less would result in a deadweight loss in terms of societal benefit, while one unit more would result in a deadweight loss in terms of societal cost.

¹⁹ [Article I, Section 8](#), Clause 8 of the [United States Constitution](#), known as the Copyright and Patent Clause, empowers the [United States Congress](#) “[t]o 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.”

²⁰ See, for example, Mark A. Lemley, *Ex Ante versus Ex Post Justifications for Intellectual Property*, 71 U. CHI. L. REV. 129.

²¹ See 8-9 above.

potential effect on incentives for future creation is not taken into account. *Access* would therefore be the paramount concern. If, however, the time unit for such maximization is long, shifting the frame from *static* to *dynamic* efficiency, then the issue of the presence of *incentives* for creation ought to be taken on board.

Just how long should this time unit be? And how is it possible for policymakers to predict the impact of today's intellectual property legislation on forthcoming innovation, particularly in an environment where technological progress is capricious? It is not surprising that answers to these questions have not been forthcoming – setting the time frame for utility maximization is problematic both from a conceptual standpoint from an empirical perspective, since the pace of technological change renders each new empirical study more and more difficult to assess for value.²² It is unsurprising, then, that economic scholars and intellectual property lobbyists alike have departed from the incentive-access paradigm in recent years, moving instead to adopt the *a priori* assumption that all informational goods are property.

3. *Tangible property versus intangible property*

In a 1985 Canadian parliamentary subcommittee report on copyright reform, it was stated that “‘ownership is ownership is ownership’: the copyright owner owns the intellectual works in the same sense as a landowner owns land[.]”²³ Viewed through even the lens of the most devoted intellectual property proponent today, however, this statement cannot be true by any measure. Indeed, as an exhortation to spur policy, the inherent preconception is dangerous: copyright, and certainly the rest of all intellectual property, has not yet come to incorporate freehold leases and zoning into its make-up. Notwithstanding this, we still see advertising campaigns equating film piracy with the theft of real property every time we go to the cinema.²⁴

What lies beneath the rhetoric of propertization? David Vaver ventures the following:

So talk about intellectual property can resemble talk about military intelligence: useful shorthand for a phenomenon, but with no implication that its components – intellectual or property – do or should exist. In particular, the property part of intellectual property should not close off policy debates about what rights attach or should attach to a particular activity. There is, after all, property and property. To

²² Elkin-Koren and Salzberger (2013) at 126.

²³ House of Commons, Standing Committee on Communications and Culture, *Report of the Subcommittee on the Revision of Copyright: A Charter of Rights for Creators* (1985) at 9.

²⁴ For example, the rhetoric on the Motion Picture Association's Singapore chapter (available at <http://www.make-a-difference.sg/>, last accessed 20 June 2013), urges cinema staff: “Stop movie theft! Your jobs are at risk!”

compare the rights someone has in a manuscript or a trademark with those he has in a timepiece or a piece of land is an exercise in contrast more than anything else.²⁵

Indeed, if one takes a careful look at patents and copyrights, the contrasts between real and intangible property do appear significant (trademarks will be dealt with in further detail later, given their ostensible role as signals rather than comprising the fruit of any creative or inventive endeavour). As earlier alluded to, intellectual property is largely non-rival and non-excludable in nature.²⁶ It is therefore, at the very least, an impure public good.²⁷ Diametrically opposed to the inherent public good nature of intellectual property is tangible property which, since time immemorial, has been rivalrous and excludable. Truly, history is replete with wars fought over territory and objects that display these very qualities. To say then that intellectual property is just another form of property, like a bungalow or a historical relic, would be doing a disservice to language. In particular, such a tendency would be doubly disingenuous in the information age, where increasingly informational goods do not have to be “fixed” in a container (like a book or a piece of hardware) in order to be enjoyed. In any case, from the first principles of intellectual property law, it is the *text* in the book that is sacrosanct, not the book itself; similarly, it is the *formula* of a pharmaceutical drug that is inviolable, not the physical pills themselves. For transgressions involving these fixed tangible property analogues, we already have criminal, contract and tort laws safely in place. These are the same laws that safeguard traditional brick-and-mortar property, the same laws that were deemed insufficient to tackle the new animal that was and is intellectual property. So the lobbyists and authorities are attempting to have their cake and eat it: on the one hand, they claim that intellectual property is no different from tangible property, but on the other they promulgate an entirely new framework of legislation to address this novel form of property. It appears that something ought to give.

Supporters of propertization had their biggest test with the Sonny Bono Copyright Term Extension Act (CTEA), enacted by the American Congress in 1998. This blanket copyright term extension was granted not only to forthcoming creations but also to *existing ones*. The law, therefore, could not have been justified as an appeal to incentives or as an attempt to correct the market failure borne of the public good nature of intellectual property, since those rationales, taken together, presuppose application to

²⁵ David Vaver, *Intellectual Property: The State of the Art in Intellectual Property Rights: Critical Concepts in Law (Vol 1)* (Oxford: Routledge, 2006) at 5.

²⁶ See 6 and 10 above.

²⁷ See Richard Cornes and Todd Sandler, *The Theory of Externalities, Public Goods and Club Goods* (Cambridge: Cambridge University Press, 1986) at 6-7. Most public goods are impure; very few display absolute characteristics of non-excludability, given that exclusion by contract is always an option. As such “non-excludable” might be better understood as “prohibitively costly to bar non-payers”.

future works. To be sure, no incentives to make up for the under-production of creative works would have been required for the creation of *already existing* works.

The justification that was eventually proffered for the retroactive copyright extension sought to restore “real property” status to intellectual property.²⁸ In the real property sphere, the law and economics literature has largely perceived the “tragedy of the commons” as the primary justification for privatizing or propertizing commons – *viz.*, the idea that when too many individuals are privileged to use a resource, such as a field or a lake, they will tend to overuse it. However, as we have seen, the non-rivalrous nature of intellectual property use has been a significant stumbling block in the application of that analysis towards informational goods. Nonetheless, Richard Posner has argued alongside William Landes that informational goods *are* rivalrous in nature. They contend that increased use of a work decreases the commercial value that could be extracted from any single work, citing Mickey Mouse as an instructive example:

If because copyright had expired anyone were free to incorporate the Mickey Mouse character in a book, movie, song, etc., the value of the character might plummet. Not only the public would rapidly tire of Mickey Mouse, but his image would be blurred, as some authors portray him as Casanova, others as cat meat, others as an animal-rights advocate, still others as the henpecked husband of Minnie.²⁹

Posner and Landes’ entire justification for the CTEA (in an apparent change of heart for Posner)³⁰ appears premised upon the normative goal of maximizing profits for the intellectual property right holder, rather than maximizing society’s welfare in general. In going from the latter position to the former, Posner and Landes have presupposed the right of the creator to enjoy *all* economic benefits flowing from the creation. This presupposition is founded in ontological assertion rather than economic analysis.

Quite apart from the fact that creators of works are frequently not the best managers for those same works, Posner and Landes’ *ex post* justification for copyright echoes dangerously Edmund Kitch’s 1977 argument for viewing the patent as a full-fledged

²⁸ Elkin-Koren and Salzberger (2013) at 83-85.

²⁹ William M. Landes and Richard A. Posner, *Infinitely Renewable Copyright*, 70 U. CHI. L. REV. 471 (2003) at 487-488.

³⁰ Earlier at 4-5, the extract from Posner stated: “Property rights can limit the distribution of intellectual property and can draw excessive resources into the creation of intellectual property, and away from other socially valuable activities, by the phenomenon of rent seeking. Striking the right balance, which is to say determining the optimal scope of intellectual property rights, requires a comparison of these benefits and costs[.]” This position implicitly takes the incentives paradigm as the main justification for intellectual property law, and not rightholders’ utility maximization.

“real” property right.³¹ Kitch argued that the complete propertization of patents would be essential to facilitate the efficient use of *existing* innovations rather than the creation of new inventions. His argument had as its lodestar the management of investments in informational goods, optimizing them for further exploitation and improvement (static efficiency). What was implicit in Kitch’s argument was that the original invention was already made and *meriting property rights*. This, clearly, was begging the question.

In moving from an *ex ante* justification (incentives to create works) to an *ex post* justification (efficient exploitation of works) of intellectual property,³² a core difference between intangible and tangible property has been overlooked. Intellectual property, being comprised of intangibles, presents a much more serious problem of “rent seeking” than traditional brick-and-mortar property. A “rent” in economics refers to the *excess of revenue over cost*; in other words, it is pure profit, or profit in excess of the cost of capital. Rent seeking is undesirable from a societal standpoint because it induces excessive (and thereby inefficient) levels of investment in particular fields.

Take, for example, land. At the dawn of the age of exploration and discovery during the 15th century, much of the territory outside of Europe, in the Americas, Africa, Asia and Oceania, was not formally owned. Following the inception of the viability of long-distance maritime journeys, there was a rush outwards from the Old World to explore and settle these lands. Obviously, there was only so much land to be explored and conquered, and losses were incurred by society both in terms of human lives and real resources like gunpowder and provisions. These losses did not *create* value; they merely reallocated resources, in a way that left society no better off.³³

Posner himself was aware of this difference between real and intangible property. He gives the following example of inefficient rent seeking:

An example is a hunt for buried treasure. If the treasure has a value of \$10 million, which will be awarded to the first finder, there will be a race to be first that may eat up the entire profit. Suppose that the cost to a particular finder of finding the treasure by April 1, 2002, would be \$1 million. Would-be finders might incur much greater costs in vying to find it sooner – for example, a finder who was confident that by expending an additional \$8 million he could win the race by finding the

³¹ See generally Edmund W. Kitch, *The Structure and Function of the Patent System*, 27 J.L. & ECON. 265 (1977).

³² For a more detailed account of this shift, see Elkin-Koren and Salzberger (2013) at 126-128.

³³ At the time, it was not clear whether, for example, the Spanish would be more efficient colonialists than the Dutch; and even if one turned out to be superior later on, that would have absolutely no relation to the *a priori* circumstances and therefore would have been nothing more than a contingent efficiency gain.

treasure on March 31 would consider the expenditure worthwhile, since it would yield him a profit of \$ 1 million. But the additional cost incurred to win the race would be wasted from a social standpoint, because the social benefit of finding the treasure a day earlier would be negligible.

The problem of rent seeking is no longer acute in the case of the historically most important form of property, land, because virtually all land is owned. ... There would be no rent-seeking problem in the buried-treasure example if someone owned the treasure and were merely offering a reward to the finder – the owner would set the reward at a level designed to obtain the finding service at least cost.³⁴

The problem of rent seeking, therefore, is most acute in the “land grab” phase of any human endeavour – and that is, unfortunately, the phase our society is perpetually stuck in with respect to intellectual property. Unlike land or treasure, intellectual property is *created* rather than *found*, which means that “if rights to intellectual property are defined too broadly, the rents generated by them will be so great that excessive resources will be drawn into efforts to be the first to create a valuable piece of intellectual property and thus to obtain the property right to do it”.³⁵ Posner himself opines that *limiting* the duration of the intellectual property right is a way to cut down its value to the rightholder and thus reduce the amount of rent seeking:³⁶ a marked contrast from his present position seeking to immortalize Mickey Mouse.³⁷

Given the present legislative climate where property rights in informational goods are taken as a given, a return to economics would be timely. As David Vaver writes:

What intellectual property law needs, whenever a policy ... is being debated or resolved, is a careful weighing and balancing of interests. Throwing “property” on to the scales contributes nothing to this

³⁴ Posner (2002) at 9.

³⁵ *Ibid.* at 9.

³⁶ *Ibid.* at 9-10.

³⁷ To be fair, it is suggested in Posner (2002) that perhaps a system of “infinitely renewable copyrights” might help to prevent “the potential congestion cost if valuable property is unowned”. Indeed, he first mentions Mickey Mouse in that same article, prior to the one written with Landes: “... [I]f anyone can use the character of Mickey Mouse, the public may become tired of him, and his value may drop to zero.” However, in that article these thoughts were qualifiers to Posner’s main analysis and Posner’s own position was still not completely fixed. Indeed, he was keenly aware that “[w]e urgently need more empirical evidence”. See *ibid.* at 10-12.

balancing exercise. At worst, it unfairly tends to bias the process in favour of protection, at the expense of other values.³⁸

Posner and Landes, in taking for granted the desirability of a maximum return to rightholders – instead of society as a whole – have effectively put the cart before the horse. By passing over the public good characteristics of intellectual property in favour of a strict analogy with real property, they have overlooked several key considerations. It is to these considerations that we now return.

4. Public versus private goods

Earlier, we established that intellectual property is a public good, given its non-rivalrous and non-excludable properties.³⁹ Like all public goods, unregulated intellectual property is host to a range of positive externalities.⁴⁰ Patent externalities include benefits accruing to competitors who profit from making, selling or using an invention after the patent term has expired. Copyright externalities include benefits derived by individuals and companies who exploit a work that has entered the public domain as well as consumers who benefit from the “fair use” of protected works. Even trademarks, with their historical roots in fraud law, possess a public good element harbouring positive externalities. While competing uses of the same or similar marks are rivalrous, consumers’ *referential* or *comparative* uses of those selfsame marks are non-rivalrous, therefore yielding positive externalities (“Let’s get the Men’s Kleenex!”).

