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**The L&E of Intellectual Property – Do we get
maximum innovation with the current regime?**

Ejan Mackaay

Série Scientifique/Scientific Series



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The L&E of Intellectual Property – Do we get maximum innovation with the current regime?

*Ejan Mackaay**

Abstract

Innovation is crucial to economic growth – the essential path for lifting much of the world population out of dire poverty and for maintaining the living standard of those who already have. To stimulate innovation, the legal system has to support the means through which innovators seek to get rewarded for their efforts and risks taken. Amongst these means, some, such as the first mover advantage or 'lead time,' are not directly legal; but secrets and intellectual property rights are legal institutions supported for the specific purpose of stimulating innovation. Whilst the protection of secrets has not changed very much over recent years, intellectual property (or IP) has. IP borrows some features from ordinary property rights, but is also distinct, in that, unlike physical goods, information, the object of IP, is not inherently scarce; indeed as information and communication technologies expand, the creation and distribution of information is becoming ever cheaper and in many circumstances abundant, so that selection is of the essence ('on the internet, point of view is everything'). New information builds on already existing information. Where rights on information extend too far, their monopolising effect may hamper innovation.

The paper investigates the underlying structure of IP rights and surveys what we know empirically about the incentive effects of IP as about industries that flourish without formal IP.

Keywords: intellectual property – copyright – innovation

Résumé

L'innovation est essentielle à la croissance économique, elle-même la voie obligée pour faire sortir une grande partie de la population mondiale de la misère et pour maintenir le niveau de vie des personnes qui en sont déjà sorties. Pour stimuler l'innovation, le système juridique doit soutenir les moyens par lesquels les innovateurs cherchent rémunération de leurs efforts et des risques pris. Parmi ceux-ci, certains comme l'« avance de départ » ne sont pas directement juridiques; mais le secret commercial et la propriété intellectuelle sont des institutions juridiques soutenues dans le but précis de stimuler l'innovation. Alors que la protection des secrets n'a pas beaucoup évolué au cours des ans, la propriété intellectuelle (PI) l'a bien. La propriété intellectuelle emprunte certains traits de la propriété classique des biens matériels, mais est aussi distincte, en ce que, contrairement aux biens matériels, l'information – l'objet de la PI – n'est pas par nature rare ; en fait, à mesure que les technologies de l'information et des communications s'étendent, la création et la distribution de l'information devient toujours moins chère. Dans certains cas, l'information devient même abondante à telle enseigne que la sélection est essentielle ('on the internet, point of view is everything'). L'information nouvelle s'appuie sur de l'information déjà disponible. Là où les droits sur l'information, et notamment la PI, s'étendent trop loin, leurs effets monopolisateurs risquent d'interférer avec l'innovation.

Le texte examine la structure sous-jacente des droits de propriété intellectuelle et fait un survol de ce que nous savons de manière « empirique » sur les effets incitatifs de la PI de même que des industries qui prospèrent sans droit de propriété intellectuelle formel.

Mots-clés : propriété intellectuelle, droit d'auteur, innovation

Codes JEL/JEL Codes : K00, K29, L17, O31, O34

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The L&E of Intellectual Property

– Do we get maximum innovation with the current regime?

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Abstract	2
Introduction	4
I Intellectual property rights – economic theory	5
II Intellectual property rights – empirics	10
A <i>Starting up intellectual property rights</i>	10
B <i>IP as an unfair lottery – the pot of gold logic</i>	12
C <i>Industries with differing degrees of IP protection</i>	13
1 <i>Industries with only minimal protection</i>	13
2 <i>The fashion industry – without IP protection</i>	18
3 <i>The music industry - drying up from piracy?</i>	19
D <i>Too much IP</i>	23
1 <i>Reduced or redirected innovation</i>	23