As with all public goods, the accepted position is that provision of intellectual property via a pure market mechanism is inefficient.⁴¹ The non-excludable nature of intellectual property encourages consumers to avoid payment and become free-riders. Since an individual’s consumption of a public good does not affect consumption by others, expenses incurred by those other than the initial purchasers are unnecessary.⁴² Producers accordingly are unable to appropriate all the benefits of rent from the public goods that they have produced, and as a result insufficient profits are generated to cover the high

³⁸ Vaver (2006) at 5.

³⁹ See 13 above.

⁴⁰ David W. Barnes, *Trademark Externalities*, 10 YALE J.L. & TECH. 1 (2007) at 25-26.

⁴¹ “Free access is desirable, because once the creative work has been produced (from a ‘static’ perspective), it costs nothing in the short-run for another person to benefit from it. Someone in society can benefit at no cost to society. In the long-run (from a ‘dynamic’ perspective), however, producers must charge a price sufficient to cover their costs, including a normal economic profit. For pure public goods, it is impossible to satisfy both goals simultaneously using market forces.” See David W. Barnes, *The Incentives/Access Tradeoff* 9 NW. J. TECH. & INTELL. PROP. 96 (2010-2011) at 97.

⁴² See generally William H. Oakland, *Congestion, Public Goods and Welfare*, 1 J. PUB ECON. 339 (1972).

fixed costs involved in the production of informational goods. Accordingly, there is an insufficient incentive for producers to produce intellectual property.⁴³

Intellectual property law thus “internalizes” the non-excludable aspect of intellectual property by artificially imposing excludability upon works and inventions. With grants of monopoly rights to producers, unauthorized copying is prohibited by legal sanction. This simulated scarcity in turn stimulates the production of intellectual property, since without free-riding producers are able to appropriate rents from their creations again.

While intellectual property law ensures that informational goods are not underproduced in the market, it does this at the expense of competition. Incentives for producers to create and invent are secured via the grant of monopoly rights, but the resulting monopoly in the intellectual property market brings concomitant efficiency problems. With monopolists being able to set price above marginal cost, consumers who value the good more than marginal cost but less than the actual set price will not be able to purchase the work. No rational consumer will pay more for a good than what it is worth to him. There is thus an underutilization of the informational good. To the extent that the price of the work is set above marginal cost, then, there is a net social cost, known as the deadweight loss, to be borne by society at large.

It might be said that the intellectual property regime has merely traded one form of evil for another. In place of market failure from a lack of incentives to produce, we now have an inefficient monopoly providing works and inventions at sub-optimal quantities. In the former case, the market failure lies in inadequate production; in the latter case, the failure is linked to insufficient access and consumption.⁴⁴ In any case, intellectual property policy recognizes that the failure of the market to provide incentives *cannot* be completely rectified by full internalization because that would interfere with the static allocative efficiency concern, *viz.* the goal of free access to avoid deadweight loss from unsupplied consumers. As a result, we have a compromise: a generally limited duration and scope for exclusive rights, after which access is free. The term and use restrictions, therefore, balance the dynamic and static efficiency concerns. Whether this balance has been properly struck will be the subject of the remainder of this paper.

THE TRADITIONAL ECONOMICS OF INTELLECTUAL PROPERTY

Traditional economic analysis of intellectual property law began, quite naturally, based off economic analysis of ordinary property law, and indeed is still today informed by much of the research pertaining thereto. As Posner and Landes state in the conclusion to their ground-breaking work *The Economic Structure of Intellectual Property Law*:

⁴³ See Shih R. Ray Ku, *The Creative Destruction of Copyright: Napster and the New Economics of Digital Technology*, 69 U. CHI. L. REV. 263 (2002) at 278 (“if enough people decide that they can enjoy the benefits of a lighthouse without paying for its costs, soon there will be no lighthouse”).

⁴⁴ Insofar as the monopoly fails to allocate works efficiently, there is also a *prima facie* market failure.

The economic analysis that unifies the different fields of intellectual property law also unites intellectual property law with ordinary property law. ... The basic economics of property applies equally to intellectual property and to physical property. The main differences between the two bodies of law can to a great extent be explained simply by the different values of the relevant variables in a unified economic model.⁴⁵

However, public goods theory, which has been the driving force for much of the economic analysis of intellectual property in this paper and beyond, grew out of a context that was markedly different from our pervasive informational environment. It began as an offshoot of public finance economics, a branch of economics concerned with the organization of and funding of government activities.⁴⁶ Under the umbrella of public finance, public goods theory identified competitive market failures and prescribed how governments could rectify those failures by collectively supplying or subsidizing the good – education, roads, police, national defence and so on – in question. The problem, however, of applying traditional conceptions of public goods theory to intellectual property is that public finance was focused on *collective/governmental* rather than the *private* provision of goods (as is mostly the case with patents, trademarks and copyrights). Accordingly, under public finance theory, it was assumed that production of public goods would be subsidized or entirely supplied through proceeds from taxes or fees collected from citizens in a state, and that the demand for public goods would be revealed by the general voting and political process.

Needless to say, this is not the how most intellectual property regimes around the world operate. Most countries rely on markets to determine the supply and demand of informational public goods, and by defining the scope and term of patents, copyrights and trademarks, intellectual property law does its level best to enable the market to allocate resources to the use and production of informational goods. Since public finance economists assumed that the collective or the government would gauge the demand for public goods through the political process and encourage the provision of public goods by paying producers from tax proceeds, the problem of *incentives* never arose in the brick-and-mortar property context. Similarly, the problem of *access* never arose in public finance public goods theory, because the public finance economists did not have to take into account the non-excludability of informational goods.

The public finance version of public goods theory – which is, by and large, the version that intellectual property economists like Posner and Landes have adopted – thus fails to describe the proper standards for optimizing the output of intellectual property. The

⁴⁵ William M. Landes and Richard A. Posner, *The Economic Structure of Intellectual Property Law* (Cambridge, Mass.: The Belknap Press of Harvard University Press, 2003) at 421.

⁴⁶ Barnes (2010-2011) at 99.

theory ignores the conflict between short and long term goals inherent in intellectual property law, and rests on an unsuited assumption that the government, rather than a market, will supply the informational goods.

With the above qualificatory remarks in mind, we now venture into a brief summary of the received economic wisdom pertaining to each individual type of intellectual property. Each of the following traditional positions, however, will be revisited subsequently in this article to account for the effects of rapid technological change.

Patents

As has already been stated earlier, the core of the traditional economic argument for patents is that free market competition will generate a sub-optimal rate of inventions, due to the public good nature of ideas and knowledge.⁴⁷ Accordingly, it is in society's best interest to supplement competition in the marketplace with certain government institutions, the patent being the foremost. This utilitarian perspective characterises patents as incentives for future innovation, and not as reward for past inventions.

The economic justification for patents begins with the non-rivalrous nature of knowledge – in other words, the idea that there is no congestion in the use of informational goods.⁴⁸ In economic terms, the implication is that the *marginal cost* of using a piece of inventive knowledge is zero – since this piece of knowledge can be used at the same time by different individuals without disappearing from its use, an *additional* (marginal) person using that information will result in no additional cost being incurred to the inventor.⁴⁹ As a corollary, therefore, the *cost of invention* is a sunk cost, to be incurred as a one-off before proper manufacture (incurring variable costs) of a good that embodies the inventive knowledge begins.

Of course, an existing piece of inventive knowledge can be beneficial to imitators along with the inventor. These imitators do not need to incur the sunk cost of invention – they can simply enjoy the positive spillover from the inventor's original ministrations. Re-inventing an already known piece of inventive knowledge, after all, is a waste of social resources: once invented, it is beneficial to society as a whole that the knowledge is made available for free to all potential users, since the inventive cost has already been incurred

⁴⁷ See 10-11 above.

⁴⁸ Indeed, this makes the knowledge protected by patents even *more* public than other public goods such as roads and education.

⁴⁹ Since the latter is not required to produce an additional piece of knowledge – the first piece of knowledge is, technically, infinite

by the inventor and further use generates no further cost to anyone.⁵⁰ As a result, unlimited and free access, as a matter of common sense, is socially preferable.

However, because the *private return* to the inventor (specifically, the inventor's use of the inventive knowledge to generate profits) is lower than the *social return* (specifically, the private return *plus* imitators' use of the inventive knowledge to generate profits *plus* any other positive externalities that might accrue), certain inventions whose social return would justify the outlay required to invent them would not come into existence due to insufficient private return. Accordingly, the competitive market mechanism might not generate an optimal level of innovation for society. Indeed, a competitive market might make matters worse, since the inventor must charge a price that will permit him to recoup his fixed inventive cost and variable production costs, while his competitors can simply just charge their variable production costs. Under such a scenario, the inventor will invariably be driven out of business. Anticipating this, therefore, inventors and companies will choose not to invest in research in the first place.

Appreciating the undesirability of such a situation, governments around the world have responded by "privatizing" knowledge, making it an "excludable" good (although still non-rival in consumption). Authorities build a patent wall around inventive knowledge, barring others than the inventor from using that inventive knowledge for a specified duration. The holder of the patent right can choose to either keep exclusivity of the inventive knowledge, or he can allow access to it to third parties under conditions that might yield a profit to himself.⁵¹ In any event, the exclusive patent right translates into a reward *over and above* the normal competitive profit, allowing the inventor to recoup the cost of both his initial research and also the risk of undertaking that research.

In granting exclusive monopoly rights, costs are incurred by society: a patent hampers access to existing pieces of inventive knowledge, reducing positive knowledge spillovers that might have led to further, better innovations. This is where the incentive-access tradeoff comes into play: the grant of monopolies to incentivize invention must be balanced against the contemporaneous reduction in the diffusion of inventive knowledge. Unlike property regimes governing tangible assets, which by and large serve the purpose of managing *current* scarcity of assets, patent rights aim at reducing *future* scarcities of inventive knowledge by inducing more investment and innovation.

Copyright

Copyright is the right of an author of an expressive work to control the exploitation of his intellectual creation. This exploitation includes the right to make the work public as well

⁵⁰ Dominique Guellec and Bruno van Pottelsberghe de la Potterie, *The Economics of the European Patent System* (Oxford: Oxford University Press, 2007) at 49-51.

⁵¹ *Ibid.* at 52-53.

as the right to reproduce the work.⁵² Under traditional economic analysis, the production of copyrightable works involves very high fixed costs.⁵³ These costs include those borne by the author⁵⁴ in creating the work, as well as those incurred in capital investment to facilitate the work's reproduction, packaging and distribution.⁵⁵ Once the necessary infrastructure for reproduction and distribution of the work is in place, however, the production of additional copies entails only low variable costs. Printing one more copy of a book with paid-for equipment does not cost much. Consequently, the marginal costs of production for traditional works of intellectual property are low.⁵⁶

In a competitive market without grants of copyright monopoly, prices of works are invariably driven downward towards the level of marginal cost. As with patents, if the prices are driven so low that the producer is unable to recoup his high fixed costs, it is unlikely that he would continue producing copies of the work. There is no incentive for rational producers to carry on producing. In the absence of copyright law, then, markets for copyright goods will necessarily fail, and there will be an undersupply of the good relative to the socially optimal level.⁵⁷ By granting them a monopoly right over their works, copyright gives producers the requisite incentive to produce. It frees them from competition which would otherwise render their creative enterprises unprofitable. Without competition, producers are no longer compelled to set their prices at marginal cost level. They are free, instead, to price to maximize profit.

As with patentable subject-matter, works that may be copyrighted are largely non-rival and non-excludable in nature – in other words, they are public goods. As with all public goods, the provision of creative works via a pure market mechanism is inefficient. Copyright law therefore takes into account the public goods externalities of these works by constructing around them synthetic walls of excludability. With this artificial scarcity in place, copying becomes easily enforceable as copyright infringement and content creators, in turn, come to enjoy an effective monopoly. With the simulated excludability also putting paid to the issue of free-riding, creators are once again free to appropriate

⁵² For a comprehensive definition of the “bundle” of rights making up copyright, see Centre for Copyright Studies, *Economic Perspectives on Copyright Law* (New South Wales: The Allen Consulting Group, 2003) at 4-7.

⁵³ See Shubha Ghosh, *Turning Gray into Green: Some Comments on Napster*, 23 HASTINGS COMM. & ENT. L.J. 563 (2001) at 567-568.

⁵⁴ In much of the traditional economic analysis of copyright, the actual creator of the work and the reproducer-cum-distributor are treated as a single entity (see, for example, William M. Landes and Richard A. Posner, *An Economic Analysis of Copyright Law*, 18 J. LEG. STUD. 325 (1989) at 326 (“to simplify the analysis, we ignore any distinction between costs incurred by authors and by publishers”)).

⁵⁵ For instance, printing presses, CD stamps and delivery trucks. See Eric W. Rothenbuhler and John M. Streck, *The Structure and Performance of the Recorded Music Industry*, in Alison Alexander, James Owers and Rod Carveth, *Media Economics: Theory and Practice (2nd Ed)* (Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers, 1998) at 199, 213-215 (discussing barriers to entry in the record industry).

⁵⁶ Ghosh (2001) at 567.

⁵⁷ The socially optimal level of production would be where the market demand curve for the good intersects the marginal cost curve for the firm. It is at this quantity that consumers and producers value the good equally, giving a Pareto efficient result.

rents from their works, whether by licensing them, fixing them in various different media formats for sale or by simply licensing their copyrights in them.

Trademarks

According to traditional economic theory, when vendors invest in trademarks by maintaining high quality standards in their goods and services or by advertising useful information about the same, they create goodwill that leads to greater profit margins from sales. Consumers stand to gain because they are able to rely on familiar trademarks to locate goods and services that are satisfactory to them, while competitors and new entrants also benefit because the trademark framework permits them to carry out their own investment in advertising and good/service quality. As competition flourishes, prices are lowered. The investment and protection of signals conveyed by trademarks, therefore, benefits both producers and consumers alike.⁵⁸

However, while patent and copyright laws are legislative responses to the inevitable market failure that results from the supply of public informational goods, trademark law does not appear to share this concern. Indeed, one leading intellectual property commentator has even gone so far as to say that “there is no public goods problem for intellectual property to solve”.⁵⁹

Unlike patents and copyrights, trademark law and the right of publicity do not exist to encourage the creation of new brand names, personal names or likenesses. There is no affirmative social interest in encouraging their proliferation, and, in any event, the fixed costs invested in creating a new name are so minimal that it is hard to imagine that creating one would require incentives.⁶⁰

Still others contend that while “[o]ne might conceive of an optimal supply of copyrighted works or patented inventions, but it makes no sense to refer to an optimal supply of [trade]marks as such”.⁶¹ The incentive to trademark – in order to distinguish one’s brand and, as a result, achieve greater sales – is seen as obvious.

The received wisdom, therefore, is that trademark law has little theoretical or practical relation to copyrights and patents. Accordingly, much of the economic analysis that informed the preceding two sections has no place in the trademark context: unlike copyrights and patents, trademarks apparently do not possess any public good aspect and do not enrich the public domain. Instead, trademarks are assumed to be rivalrous, private goods, with any one trademark only being able to be utilised by any one vendor at any one time. If anyone other than the trademark owner simultaneously employs an identical

⁵⁸ David W. Barnes, *The New Economics of Trademarks*, 5 NW. J. TECH. & INTELL. PROP. 22 (2006) at 22 n 1.

⁵⁹ Lemley (2004) at 143.

⁶⁰ *Id.* at 143 n 50.

⁶¹ Stephen L. Carter, *The Trouble with Trademark*, 99 YALE L.J. 759 (1990) at 768.

trademark, that act will interfere with the benefit that ought to have accrued to the trademark owner from the owner's use of the mark in the market.

The upshot of all of this is that trademark law is largely seen as the poor cousin to copyright and patent law, concerned not so much with the promotion of progress in science and the useful arts but rather firm-centred deliberations on branding strategy. It is thus seen not so much as "intellectual", but rather a market-oriented policy tool.

Unsurprisingly, in place of the static-dynamic/incentives-access debate that dominates much of the copyright and patent discourse, the economics of trademark law focuses on the justification of various standards for determining the point at which trademark infringement occurs.⁶² The economics literature also asks questions about what level of "distinctiveness" of a trademark is efficient, and why the non-protection of generic marks is desirable for society as a whole. Throughout these meta-analyses, the safe *supply* of trademarks is taken for granted. This is so because, being viewed as a private good, trademarks do not present any issues of market failure: each and every vendor is free to include, for example, its trademark advertising costs into the good or service that it has for sale. The regular economic analysis of a private good in a competitive market follows, and there are no complications pertaining to non-excludable free-riders or non-rivalrous consumption that might lead to an undersupply of trademarks.

TECHNOLOGY AND THE OBSOLETE ECONOMICS OF INTELLECTUAL PROPERTY

For intellectual property, technology is a knife that cuts both ways. The proliferation of global networks, digital intellectual goods and the Internet has brought with it both threats and opportunities for producers and consumers alike.⁶³ On one hand, these developments promise a reduction in consumer search costs, allowing an increasing proportion of the world's population access to a variety of informational goods. On the other hand, however, the advances in technology also harbour the potential to control intellectual property in a manner heretofore unheard of. Digital Rights Management tools such as encryption, "trusted" systems and digital watermarking technologies, when used under the auspices of copyright law, can collectively limit access to a great extent.⁶⁴ In the same vein, the globalized business of cutting-edge pharmaceuticals has delivered much less than it has promised: with differential pricing for drugs across developed and developing nations, access is not as high as one might imagine.⁶⁵ Technology, then, could be a social leveller, promoting access to all across geographical, social and

⁶² See generally William M. Landes and Richard A. Posner, *Trademark Law: An Economic Perspective*, 30 J.L. & ECON. 265 (1987).

⁶³ For a succinct outline of the origins of and issues precipitated by the digital revolution, see Committee on Intellectual Property Rights in the Emerging Information Infrastructure and National Research Council, *The Digital Dilemma* (Washington, DC: National Academies Press, 2000) at 1-22.

⁶⁴ For a critical exposition of these technological measures, see Mark Stefik, *Shifting the Possible: How Trusted Systems and Digital Property Rights Challenge Us to Rethink Digital Publishing*, 12 BERKELEY TECH. L.J. 137 (1997) at 137-138.

⁶⁵ See, for example, Michele Boldrin and David K. Levine, *Against Intellectual Monopoly* (Cambridge: Cambridge University Press, 2008) at 69-71.

economic boundaries; alternatively, it could well turn out to be a stratifier, broadening the rift between the “haves” and the “have-nots” in the information age.⁶⁶

It should be made clear from the outset, however, that the present problems within the global intellectual property framework are not *borne* of the technological revolution. Rather, these were existing problems that have merely been exacerbated by the intrusion of technology into our daily lives. Technology, by facilitating an increasingly connected world, has ironically exposed a widening disconnect between intellectual property law and the subject matter it seeks to govern.

Objective analysis first started going down a dangerous path with the ascendant primacy of intellectual property rightholders’ interests. The proprietary paradigm of intellectual property led courts and legislatures alike to prioritize the maximization of rightholders’ utility, often at the expense of overall societal well-being. Courts were quick to grant trademark registrants protection online in avenues where they had never done so in the real world;⁶⁷ and legislatures were happy to endow *already created works of copyright* with retroactive extensions to their validity periods.⁶⁸ None of this was properly informed by economic reasoning. They were more likely a function of the fact that collective lobbying action for a smaller group of beneficiaries (rightholders in coalitions such as the Recording Industry Association of America) is easier to organize than for a large, diverse mass of stakeholders (consumers and society at large).⁶⁹

What has been forgotten is that property, first and foremost, is the governmental regulation of relations between persons vis-à-vis resources via the granting of circumscribable rights. Accordingly, the fact that technology has made property intangible, non-rival and infinite does not itself matter. The real issue at hand for intellectual property policy, as we shall see shortly, is the *cost of imitating an idea for the purpose of commercial exploitation*.⁷⁰

⁶⁶ Committee on Intellectual Property Rights in the Emerging Information Infrastructure and National Research Council, *The Digital Dilemma* (Washington, DC: National Academies Press, 2000) at 2.

⁶⁷ See Stacey L. Dogan and Mark A. Lemley, *Trademarks and Consumer Search Costs on the Internet*, 41 HOUS. L. REV. 777 (2004) at 802, where the authors observe that “courts have widened the net of trademark infringement to encompass search engines, advertising firms, and others who help competitors reach their audiences through non-traditional ‘uses’ of established marks ... and have extended the definition of actionable confusion to include the mere possibility of customer diversion to competitors’ websites, in some cases even when the consumer knows where she is headed at all times.”

⁶⁸ Namely, the Sonny Bono Copyright Term Extension Act of 1998, known vividly also as the “Mickey Mouse Protection Act”.

⁶⁹ This is one of the core principles of public choice economic theory, which is addressed briefly in the final section on behavioral economics below (from 64).

⁷⁰ Sol Picciotto and David Campbell, *Whose Molecule is it Anyway? Private and Social Perspectives on Intellectual Property*, in Alistair Hudson (ed.), *New Perspectives on Property Law, Obligations and Restitution* (London: Cavendish Publishing Ltd, 2004) at 285.

Some elaboration is in order. Take John, for example, the inventor of a novel and efficient bronze-making process. John would not be concerned if his idea were copied for the purposes of a pure laboratory experiment; however, he *would* be if a rival bronze-maker started using John's idea in such a way as to reduce John's revenues from making and selling bronze. This imitation by the rival, of course, involves costs – the costs in setting up new hardware, the costs in understanding the novel bronze-making process, the costs in hiring and training staff and so on and so forth. Ergo, the *type of use* of an idea that intellectual property protection is meant to regulate – rival commercial exploitation – always involves costs, even if it is flat-out imitation.

Once we see that imitation always incurs costs, the now-clear target of intellectual property legislation – *imitation in order to create a rival product which might cut into the inventor's revenues* – becomes less of a black-and-white zone, and more of a spectrum for possible legislative responses. There will be industries where the costs of imitation are so high (for example, extremely niche industrial machines) that even the most cunning of competitors would balk at investing the initial capital outlay for mere *imitation*; and there will be industries where the costs of imitation are so low (for instance, teenage romance novels) that competition would appear to be logical, and even healthy. But between these two extremities there is no abrupt cut-off point between which goods which naturally can have a market and those which require intellectual property monopoly rights in the face of possible market failure.

But what is market failure? The existence of transaction costs⁷¹ means that all markets, to some extent, are imperfect. In the intellectual property context, imperfections come from the need, *inter alia*, for non-excludable informational goods to be excluded.⁷² Market failure in the intellectual property framework appears, therefore, to include the absence of a market for informational goods when society does not invest sufficiently to create excludability. The provision of excludability becomes a legitimate transaction cost, and accordingly market failure occurs at the point where the *transaction costs of ensuring excludability* exceed the *benefit obtained from excluding*. Per Kenneth Arrow:

[M]arket failure is not absolute; it is better to consider a broader category, that of transaction costs, which in general impede and in particular cases completely block the formation of markets ... Market

⁷¹ A *transaction cost* is the cost incurred in making an exchange with economic consequences. There are three broad transaction costs involved in a market transaction: search and information costs, bargaining costs and enforcement costs. For an detailed introduction to transaction costs, see Ronald H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960).

⁷² There is, of course, a difference of degree between goods in relation to how difficult it is to make them exclusive – my mobile phone does not require much to be made exclusive, but May's singing voice does.

failure is the particular case where transaction costs are so high that the existence of the market is no longer worthwhile.⁷³

Ergo, there should be no prior slant in favour of establishing a market in inherently non-excludable informational goods, particularly where the costs of excludability are prohibitive. Indeed, the overall transaction costs involved in planning, administering and enforcing a rights-based intellectual property system might well also prove to be formidable. Whether these costs are balanced by gains from the increased production of informational goods is indeterminate,⁷⁴ but it is clear that as stronger proprietary rights are granted and enforced, the corresponding increase in transaction costs will necessarily precipitate a decrease in overall social welfare.

Unfortunately, while lip service has been paid to the need to justify intellectual property by balancing between the rights of exploitation (by rightholders) and obligations of diffusion (upon rightholders), the initial conceptualisation of intellectual property rights, from the outset, as *absolute* rights of dominion subject to minor qualifications tends to prejudice the debate in favour of rightholders. In the sections that follow, this article will spotlight specific real-world examples of how technology has laid open the deficiencies in prevailing intellectual property policy.

Software patents

Computer software was not always patentable subject matter.⁷⁵ Despite this, it appears that historically the software industry was none the worse for it: there is little evidence to suggest that increased patenting has been linked to higher levels of innovation in the United States' software industry.⁷⁶ It seems a natural question, then, why the *status quo* today is patent protection for software, over and above copyright and trade secret law?

⁷³ Kenneth J. Arrow, *The Organisation of Economic Activity*, in Kenneth J. Arrow, *Collected Papers, Vol 2* (Cambridge, MA: The Belknap Press of Harvard University Press, 1983) at 134, 139.

⁷⁴ See Samuel E. Trosow, *The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital*, 16 CAN. J.L. & JURIS. 217 (2003) at 229 (“the losses from limiting access are not as susceptible to precise quantitative measurement as are the financial benefits accruing to the owners of the information commodity”).

⁷⁵ Dan L. Burk and Mark A. Lemley, *Is Patent Law Technology-Specific?*, 17 Berkeley Tech. L.J. 1155 (2002) at 1160 n 16.

⁷⁶ See, for example, Stuart J. H. Graham and David C. Mowery, *Software Patents: Good News or Bad News?*, Georgia Tech Technological Innovations: Generating Economic Results Working Paper Series (2004) at 28, Boldrin and Levine (2008) at 72-73, Pamela Samuelson, *The Strange Odyssey of Software Interfaces as Intellectual Property*, in Mario Biagioli, Peter Jaszi and Martha Woodmansee (eds.), *Making and Unmaking Intellectual Property* (Chicago: The University of Chicago Press, 2011) at 332, and generally Mariko Sakakibara and Lee Branstetter, *Do Stronger Patents Induce More Innovation? Evidence from the 1998 Japanese Patent Law Reforms* 32 RAND J. ECON. 77 (2001). Compare also the similarly anti-patent findings from a study conducted on the semiconductor industry, an industry also “characterized by rapid technological change and cumulative innovation”: Bronwyn H. Hall and Rosemarie Ham Ziedonis, *The Patent Paradox Revisited: An Empirical Study of Patenting in the U.S. Semiconductor Industry, 1979-1995*, 32 RAND J. ECON. 101 (2001).

Indeed, to many people in the software and computer industries, the extension of patent protection to software seemed at the time (and even now) nothing more than an attempt to fix something that had yet to be broken.⁷⁷ In this connection, the statistical evidence is difficult to ignore. An analysis by James Bessen and Robert Hunt in 2004⁷⁸ showed that software patents are largely applied for and acquired by large *hardware* firms. However, it is the small technology startups that focus on writing and selling software. Bessen and Hunt found that these software companies have, interestingly, an extremely low “propensity to patent”.⁷⁹ Accordingly, the software patent *could not possibly have been the incentive for these software firms to innovate* – yet they did. Even more tellingly, Bessen and Hunt also found that the firms that did acquire large numbers of software patents during the 1990s actually *reduced* their research and development spending relative to sales. It appeared that the large firms were patenting, but in all likelihood not quite innovating.

Why is this so? To understand, we begin with the exposition of some traits of the software industry. Relative to other industries, the cost of producing software is low,⁸⁰ and the risks involved in software innovation are also low. Biotechnology research, for example, requires great expense and plays host to a very high probability of failure, with strict patenting requirements at the United States Patent and Trademark Office (USPTO).⁸¹ By contrast, because of the extremely lax requirements vis-à-vis software patent claims at the USPTO, the research and development required to obtain a software patent can, quite literally, be carried out with some paper and pencil. For example, in the case of *Fonar Corp. v General Electric Co.*, it was stated that:

[W]here software constitutes part of a best mode of carrying out an invention, description of such a best mode is satisfied by a disclosure of the functions of the software. This is because, normally, writing code for such software is within the skill of the art, not requiring undue experimentation, once its functions have been disclosed. It is well established that what is within the skill of the art need not be disclosed ... Stating the functions of the best mode software satisfies that

⁷⁷ For example, see David R. Syrowik, *Software Patents – Just Make a Good Thing Better*, 2 MICH. TELECOMM. TECH. L. REV. 113 (1996). Such approaches have been criticised by other commentators. See Bessen and Maskin, (2005) at 4, where the authors note that “[computer software] industries were already highly innovative; firm entry, the number of new products and R&D investment were all high relative to sales.”

⁷⁸ James Bessen and Robert M. Hunt, *An Empirical Look at Software Patents*, Federal Reserve Bank of Philadelphia Working Paper 03-17R (2004).

⁷⁹ *Ibid.* at 16.

⁸⁰ Robert E. Thomas, *Debugging Software Patents: Increasing Innovation and Reducing Uncertainty in the Judicial Reform of Software Patent Law*, 25 Santa Clara Computer & High Tech. L.J. 191 (2008) at 218.

⁸¹ *Ibid.* at 220. See also Burk and Lemley (2002) at 1184.

description test. ... Thus, flow charts or source code listings are not a requirement for adequately disclosing functions of software.⁸²

Findings such as the ones above have led commentators to observe:

[Software patents] can claim the function itself. The fact that they give little or no description of how to achieve this function will not bar the broad claims because the Federal Circuit has proven remarkably unwilling to require software patentees to disclose details. As a result, “we should expect the first programmer to implement a new idea in software to encompass the entire category of software, regardless of how second-comers actually implement the same concept.”⁸³

The latter point is troubling: the costs to society, should these commentators prove correct, would be astronomical. Indeed, first-to-patent software developers would receive what no intellectual property right owner should be permitted to receive: a monopoly over an idea, at minimal cost to boot. The practical consequence of this is that a developer may submit and obtain approval for a software patent claim by merely outlining the basic functionalities of the software patent claim and submitting a program flowchart. No *working* program or sample is required, and indeed programming proper can start even *after* the software patent claim has been submitted.⁸⁴

The cost involved in software development is further lowered by the extremely low risk of failure. As long as a computer function can be described, it is only a matter of time before a competent programmer can be made to write the relevant code for the function to be carried out. Even where a programming task proves difficult, experienced programmers can simply break the task down into modular sub-functions until they are able to write code that implements the requisite function.⁸⁵ This is in stark contrast, once again, to the biotechnology industry, where researchers go through wave after excruciating wave of trial and error, not knowing whether it is actually possible (with the given state of technology) to achieve a particular (albeit fully articulated) result.

With such low costs involved in the software industry, one wonders whether the traditional economic argument for patents – to cover the high fixed costs of research and development – still holds as much water. Even if patents are the primary method under which developers recoup their research outlay, because of the quick product turnover times in the software industry, rightholders have only very limited amounts of time to collect rents on their valid but soon-to-be obsolete patents.

⁸² *Fonar Corp. v. General Electric Co.* 107 F.3d 1543 (Fed. Cir. 1997) at 1549.

⁸³ Burk and Lemley (2002) at 1170-1171.

⁸⁴ Thomas (2008) at 220 and Lindholm (2005) at 102.

⁸⁵ Ben Klemens, *Math You Can't Use: Patents, Copyright and Software* (Washington, DC: The Brookings Institution, 2006) at 21-23.

This leads us to another characteristic of the software industry: innovation in the industry takes place not just *collaboratively* and *interactively*, as intimated immediately above, but also *rapidly* and in a *dynamically networked* environment. “Hackers” and imitators⁸⁶ can add tremendous value to a particular piece of software, and because of the speed and environment at which those individuals and the rest of the software industry work, software patents that might be valuable today can be rendered worthless tomorrow in the blink of an eye. The incentive argument therefore appears even weaker: in an industry where *lead time* is sacrosanct and product life cycles short, the patent mechanism appears to be superfluous afterthought.

The ill-fit of the existing patent framework to software does not end there. Due to the fact that the software industry has a natural tendency towards *interoperable standards* for efficient user interaction,⁸⁷ *network externalities* are a distinctive concern not otherwise present in tangible resource markets.⁸⁸ Specifically, the value that one individual derives from an informational good like software is directly correlated to how many other people are using that same good. To cite a common example: the more people use Facebook, the more value each existing user of Facebook derives, because he or she will be connected to a larger network than before. In the context of software, should patent monopolies prevent mutual access to “standards-essential” patents, there is a risk that deadweight losses will accrue to society for no ostensible benefit:

In its response ... Apple addressed “standards-essential” patents, which companies are obligated to license to competitors at reasonable rates, and wrote that it was “deeply concerned by the rampant abuse of standards-essential patents by some of our competitors.”

“Standards-essential patents are technologies which these companies have volunteered to license to anyone for a reasonable fee,” the statement said, “but instead of negotiating with Apple, they’ve chosen to sue us.” Samsung, Motorola, Nokia and HTC have sued Apple, claiming it violated standards-essential patents.⁸⁹

Whether Apple has a case is unimportant; all that matters from a societal perspective is that on top of statically-inefficient software patents, further costs have to be incurred in

⁸⁶ Bessen and Maskin (2005) at 5.

⁸⁷ For example, because I created documents on Microsoft Word, it would be good if you had Microsoft Word too in order to read them; however, my possessing an ergonomic reclining chair from IKEA would not require you to possess that same chair for any reason other than shared taste.

⁸⁸ Peter S. Menell, *Governance of Intellectual Resources and Disintegration of Intellectual Property in the Digital Age*, 26 BERKELEY TECH. L.J. 1523 (2011) at 1536.

⁸⁹ Charles Duhig and Steve Lohr, *The Patent, Used as a Sword* (7 October 2012), available online at http://www.nytimes.com/2012/10/08/technology/patent-wars-among-tech-giants-can-stifle-competition.html?pagewanted=all&_r=0 (last accessed 20 June 2013).

both negative externalities from deficiencies in interoperability⁹⁰ and expensive software patent litigation. Former Apple general counsel Nancy R. Heinen puts it succinctly: “Think of the billions of dollars being flushed down the toilet ... [w]hen patent lawyers become rock stars, it’s a bad sign for where an industry is heading.”⁹¹

Indeed, “strategic” or “defensive” patenting – where technology companies file and register for software patents, only to not use them subsequently for various reasons, foremost among them the suppression of competitors’ entry into the market – cast further doubt on the efficiency of the patent system as a means of optimizing both the rate and direction of innovative activity.⁹² This “patent thicket” strategy is well-documented in the existing patent literature:

Companies have been said to use a technique of patent “flooding” or “blanketing a technology area ... The typical scenario is that a new technology is patented by a first company, and a second company ... if the stakes are high enough, can assign enough resources literally to blanket all of the potential improvements to the invention by filing patents on these improvements. The first company is essentially forced into some type of cross-licensing agreement if they want a business to grow.⁹³

Jerry Baker, senior vice president at Oracle Corporation, had this to say about the zero-valued-added game of patent warfare:

Our engineers and patent counsel have advised me that it may be virtually impossible to develop a complicated software product today without infringing numerous broad existing patents ... As a defensive strategy, Oracle has expended substantial money and effort to protect itself by selectively applying for patents which will present the best opportunities for cross-licensing between Oracle and other companies who may allege patent infringement. If such a claimant is also a software developer and marketer, we would hope to be able to use our

⁹⁰ See Boldrin and Levine (2008) at 86, where the authors give the example of Rambus, an erstwhile manufacturer of memory chips: “Rambus’ anticompetitive scheme involved participating in the work of an industry standard-setting organization, known as JEDEC, without making it known to JEDEC or its members that Rambus was actively working to develop, and did in fact possess, a patent and several pending patent applications that involved specific technologies proposed for and ultimately adopted in the relevant standards ... Rambus’ anticompetitive scheme further entailed perfecting its patent rights over these same technologies and then, once the standards had become widely adopted within the DRAM industry, enforcing such patents worldwide against companies manufacturing memory products in compliance with the standards.” For more on Rambus, the Federal Trade Commission Complaint may be accessed here: <http://www.ftc.gov/opa/2002/06/rambus.shtm> (last accessed 20 June 2013).

⁹¹ Duhig and Lohr (7 October 2012).

⁹² Landes and Posner (Belknap Press, 2003) at 321.

⁹³ H. Jackson Knight, *Patent Strategy for Researchers and Research Managers* (Chichester: John Wiley & Sons Ltd, 1996) at 42-43.

pending patent applications to cross-license and leave our business unchanged.⁹⁴

Other equally inefficient situations are not difficult to imagine: the large, established firm crowding out the small software startup with its formidable patent portfolio;⁹⁵ patent “trolls” that go around purchasing disused patents on the cheap before bringing surprise lawsuits against deep-pocketed companies;⁹⁶ and applicants for “submarine patents” – useless patents, encapsulating vague and broad ideas, for which the patent filing process is dragged out until an actual innovator invests the time and effort to make the idea practicable – resurfacing for licence fees at the opportune moment.⁹⁷ All of this strategic behavior has served only to increase costs and uncertainty in an industry that technically should be running on very low expenditures.⁹⁸ For example, in the case of the submarine patent, the cost of the bogus innovator’s “innovation” is *already sunk*, so there is absolutely no economic argument in favour of allowing him to recover his own costs. But the first row in the cinema of the software industry has stood up; and now all the other firms behind have to follow suit, or risk missing the movie.

The original patent bargain was for the disclosure of useful, technical knowledge in return for a limited term monopoly over the employment of that useful knowledge. This exchange, as earlier discussed, went some way in balancing the inventors’ need for innovation incentives and society’s access to the inventors’ work, which could be built upon for further innovation.⁹⁹ In the software context, however, the knowledge disclosed by developers is devoid of implementation details and vague to the point of being useless. Worse, because software does not lend itself to easy articulation in a patent claim,¹⁰⁰ patent attorneys draft to encompass every potential aspect of a new technology – the end

⁹⁴ Boldrin and Levine (2008) at 73.

⁹⁵ *Ibid.* at 75. Because of the nature of the patent system, most small software firms are forced to set themselves up as one-idea companies, aiming only at being purchased by the big incumbent. The presence of a patent thicket creates an incentive not to *compete* with the monopolist, but to simply find something valuable to feed it – *viz.*, a new patent – and then stay out of the way. This is arguably not an ideal economic system that society should seek to maintain, since consumers continue to live in a monopolized world of software paying high rents for products while potential entrepreneurs find it difficult to enter and compete in the long term.

⁹⁶ For example, Panip IP LLC – a company formed solely to collect from small businesses using overbroad patent claims (e.g. “using graphical or textural information on a video screen for the purpose of making a sale”). *Ibid.* at 74.

⁹⁷ *Ibid.* at 84-85.

⁹⁸ Peter S. Menell, *A Method for Reforming the Patent System*, 13 MICH. TELECOMM. TECH. L. REV. 487 (2007) at 499-500.

⁹⁹ See 25 above.

¹⁰⁰ The alternatives are stark: abstract description tantamount to claiming an idea, or line after line of machine code. See Duhig and Lohr (7 October 2012): “‘There are hundreds of ways to write the same computer program,’ said James Bessen, a legal expert at Harvard. And so patent applications often try to encompass every potential aspect of a new technology. When such applications are approved, Mr Bessen said, ‘the borders are fuzzy, so it’s really easy to accuse others of trespassing on your ideas.’ ... ‘If you give the same application to 10 different examiners, you’ll get 10 different results,’ said Raymond Persino, a patent lawyer who worked as an examiner from 1998 to 2005.”

result is broad, oppressive patent claims disclosing knowledge of minimal utility to society at large. As a consequence, not only will the incumbent patent holder be able to charge prices significantly above the competitive level, there will also be a social welfare loss from the lack of substitutes to the existing software product.

From an *operative* standpoint, the software patent system also fails to make any economic sense. A potential competitor, desiring to check up on the potential for any infringement prior to issuing his product, would have to fork out anywhere between \$20,000 and \$100,000 for a competent opinion of counsel on a *single* patent.¹⁰¹ Even at this cost, however, this opinion would not be a guarantee of immunity against legal problems, given the lack of expertise in courts and judges pertaining to the technical field of software programming. Additionally, defending against even an unmeritorious case of software patent infringement can cost millions in legal fees and risk an unfavourable verdict worth even more.¹⁰² The ridiculousness of the phenomenon of software patent infringement is captured well by Stephen Lindholm:

Perhaps the best evidence that infringement is practically impossible to determine is that even patent holders do not necessarily know the scope of their claims. Large portfolio-holders like I.B.M. and Texas Instruments make billions of dollars by licensing their patents to smaller companies. They do so, not by determining the scope of infringement, but by blanket licensing most of their entire portfolio in exchange for a fixed percentage of gross sales or for a large fixed fee. It is simply not economical to determine infringement precisely ... Even companies with only a few patents may not know their scope. A small company named Forgent did not realize until 2002 that one of its patents allegedly claimed one of the steps in producing JPEG image files. ... In light of the abstruse way in which algorithms are claimed in software patents, it is not completely surprising that a company holding only forty patents would fail to uncover this claim for fifteen years. Yet Forgent has collected at least \$100 million in royalties on the JPEG claim from companies unwilling to risk litigation.¹⁰³

In short, with the software patent we have an unsearchable resource that discloses next to nothing to the public domain, bargained for by increased costs all across the board in the software industry resulting from due diligence, registration and litigation expenses.

Litigation expenses, however, make up only a portion of litigation *cost*, which must also encompass the systemic uncertainty in the software patent framework. Because software patents are so alien compared to traditional mechanical patents, every time a case ends up

¹⁰¹ Lindholm (2005) at 107.

¹⁰² *Ibid.* at 107.

¹⁰³ *Ibid.* at 108.

in court the issues are “novel”. Stephen P. Fox, former associate general counsel and director of Hewlett Packard observed that:

... pervasive uncertainty about legal rights, both in terms of ability to enforce one’s own patents and ability to avoid rapidly escalating exposures to infringement claims by others ... heightens risks surrounding innovation investment decisions.¹⁰⁴

The result is that nobody really knows how a software patent infringement or invalidation action might pan out – to this day, for instance, nobody is really quite sure who won or is winning the battle of Apple versus Samsung.¹⁰⁵ Indeed, for the people who think they know who, the “why” remains elusive.

This legal uncertainty leads to several negative consequences. Transaction costs are increased as a result of inconsistency in the decision-making process, and developers are stifled from innovating further for fear of having their new products unprotected by law.¹⁰⁶ As a corollary, developers are also worried that their potential new products might infringe the existing patents of other developers. Most damagingly, parties with unmeritorious cases might decide opportunistically to try their luck in the courts, drawing either inefficient and highly priced settlements or worse, obtaining judgment at even higher damages. All of this strategic behavior in response to legal uncertainty serves only to catalyse further inefficiency and lack of innovation in the industry.

All in all, it appears that patents do not spur computer software research in the same manner that they do other forms of technology. Software developers do not seem to be encouraged by the dynamic patent incentive,¹⁰⁷ indeed, they do not even know, for most

¹⁰⁴ Stephen P. Fox, *Opening Statements of Stephen P. Fox Associate General Counsel, Director of Intellectual Property Hewlett-Packard Company*, Federal Trade Commission/Depart of Justice Hearings on Competition and Intellectual Property Law and Policy in the Knowledge Based Economy (28 February 2002).

¹⁰⁵ *Apple Inc. v. Samsung Electronics Co., Ltd.* was the first of a series of ongoing [lawsuits](#) between [Apple Inc.](#) and [Samsung Electronics](#) regarding the design of [smartphones](#) and [tablet computers](#). In early 2011, Apple sued Samsung for [patent infringement](#). By August 2011, Apple and Samsung were litigating 19 ongoing cases in nine countries; by July 2012, the two companies were still embroiled in more than 50 lawsuits around the world, with billions of dollars in damages claimed between them. While Apple won a ruling in its favor in the United States, Samsung won rulings in South Korea, Japan, and the United Kingdom. For updates on the ongoing litigation, the Wikipedia page provides a comprehensive treatment: http://en.wikipedia.org/wiki/Apple_Inc._v._Samsung_Electronics_Co.,_Ltd. (last accessed 20 June 2013).

¹⁰⁶ As Cecil D. Quillen Jr., former general counsel at Eastman Kodak, says: “If the uncertainties are such that you cannot be confident that your products are free and clear of others’ patents you will not commercialize them, or a higher return will be demanded if you do to compensate for the additional risk. And this probably means you will not do the R&D that might lead to low return (or no return) products.” See generally <http://www.researchoninnovation.org/quillen/quillen.htm> (last accessed 20 June 2013), where Quillen’s writings and presentations are collected.

¹⁰⁷ According to the Carnegie Survey, described in Wesley M. Cohen, Richard R. Nelson and John P. Walsh, *Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not)*, National Bureau of Economic Research Working Paper No. 7552 (2000), patents are employed for economically valuable uses for about only 6% of the time. For most part, patents are utilized

part, whether their ideas are already claimed by older, broader patents. Competitors in the software industry do not benefit from published patents because the threshold for disclosure is extremely low.¹⁰⁸ Indeed, most of these potential competitors cannot even gain a foothold in the software market, since they do not possess their own portfolio of defensive patents and cannot compete (or cross-license) on equal footing with the technological “big boys” such as IBM, Apple and Microsoft.¹⁰⁹ In the event, limited disclosure and overbroad patents increase the costs of developing substitutes and act as a strong disincentive to competitive innovation (and also to the incumbent from improving its software product). The inevitable end result for the software industry: both the goals of static and dynamic efficiency remain unfulfilled.

Biotechnology and pharmaceutical patents

Technology has not advanced only in the digital field. In the world of biomedical research, the state of knowledge today is unprecedented; but so also is the extent and scope of patenting. Even as early as 1998, as many as 500,000 claims had been filed on gene sequences,¹¹⁰ and today the acceptance of *product* patent filings (as opposed to process patents) for merely *purified* or *isolated* substances that otherwise occur naturally in nature is the norm.¹¹¹ As had been the case with software patents, this precautionous approach by biomedical researchers – both corporations and universities alike – was the result of strategic concerns:

The patenting of genes, which through the 1990s drew more public attention, was the culmination of a business approach that had been evolving in the chemical, agricultural, seed and pharmaceutical sectors for all of the 20th century.¹¹²

It was extensive lobbying by these sectors,¹¹³ after all, that had led to the extremely broad provision in Article 27 of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) that “patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step, and are capable of industrial application.” But quite apart from the legal question of fit, does it make any economic sense in the first place for a society to tolerate patents on genes and, say, adrenalin? In the literature, the foolhardiness of this latter position is often reduced to a single rhetorical flourish: “Whose molecule is it

to block competitors, prevent lawsuits and for bargaining power in negotiations – in other words, for purposes of monopoly consolidation and rent-seeking.

¹⁰⁸ Thomas (2008) at 222.

¹⁰⁹ Boldrin and Levine (2008) at 77.

¹¹⁰ Picciotto and Campbell (2004) at 568 n 76.

¹¹¹ *Ibid.* at 568-569.

¹¹² *Ibid.* at 569.

¹¹³ See 31 (fn 69) above and 64 below for more discussion on lobbying.

anyway?”¹¹⁴ But behind the theatre lies a stark truth. Molecules, along with genes and receptors, are building blocks for not just the human body, but also nearly every biotechnological breakthrough. Were all the results of this upstream research to fall into private hands via the patent system,¹¹⁵ further downstream use and exploitation of these results would involve very large transaction costs. Consequently, the harnessing of biomedical research, for the progress of society, would take place at a sub-optimal level. What might these transaction costs be? A brief throwback to the “tragedy of the commons” is instructive. Such a tragedy occurs, we have learnt, when too many users or owners are given a privilege over a given *common* resource and no one has any right to exclude anyone else. In contrast, a resource is prone to *underuse* in a reverse scenario where multiple owners each have a right to exclude others from a limited resource and no one has any effective privileged use. In a world free of transaction costs, both these commons tragedies can be averted by the mutual trading of rights between affected parties;¹¹⁶ however, in the reality of the biomedical research industry, the trading of rights is an extremely complicated and socially wasteful process.

Take, for example, genes. All through the 1980s, patents on genes generally corresponded to likely eventual commercial products, such as therapeutic proteins or diagnostic tests for genetic diseases. However, in 1991, the patenting of expressed sequence tags (ESTs)¹¹⁷ paved the way for the patenting of gene *fragments*. Since then, many private firms have taken out patent applications on newly identified DNA sequences, including gene fragments, before identifying a corresponding potentially commercializable product.

The problem with the patenting of gene fragments is that any useful commercial biotechnological product is likely to require the use of *multiple* fragments in its development. A deluge of patents on individual fragments held by *different* rightholders will require costly transactions to gather the requisite licenses together before any effective development of a biotechnological product may take place. Worse, the considerable delay between patent filing and issuance means that during the pendency period, there will inevitably be uncertainty as to the scope of the many eventual biotechnological patents (if it is even granted at all), given the extreme novelty of the collective subject matter. The license-gathering transactions being usually entered into *before* the issuance of any patent,¹¹⁸ each potential patent therefore effectively creates a penumbral zone around the eventual rights that may eventually issue, promising more

¹¹⁴ *Ibid.* at 547.

¹¹⁵ Indeed, even government-sponsored academic research is *encouraged* by the American Congress to become patented, with the result that American taxpayers’ money is being used to sponsor private patents for subsequent monopoly profits! See Michael A. Heller and Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 *SCIENCE* 698 (1998) at 698.

¹¹⁶ *Ibid.* at 698.

¹¹⁷ An EST is a tiny portion of an entire gene that can be used to help identify unknown genes and to map their positions within a genome. A genome is all of a particular organism’s hereditary information.

¹¹⁸ Biotechnology firms raise capital on the basis of the *inchoate* rights preserved by pending patents.

than they might actually deliver. This distortion leads to distorted risk calculations on the part of biotechnology investors, who might end up investing more than is socially optimal in the complicated web of overlapping, yet inchoate patent licenses.

To make matters even direr, there are myriad sources of other transaction costs that should be borne in mind. In the first place, it should be noted that many upstream patent owners (e.g. of gene fragments) are public and academic institutions with limited resources and experience to grapple with market-oriented bargaining. The various patent rights involved also cover an extremely diverse set of reagents, techniques and DNA sequences, making any comparison of value between patents difficult. As a result of this difficulty, it is unlikely that a standard licensing and distribution scheme for patents, as has taken root in the music industry for copyright with copyright collectives,¹¹⁹ is likely to evolve in the biomedical context. Accordingly, costly case-by-case negotiations will have to be tolerated by the industry and society at large.

In addition, this heterogeneity of rights between public and private patent owners reflects a broader heterogeneity of interests: research institutions sponsored by government funding might want to utilise patent rights to ensure widespread availability of new therapeutic products at reasonable prices, while the private pharmaceutical firm is more likely than not to use patents to maintain lucrative product monopolies that reward investors, who in turn can fund future product development.¹²⁰ In the same way, a rightholder who has as its main goal the development of biotechnological end-products may think that making patented resources broadly available on a nonexclusive basis would be the best strategy going forward, while another rightholder who wants to obtain more upstream funding would be more concerned with offering exclusive licenses to potential sponsors. When multiple sides with conflicting agendas *can* deploy their respective patent rights to block the strategies of one another, they may be unable to reach a satisfactory agreement that would leave sufficient value for downstream developers to bring actual products to the market. The loser, in the end, is society.¹²¹

Even where biotechnological research manages to result in a proper end-product, say a life-enhancing pharmaceutical drug, one final question of utilitarian economics remains. We take as our example antiretroviral drugs: drugs that do not cure HIV or AIDS, but instead allow people afflicted with the illnesses the possibility of living normal lives. Some of these drugs are under patent, some have their patents expiring soon and a few are already in the public domain. Because big pharmaceutical firms are monopolists with respect to the antiretroviral drugs that are still under patent, they can afford to *price discriminate*: that is, they can extract a higher price from those who value the product more highly. HIV/AIDS sufferers in the developed world, therefore, pay more per pill than their developing world counterparts. Theoretically, this is a desirable state of affairs,

¹¹⁹ For example, the *American Society of Composers, Authors and Publishers* (ASCAP) and Broadcast Music Incorporated (BMI).

¹²⁰ *Ibid.* at 700.

¹²¹ *Ibid.* at 698.

economically and morally:¹²² the monopolist captures the first world consumer surplus (the value over the price that some consumers would have been willing to pay for the drug) without restricting access to poorer and needy patients in the third world.

But the reality of price discrimination is not so neat. In a nutshell, pharmaceutical companies do not sell to developing countries at a significant discount because they are afraid that a *parallel import market*, reselling the cheap third world drugs in first world markets, will deprive them of their monopoly profits. This despite the fact that there would be profits to be made anyway by selling cheaply (but above marginal cost) in both markets.¹²³ Utilitarianism thus meets humanism: does the incentive-access balance struck with respect to antiretroviral drugs properly take into account the results and necessary externalities that come from HIV/AIDS-infected people not having access to those drugs?

¹²⁴ Over and above market inefficiencies, in both the short- and long-term, surely there is nothing more valuable and worthy of preservation than a human life. First-mover firms decry generic pharmaceutical firms (that take on the manufacture and sale of drugs on the cheap once the patents on those drugs have expired) as “free riders” on the global public good of drug innovation,¹²⁵ but this objection is curious: would these firms prefer the blood of dying Africans on their hands?

Indeed, while the introduction of generic drug manufacturers has forced incumbent pharmaceutical firms to lower the prices of their originals,¹²⁶ much of this has been contingent, market-specific activity rather than any genuine welfare economics epiphanies.¹²⁷ For now at least, therefore, it appears that the typical pharmaceutical firm would still prefer to withhold access to the needy in favour of rents from the rich.

Digital content and copyright

Every major content industry, from film to software to books, has been impacted significantly by the rise of the Internet. Most have embraced the digital realm, viewing the World Wide Web as a unique opportunity for increased advertising, distribution and ultimately sales. The music industry, thus far, has been the proverbial “canary in the coal mine”, thanks to the standardised MP3 format and the comfortable file sizes concerned; however, even films will eventually come to be compressible into manageable file sizes

¹²² See generally Anna Lanoszka, *The Global Politics of Intellectual Property Rights and Pharmaceutical Drug Policies in Developing Countries*, 24 INT. POLIT. SCI. REV. 181 (2003).

¹²³ Incidentally, the US pharmaceutical industry has been on top of the list of the most profitable sectors in the US economy for almost two decades, never dropping below third place. This is an accomplishment unmatched by any other manufacturing sector. See Boldrin and Levine (2008) at 226.

¹²⁴ Kenneth C. Shadlen, *The Political Economy of AIDS Treatment: Intellectual Property and Transformation of Generic Supply*, 51 Int. Stud. Q. 559 (2007) at 577.

¹²⁵ *Ibid.* at 577.

¹²⁶ *Ibid.* at 564.

¹²⁷ When one considers the simple fact that, on average, firms in the pharmaceutical industry spend twice on marketing what they do on the research and development of new drugs despite claims of threatened margins, it is clear where the priorities of the industry lie. See Boldrin and Levine (2008) at 226.

(or transferred at extremely high speeds),¹²⁸ while electronic books will without question evolve steadily toward more reader-friendly formats.

In this era of connectivity, the roles of the publisher and distributor have largely been usurped by the digital phenomenon. With copyrighted works no longer requiring fixation to enable effective consumption, the publisher has been made somewhat redundant. Mass diffusion of copyrighted content has also come to be possible without distributory intermediaries, and direct author-to-consumer and even consumer-to-consumer dissemination is increasingly the reality today. If the high fixed costs of production that once partially justified the copyright system no longer exist, it would appear that the case for the maintenance of copyright in its present incarnation is weakened, in at least one respect.

High fixed costs of production aside, the information revolution has also sunk its teeth, albeit with less success, into the second limb of the *raison d'etre* for copyright: the free-rider problem. Previously, copyright – as with the case with patents – circumvented the free-rider problem by granting distributors monopoly rights to reproduce and distribute works. Distributors were hence willing to invest in capital equipment to produce and distribute works as they had the incentive of monopoly profits to spur them. It may be contended, however, that free-riding, understood as the non-payment for the use of a non-excludable resource, no longer takes place in the digital age. Copying and distribution costs are internalized by the public when they purchase the tools necessary for connecting to the World Wide Web. By paying for computers, Internet access and electricity, consumers come to bear the costs of digital distribution. With the previously high fixed costs being shifted to consumers to be borne as low fixed costs (since computers are inexpensive relative to traditional capital equipment¹²⁹), the consumer can no longer be legitimately labelled a “free-rider”. Distribution costs, which were once borne by a conglomerate of big firms, are now spread more or less uniformly across an entire population of “paying riders”.

An obvious caveat here is that while the consumer no longer pays nothing for something, his payment is to the wrong parties. It is the technology industries, rather than the content industries, that will ultimately benefit from the consumer’s expenditure. The author of the work is not rewarded, and hence there is no incentive for future production.¹³⁰ A possible

¹²⁸ Indeed, Samsung has recently claimed technology that can deliver wireless mobile speeds of up to 5G, meaning ultra-high-definition movies can soon be downloaded within seconds – or better yet, streamed on the go. See Nigam Arora, *Samsung’s New 5G Breakthrough Points to Long Term Risks for Apple* (13 May 2013), available at <http://www.forbes.com/sites/nigamarora/2013/05/13/samsungs-new-5g-breakthrough-points-to-long-term-risks-for-apple/> (last accessed 20 June 2013).

¹²⁹ For instance, printing presses, CD stamps and delivery trucks. See Rothenbuhler and Streck (1998) at 199, 213-215 (discussing barriers to entry in the record industry).

¹³⁰ This argument, however, assumes that creators *are* indeed sufficiently rewarded under the current copyright regime. This, however, might well not be the case. As any casual observer of the music industry will know, the vast majority of artists earn very little, with a few elite (and heavily promoted) “superstars” earning the bulk of the money.

way of getting around this problem is through the use of reallocative taxes and subsidies, to divert income from the former industry to the latter.

Such a reallocative mechanism, however, would not be without problems. When I pay for a computer, I am not strictly paying *only* for access to digital goods; I am also paying for the computer's multifarious other functions. Insofar as this is true for all consumers, then, their payments only reflect a fraction of their actual valuation of digital access to intellectual works. Even with redirected earnings, then, content industries will be unable to appropriate full rents from works, and sufficient incentives for future production will not be secured. Furthermore, in a more fundamental sense, in what way can the payment for a computer equate to that for an intellectual work? There is a difference between paying for something that *facilitates* access to the work and paying for something that *is* the work, a difference that will be difficult to capture absolutely with reallocative mechanisms, however accurate they might prove to be.¹³¹ The price on a modem I buy will never represent correctly my valuation of the future stream of potentially downloadable works.

A rejoinder to this might be that in the information age, tools for access to digital works and the works themselves become so intertwined that it is all but impossible to separate the two. It could conceivably be argued that without the computer, there is no separate, independent work to speak of. Put another way, it is all a matter of degree; just as we do not shunt revenue from chair industries to content industries (the connecting link between chairs to sit on while reading books being very weak), we *should* pass on earnings from technology industries to content industries (the connecting link between computers to play MP3 files over being very strong).

In any case, it is clear that the economic rationale underlying copyright law today has been considerably shaken. Of course, the effects of digital technology on different content industries have been uneven. Books and music, which often can be produced by a single individual with the proper equipment and expertise, stand to benefit most from the digital revolution in terms of the production and distribution of works. By contrast, films, particularly those of the blockbuster variety, still remain large-scale collaborative works requiring the skilled combination of human, industry and financial capital. Digital technology might help in the final stage of film delivery to consumers, but apart from that the fundamentals of making a movie remain the same. In the same way that a "one-size-fits-all" approach to intellectual property might not do justice to the discrete patent, copyright and trademark doctrines involved, therefore, a "one-size-fits-all" approach to copyright might also not do justice to the variety of works available.

Extreme opponents of copyright would claim that there is no longer a need for it, since publishers and distributors, being redundant in the digital age, do not warrant any further

¹³¹ See Alfred C. Yen, *The Legacy of Feist: Consequences of the Weak Connection Between Copyright and the Economics of Public Goods*, 52 OHIO S.L.J. 1343 (1991) at 1367 ("[a]lthough economic theory suggests that each person should pay a tax equal to the amount she is willing to pay for access to the public good, measuring that amount is extremely difficult").

protection.¹³² Indeed, to take the music industry as an example, the position does not appear too far-fetched. Out of the US\$17 one pays for the average audio compact disc, only 83 cents finds its way into the pockets of the artist in question. The rest ends up with the retailer and the record label.¹³³ Sometimes, even sales of five hundred thousand copies of an album earn the artist no royalties.¹³⁴ Given that only a very small percentage of records sell a million or more copies (“going platinum”), it is no surprise that the current structure of the music industry serves only the interests of a few, all things considered. The truth is that the vast majority of artists do not make any money from album sales.¹³⁵ Insofar as the incentivization of *creators* is desirable, therefore, the case for preserving the existing structure of the music industry becomes diluted. Further, only a tiny percentage of music that is written is actually produced and distributed by record labels. As monopolists, it is in the labels’ best interest to control the production and distribution of music,¹³⁶ allowing them to earn large profits from the undersupply of music. As such, less than 1% of music ever written is distributed by the record labels.¹³⁷ This empirical fact militates against the “incentive” arguments put forward by the music industry. A 99% failure rate for prospective artists means that the opportunity cost of their time is very small. Consequently, it is hardly the case that monopoly rights are needed, or even suitable, to compensate the successful artists. As it stands, then, the existing configuration of the music industry appears to reward only a fraction of those who engage in creative effort – the “superstars”, if you will. In taking for granted the primacy of profits stemming from the record labels’ monopoly rights – as had been the case with patents and pharmaceutical firms – the current copyright structure

¹³² See, for instance, Joel R. Reidenberg, *Lex Informatica: The Formulation of Information Policy Rulesthrough Technology*, 76 TEXAS L. REV. 553 (1998) (arguing for an entire new set of rules in place of copyright, based on the state of the art in technology and set by software engineers).

¹³³ Moses Avalon, *Confessions of a Record Producer* (Milwaukee, WI: Backbeat Books, 2002) at 147.

¹³⁴ Shih (2002) at 308.

¹³⁵ Live performances tend to be the main source of income for artists. See generally John Perry Barlow, *The Economy of Ideas: A Framework for Patents and Copyrights in the Digital Age* (1994), available at http://www.wired.com/wired/archive/2.03/economy.ideas_pr.html (last accessed 20 June 2013).

¹³⁶ See Teramoto Shinto, *Protect Network Neutrality against Intellectual Property Rights: A Legal and Social Network Perspective*, 42 INTERNATIONAL PROCEEDINGS OF ECONOMICS DEVELOPMENT AND RESEARCH 7 (2012) at 10: “In reality, we often see a star network, of which the hub is an enterprise (a publisher, a record label, a film distribution company, etc.) which distributes goods or services implementing creative works ... [H]ub actors are not usually neutral because they choose works that are likely to give them profit. There is probably a certain degree of difference between choice by respective hub actors. Still, however, many creative works are neglected.” Social network theory provides further evidence that the record label distribution model is being rightly replaced by peer network distribution. For a detailed background on social network theory as applied to intellectual property law, see Teramoto Shinto and Paulius Jurcys, *Intermediaries, Networks, and Efficiency of Communication: A Social Network Perspective* (May 29, 2013) in Mark Fenwick, Steven van Uytsel and Steven Wrbka, (eds.), *Networked Governance, Transnational Business and the Law* (Springer, 2013), available at SSRN: <http://ssrn.com/abstract=2270254> (last accessed 20 June 2013).

¹³⁷ See Michele Boldrin and David K. Levine, *Why Napster is Right* (2000), available at <http://www.dklevine.com/general/intellectual/napster.htm> (last accessed 20 June 2013).

also restricts the variety and quantity of music actually produced. These trends look set to continue at great cost to society. There remains, therefore, very little to recommend the preservation of the *status quo*, and even less to justify heeding the music industry's ever-present calls for more extensive copyright laws. The digital age has brought with it both the rationale and potential for reform, and it is submitted that the opportunity be seized with an eye on the artist, not the record label. Otherwise, copyright law will simply be left "further behind [and] more profoundly confused" in the information era.¹³⁸

Trademarks on the Internet

Previously, it was discussed that trademarks are different from their intellectual property brethren because, according to traditional economic theory, they do not concern the supply of informational goods that require incentivization.¹³⁹ Trademarks come into existence quite naturally simply because of the good that accrues to their creators: reputation and goodwill. By establishing their brand, trademark owners are still behaving as rational, profit-maximizing actors. There is no public good element that invites government intervention in the form of pseudo-privatization measures; instead, the trademark is seen as a wholly private good, comprising (and being completely accounted for as) an important part of private firms' business strategy.

This analysis, however, is incomplete. Much of the economic trademark literature only sees the trademark device as representing the rightholders' *proprietary interest*, *viz.*, the use of the device as a private mark *per se* in order to indicate a link between that mark and a product or service.¹⁴⁰ They do not consider the *referential* use of the mark: where the various members of society use the mark to refer to the products or services represented by the mark or to distinguish those products or services from others. In the same way that a music aficionado may search for particular types of songs by employing the name of a representative band from that genre of music, so too might a cereal lover search for a particular kind of cereal by utilising the name of a particularly famous cereal of that variety. So I might type "JAWBONE Underwater MP3 Player" into my search engine box, but this does not necessarily indicate that I am bent on looking for JAWBONE products alone – indeed I might be more than happy to buy a cheaper but slightly less branded alternative that I come across on another online store.

The referential role of trademarks is frequently underestimated. In going about our daily lives, we use trademarked words frequently. Nobody says "I prefer the smartphone designed by the company named after the sub-tropical fruit to the latest-generation one from the Korean company that also makes LED TVs"; instead, we say "I prefer the Apple iPhone to the Samsung Galaxy S4." This manner of usage represents the public good aspect of trademarks: the simultaneous use of a trademark by consumers referring to a source of a product or service, after all, is entirely non-rivalrous. Accordingly, since

¹³⁸ Barlow (1994).

¹³⁹ See 27-29 above.

¹⁴⁰ Barnes (2006) at 26.

trademarks possess the non-rivalrous properties of public goods in some uses (referential use) and are rivalrous in other uses (competing proprietary use),¹⁴¹ an unregulated private market would be unlikely to provide optimal incentives for not simply the production of trademarks but rather *the production of information about products and services*. This is “search information”, comprising both proprietary and referential use information. Unlike copyrights and patents, which have under their purview informational *goods*, trademarks exist primarily to supply *information*. The mark “Starbucks”, for instance, informs potential consumers of the quality of its coffee, its fair trade affiliations, its range of beverages and foods and so on and so forth. Creators of source-indicating devices and expressions, therefore, all contribute search information to the public domain. Because of the importance of the preservation of this public domain and the maintenance of the unfettered referential use of marks, a public use viewpoint on trademarks would seem to be in order.¹⁴²

The new economics of trademarks therefore appears to be this:¹⁴³ where consumers are made to pay for search information so that rightholders can make back their costs of supplying search information (i.e. advertising and marketing costs), a deadweight loss results from consumers who would have purchased the good or service in question *but for* the additional cost of search information on top of the price. As a corollary, should rightholders be prevented from charging for provision of search information, the deadweight loss from undersupply will stem from rightholders’ diminished incentive to provide search information. All of this is essentially the same static versus dynamic efficiency tension faced in both the patent and copyright fields, save that what is at stake is the production of *search information* and not informational goods.

Trademark law addresses this static-dynamic tradeoff by giving rightholders the right to preclude others from free-riding *proprietary* usage, and to sell their goods and services with the costs of search information bundled into their retail price. Inevitably, there will be *some* deadweight loss since the price of *referential* information¹⁴⁴ ought technically be zero. But overall, a reasonable balance appears have to been struck by trademark law: society benefits from greatly reduced search costs, and pays for it via the deadweight losses earlier mentioned. To date the trademark compromise has been fairly well balanced: incentives in the form of firms being able to charge (but not too much lest no one buys the attached good or service) for search information, and access in the form of reduced search costs and an ever-growing public domain of referential vocabulary and use. But then the Internet happened.

Earlier, the example of the “JAWBONE Underwater MP3 Player” Internet search string was given.¹⁴⁵ When I type this search string into my search engine dialogue box, the

¹⁴¹ For example, two firms using the exact same mark for the exact same product.

¹⁴² *Ibid.* at 30.

¹⁴³ *Ibid.* at 38-39.

¹⁴⁴ As opposed to proprietary brand information, which can take significant capital to build up.

¹⁴⁵ See 57 above.

results that show up will invariably comprise both JAWBONE and JAWBONE's competitor's products. Initially, I will be confused – which link represents the real McCoy? A few mouse clicks later, all becomes clear. There is one official JAWBONE website selling JAWBONE products directly, a few third-party resellers like Amazon and BestBuy carrying official JAWBONE products, and a few other competing retailers selling similar underwater MP3 players that, because of the way search engine algorithms are structured,¹⁴⁶ appear when the phrase “JAWBONE” is employed. But for a brief few seconds, there will be what commentators and judges have come to term “Internet initial interest confusion”: namely, where a party's conduct online *temporarily* confuses an Internet surfer about who is the source of a product or service marketed on the Internet.¹⁴⁷ This doctrine was an outgrowth of traditional “initial interest confusion”, where competitors employed similar trade dress and/or trademarks in a bid to get a “foot in the door” with potential consumers who were used to seeing the original trade dress and/or trademarks on a particular product. Unlike initial interest confusion on the Internet, however, the brick-and-mortar form of initial interest confusion was seldom invoked, with fewer than a dozen published cases in the United States before 1990.¹⁴⁸

Two forms of Internet initial interest confusion have come to dominate present-day legal discourse: metatags and domain names.¹⁴⁹ Metatags are hypertext mark-up language (HTML) code that describe a website's contents. These metatags are not visible to users surfing onto a website, but can and are parsed by search engines carrying out their core function of returning relevant results to the user. Unsurprisingly, trademarks are regularly used as metatags, with webmasters incorporating the name of a competitor's mark into the site's metatags in the hope of drawing potential consumers who are in the market for a same or similar good or service. This behavior has spurred infringement claims based on Internet initial interest confusion.¹⁵⁰

The other battle raging over Internet initial interest confusion finds its home in the domain names that identify websites. Every website on the Internet has a unique identification or Uniform Resource Locator (URL) address. Although this specific Internet Protocol (IP) is produced using numbers that are machine-friendly, it is translated into the Roman alphabet to permit ease of use by consumers. Because they are far easier to remember than numeric-string IP addresses, domain names are extremely valuable. Only one individual or firm can own one domain name at a time, in the same way that there can only be one residential unit with a particular address. Predictably, as is the case with metatags, market competitors have been known to use marks similar to

¹⁴⁶ These competitors *could* be using the phrase JAWBONE in their respective websites' metatags, but this is increasingly the exception rather than the norm. See later. See Jennifer E. Rothman, *Initial Interest Confusion: Standing at the Crossroads of Trademark Law*, 27 CARDOZO L. REV. 105 (2005) at 174.

¹⁴⁷ Barnes (2007) at 34.

¹⁴⁸ Rothman (2005) at 109.

¹⁴⁹ Michael Grynberg, *The Road Not Taken: Initial Interest Confusion, Consumer Search Costs, and the Challenge of the Internet*, 28 SEATTLE U. L. REV. 97 (2004) at 118.

¹⁵⁰ *Ibid.* at 119.

rightholders' trademarks as domain names, each hoping to divert some business away in their favour.¹⁵¹ This practice is said to cause initial interest confusion because the potential consumer thinks he will reach the trademark owner's site when he performs a typographical error or simply remembers the domain name incorrectly.

The point concerning metatags may be dealt with shortly. Increasingly, search engines do not use metatags when collating results in response to a search query.¹⁵² Search algorithms have evolved beyond this rudimentary technique and increasingly use other factors, such as the quantity and credibility of external links to a particular website for a certain words or phrases, to decide what search results to return and in what order of priority. In any case, it is submitted that trademark referential use covers the use of competitors' marks in metatags, since there is zero to little likelihood of confusion. The web-surfing potential consumer will know, upon navigating to the respective websites, exactly which product is sold where. Anything that will confuse the consumer to a significant degree will not qualify as referential use *by definition*, and so will not and should not be protected by trademark law. Ordinary non-bad-faith referential use, however, should be permitted since it promotes competition (the user is able to inform himself of what alternative products and services are available) and reduces search costs (the user is able to use the single word "JAWBONE" to seek out competing brands of underwater MP3 players, third-party products, community review sites etc.). In turn, the costs to society are minimal: indeed, over and above the fact that metatags are invisible to consumers (and so the direct passing off of a trademark holder's good or service is precluded), the reality is that it takes mere seconds to click back to a prior website or search result list, or to redirect one's browser to another website. No costly physical relocation is required.¹⁵³ Moreover, search engines usually display an excerpt from the linked page in question, reducing the likelihood of misguided clicks.¹⁵⁴

Domain names present a similar analysis, but are complicated slightly by their rivalrous nature. An analogy to telephone numbers might be apposite in the circumstances:

Guessing the wrong website is similar to misdialing a telephone number. Courts thus far have held that the adoption of similar vanity numbers in the hopes of profiting from misdialled numbers is a legitimate business practice. It is possible that if a consumer accidentally lands on the wrong site, he might settle for a competitor's product, but this is a risk

¹⁵¹ The outright use of rightholders' trademarks as domain names is governed in the United States by the Anti-Cybersquatting Consumer Protection Act, which forbids such bad faith registrations. This form of conduct is socially inefficient because the likelihood of confusion is great – a reasonable internet user would believe that the domain name and the mark in question are linked, in much the same way that no one would suspect www.nike.com as not being owned and operated by Nike. This results in significant increased search costs, while at the same time no incentives are provided to proper going concerns such as Nike from promoting and protecting accurate brand and search information.

¹⁵² Rothman (2005) at 174.

¹⁵³ Grynberg (2004) at 125.

¹⁵⁴ *Ibid.* at 125.

any time anyone walks into a store and is confronted with other purchasing options. ... There is no doubt that reasonably prudent Internet shoppers will be aware and prepared for the possibility that their guess of a domain name will send them to the wrong location. Courts have also greatly exaggerated the burdens of being led to a different website. Unlike in the brick and mortar world where one may have gone a substantial distance to get to a particular store, websurfers can quickly, in a matter of seconds, redirect their web browser away from the incorrect site.¹⁵⁵

The extract presupposes, rightly, that the outright use of rightowners' trademarks – a practice also known as “cybersquatting” – is wrong. This form of conduct by competitors at the expense of trademark holders is socially inefficient because the likelihood of confusion is great – a reasonable Internet user would believe that the domain name and the mark in question are linked, in much the same way that everyone would assume that www.nike.com is owned and operated by Nike Corporation. Cybersquatting results in significantly increased search costs, while at the same time providing no incentives to legitimate corporations (like Nike) to incentivize their promotion and protection of accurate brand and search information. Fortunately, the cybersquatting problem has been largely resolved by the Anticybersquatting Consumer Protection Act (ACPA), which prohibits bad faith domain name registrations.¹⁵⁶

In sum, internalizing the positive externalities from free access to marks for referential use is unlikely to increase the trademark holders' supply of search information. This is simple economics: once competitors are no longer permitted to use the trademark holder's mark even to reference the latter's products, the trademark holder has no further incentive to increase its production of search information in the absence of competition. Indeed, it can now sit on its monopoly, doling out minimal search information to beleaguered consumers. The purposes of trademark law are thus defeated: while the potential *dynamic* inefficiency associated with a competitor's free access to a rightholder's mark leads to insufficient incentive for trademarking activity by owners of marks, it is contrary to societal welfare to increase incentives (for example, via enforcement of the initial interest confusion doctrine) by hindering competition.

Competition is increased where search results reference alternatives to the leading trademark incumbent. This is fair competition on the merits as the trademark owner's good or service will show up in the search results as well. This fair competition results in an overall increase in consumer welfare, since the competing firms will have incentives to provide better substitute goods to follow on from the initial search exposure. So long as any confusion is dispelled by the time consumers actually purchase the goods or

¹⁵⁵ Rothman (2005) at 171-172.

¹⁵⁶ 15 U.S.C. s 1125(d).

services, consumers can be presumed to have found goods at least as desirable as the rightholders'.¹⁵⁷ There is utility gain to society in that consumers have access to more search information and, eventually, substitutes. The costs, in turn, are minimal, often not amounting to anything more than the click of a “back” button.

There will always be a tendency for courts and commentators to focus on the trademark owner’s goodwill¹⁵⁸ with respect to initial interest confusion. The ingrained instinct is to foil the usurper and to punish the free-rider:¹⁵⁹ but these, unfortunately, stem from a fundamental misunderstanding of trademark law’s goals. Trademark protection is not given for its own sake, but rather to encourage the production of useful search information and to protect and assist consumers. The correct rubric should take into account the *degree of consumer diversion* necessary in order to precipitate a legitimate initial interest confusion claim. In the age of the Internet, with browsers allowing the near-instant rectification of any potential confusion, it is submitted that actual cases of initial interest confusion will be rare. As such, while search costs may be raised slightly by initial interest confusion in a few exceptional cases, the concomitant increase in search efficacy and competition appears to be a net gain to society.

BEHAVIORAL ECONOMICS AND INTELLECTUAL PROPERTY

Thus far, this paper has concerned itself with identifying weaknesses subsisting in the disconnects between existing economic theory and the ascendant technologies that inform much of the new intellectual property. However, there remains one area of weakness that has yet to be covered: that of *new* economic theory. Specifically, the relatively novel approach of behavioral economics towards intellectual property policymaking has yielded many insights in recent years that will surely set the foundation for forthcoming academic work in the area. It should be noted, however, that even as early as 1932, the economist Lionel Robbins had already defined the discipline as “the science which studies human behavior as the relationship between ends and scarce means which have alternative uses”.¹⁶⁰ Taking as its baseline this broad definition of economics, which encompasses every human choice under the proviso of scarcity, the behavioral economics approach to intellectual property spans numerous fields (including, assumptions of rationality notwithstanding, the study of error-prone human psychology) that do not traditionally fit under the law and economics rubric.

Public choice theory

¹⁵⁷ Barnes (2007) at 35-36.

¹⁵⁸ Grynberg (2004) at 131.

¹⁵⁹ Barnes (2007) at 43. See also Mark A. Lemley and Mark P. McKenna, *Owning Mark(et)s*, 109 MICH. L. REV. 137 (2010) at 137, 187-189 (“The anti-free-riding impulse is a deep-seated one ... perhaps this results from our intuitions about land, or perhaps we have internalized the incentive stories of other, quite different IP regimes ... trademark law needs a theory of trademark injury that distinguishes harm to legitimate interests the law should protect from a mere desire to capture a benefit enjoyed by another.”).

¹⁶⁰ Lionel Robbins, *Nature and Significance of Economic Science* (UK: Macmillan, 1932) at 15.

One aspect of the new behavioral economics zeitgeist that has already been touched on briefly above is public choice theory.¹⁶¹ Put simply, public choice theory proposes that legislators and politicians are driven by self-interest and often err on the wrong side in balancing long-term ideology with the short-term concerns of re-election. Applied to intellectual property, the theory indicates that rent-seeking behavior from collective interest groups such as the RIAA, disguised as being in the public interest, motivates much of intellectual property rightholders' rhetoric in the political arena. In turn, politicians behave rationally by acceding to rightholders' requests, since they would be maximizing their personal utility in terms of campaign funding and patronage from the various deep-pocketed intellectual property industries.¹⁶² Whether or not a particular industry opts for lobbying to fulfil its ends depends in large part on whether or not there are barriers to entry in that particular industry; where entry is easy (for example, in the case of copyrights, which subsist the instant a work is created), recourse to a law making lobby is often viewed as efficacious. On the other hand, where entry barriers are extensive (as in the case of pharmaceutical patents, which are costly to research, acquire and register), the simple exercise of market power in crowding out competitors might be preferable to political rent-seeking.¹⁶³

Since intellectual property legislation, under this view, becomes the result of the *politicians'* vote rather than the vote of the *stakeholders* concerned, society's true preferences – in terms of weight and distribution – do not come to the fore in laws that are ultimately passed. As such, the normative-positive distinction discussed earlier becomes blurred: in other words, the positive analysis of intellectual property can *no longer* be in any way predicted by its normative exhortations. What this means is simple: as long as legislative intervention is required as a result of market failure, there will be no limit on the unpredictability of the *results* – good or bad – of intervention.

Cognitive biases

Apart from public choice theory, behavioral economics also introduces the idea of *cognitive bias* into the realm of intellectual property. For example, it is well documented that ostensibly rational actors nonetheless assign a higher value to property they *already own* as opposed to property they are thinking of buying. This cognitive bias is also known as the *endowment effect*,¹⁶⁴ and takes on greater force where the property in question is *created* (as in the case of intellectual property).¹⁶⁵ This is due in large part to the fact that

¹⁶¹ See 32 (fn 69) above.

¹⁶² For a more in-depth treatment of public choice theory, see generally James M. Buchanan and Gordon Tullock, *The Calculus of Consent: Logical Foundations of Constitutional Democracy* (University of Michigan Press 1962).

¹⁶³ This idea is not new. For its genesis prior to any application to intellectual property, see generally Mancur Olson, *The Logic of Collective Action* (Cambridge, MA: Harvard University Press, 1965).

¹⁶⁴ For a review of the many different types of legal property subject to this effect, see Russell Korobkin, *The Endowment Effect and Legal Analysis*, 97 NW. U. L. REV. 1227 (2003) at 1230-1242.

¹⁶⁵ See Christopher Buccafusco and Christopher Sprigman, *Valuing Intellectual Property: An Experiment*, 96 CORNELL L. REV. 1 (2010).

an item of intellectual property, over and above being merely *owned* initially by the creator, also carries with it part of the creator's mind, personality and individuality. The implications of the endowment effect are far-reaching: the inefficiency that results from the enhanced valuation asymmetry between creators and (potential) purchasers means that organizing intellectual property as a set of rights to exclude what, in the first place, is a non-rival good might lead to ever more costs on society, over and above what has already been discussed in prior sections. It has been argued that this particular cognitive bias will have great repercussions on the larger debate concerning whether intellectual property law ought to be structured around liability rules (that is, rules that permit users access to works for a fee via private contracts) rather than state-sanctioned property rules that make up the *status quo*:

If the wide disparities between Buyers' willingness to pay and Authors' and Owners' willingness to accept ... characterize a range of IP transactions, then parties seeking to license or otherwise transfer ownership of creative works will face substantial negotiation costs arising from the need to bridge these large differences in valuation. ... This should be troubling: the efficacy of rights transfer via negotiation is crucially important to IP law as it is currently structured. In both the copyright and patent contexts, initial rightsholders (usually authors in the case of copyright and inventors in patent) often are not particularly well positioned to exploit their own work. The novelist's prospects for successful commercialization of his work depend on the very different skills and resources of the publisher. The same is true of the engineer and the venture capitalist in the patent context.¹⁶⁶

Indeed, in the patent context we come to witness yet another cognitive bias that has only recently been uncovered by behavioral economics: that of how people frequently overestimate the likelihood that very low-probability events of high salience (in other words, importance or prominence) will occur.¹⁶⁷ For inventors and patent-owners, the relevant high-salience event is that of a patent becoming lucrative and profitable. Similar to how flight passengers overestimate the risk of an aeroplane crash relative to the hazards of other more pedestrian modes of transport, owners of patents, in particularly those upstream in research fields, tend also to overvalue their discoveries. A practical example is instructive:

Imagine that one of a set of 50 upstream inventions will likely be the key to identifying an important new drug, the rest of the set will have no practical use, and a downstream product developer is willing to pay \$10 million for the set. Given the assumption that no owner knows ex

¹⁶⁶ *Ibid.* at 34.

¹⁶⁷ See Heller and Eisenberg (1998) at 701.

ante which invention will be the key, a rational owner should be willing to sell her patent for the probabilistic value of \$200,000. However, if each owner overestimates the likelihood that her patent will be the key, then each will demand more than the probabilistic value, the upstream collectively will demand more than the aggregate market value of their inputs, the downstream user will decline the offers, and the new [product] will not be developed. Individuals trained in deterministic rather than probabilistic disciplines are particularly likely to succumb to this sort of error.¹⁶⁸

It is perhaps fair to say that most inventors – let alone copyright-conscious authors and trademark-conscious advertising men – do not have formal schooling in any manner of “probabilistic discipline”! It is for this reason that this and the various psychologies outlined by the behavioral economics approach, sketched briefly above, must be adopted in any future research concerning the optimization of intellectual property regulation. In an age where information is produced via communities rather than companies, where content enshrines not just price value but also personality and identity, where every piece of intellectual property is more than the sum of the different parcels of ownership of each contributor, the individual *behaviors* of content producers-cum-consumers, as well as their relationships with each other and each other’s’ content, becomes that much more important. A proper law and economics approach to intellectual property, in short, should also trace the psychology – in all of its irrational fallibility – of market participants.

CONCLUSION

In a field such as intellectual property, appeals to “fundamental principles of justice” or “inherent, basic values” are misplaced. Intellectual property is a man-made construct, throttling deliberately non-rival and non-excludable resources for the ostensible betterment of mankind. In doing so, it has conflated a disparate set of disciplines. Films involving mass collaboration, for instance, require a different form of incentivization than books and music; and biotechnology and software patents appear to require almost antithetical standards for approval.¹⁶⁹ Zooming out, we see that copyrighted works require a very different form of incentivization than trademarks. There is no “cure-all” solution, and it would be naïve to make policy along such lines.

Instead of “principles”, which are all too easy to invoke,¹⁷⁰ it is submitted that an updated economic approach to intellectual property law and lawmaking is crucial. What

¹⁶⁸ *Ibid.* See also generally Dennis D. Crouch, *The Patent Lottery: Exploiting Behavioral Economics for the Common Good*, 16 GEO. MASON L. REV. 141 (2008) for an analysis of the implications of this “lottery effect” in the patent context.

¹⁶⁹ Burk and Lemley (2002) at 1183-1184.

¹⁷⁰ This probably explains why judges prefer the principled approach, with rules and heuristics making for easy rulings. See Thomas C. Folsom, *Missing the Mark in Cyberspace: Misapplying Trademark Law to Invisible and Attenuated Uses*, 33 RUTGERS COMPUTER & TECH. L.J. 137 (2007) at 228-234, where

is at stake in all of intellectual property are monopolistic rights: the grant of these economic rights requires, first and foremost, a considered analysis of their effect on the economy. This is as true of the legislature as it is for the judge sitting in the courthouse.¹⁷¹

This paper has outlined a brief economic framework of analysis for the separate bodies of patent, copyright and trademark law. It has done this both thematically and chronologically, with two convictions remaining constant throughout. First of all, what we must all realize is that going forward into an era of rapid technological advance, the law will have to advance just as quickly, if not quicker. While it is a mistake to see technology as the problem – since many intellectual property laws were inefficient to begin with – technology does what technology is wont to do, which in this case is accelerating the exposure of the cracks in intellectual property’s theoretical foundations. The second conviction is something often taken for granted. When we speak of intellectual property, too often do we frame the discussion as one of rightholders’ entitlements. But we should not forget that:

... against intellectual property as an absolute ideal are ranged values of at least equal, if not often constitutional importance: the right of people to imitate others, to work, to compete, talk, criticize and write freely, and to nurture common cultures. The way intellectual property should be reconciled with these values – or vice versa – has changed much over time and continues to vary among countries and among legal systems. The adjustments occur for social and economic reasons; they are not preordained. Where a particular line should be drawn can certainly not be answered by circularities like “intellectual property is property” or “ownership is ownership is ownership”.¹⁷²

The irony is that although intellectual property is a regime aimed at nourishing the mind and rewarding its fruits, the general approach to intellectual property has been one where assumptions in favour of select portions of society have been unthinkingly accepted. For the sake of the true promotion of science and the arts for future generations, as countenanced by Professor Hettinger, we would do well to consider supplements and alternatives¹⁷³ to the continued state-sanctioning of non-competition, particularly in

the author talks about the “juridical capability problem” in respect of intellectual property matters in cyberspace: “Judges have less general computer and network expertise, and less information about the specifics of the technological problem in question than most computer and electronic engineers ... Under such conditions, judges will shirk, i.e., look for ways of deciding cases with minimal effort. One well-established way of doing so is to invoke shortcuts – heuristic problem solving decision making processes.”

¹⁷¹ Indeed, initial interest confusion was a judge-made doctrine, originating from the case of *Grotian, Helfferich, Schulz, Th. Steinweg Nachf. v. Steinway & Sons* 523 F.2d 1331 (2d Cir. 1975) concerning the infringement of the Steinway mark for pianos.

¹⁷² Vaver (2006) at 5.

¹⁷³ These include, *inter alia*, open-software standards initiatives, the reduction of pharmaceutical drug patent terms, a shift from a copyright-reliant intermediary model to self-publication and the complete

industries where the new economic characteristics of informational goods no longer dictate the ostensible necessity of monopoly. We would also be well-advised not to ignore the fact that before they became *homo economicus*, human beings were first and foremost *human*, subject to biases and psychologically irrational tendencies. These tendencies, manifested not just by rightsholders but also lawmakers, have led to a strong disconnect between normative intellectual property recommendations and positive intellectual property laws that are actually realized.

Nevertheless, it is this article's firm conviction that for as long as the fundamental economic assumption – that existing intellectual property frameworks should exist only to the extent to which they are more efficient, both in *theory* and in *implementation*, than alternative systems at incentivizing the production of informational goods – is firmly borne in the back of our minds, the future of intellectual property law, truly for the good of all mankind, will be as bright as the ideas it seeks to cultivate.

disavowal of the initial interest confusion doctrine for trademarks on the internet. While beyond the scope of this paper, a comprehensive catalogue of possible reforms to the existing intellectual property framework can be found at the Electronic Frontier Foundation (<http://www.eff.org>) and its sub-project Defend Innovation (<http://defendinnovation.org>). See also generally Graham Dutfield, *A Rights-Free World – Is it Workable, and What is the Point?*, in Charlotte Waelde and Hector MacQueen (eds.), *Intellectual Property: The Many Faces of the Public Domain* (Cheltenham: Edward Elgar, 2007).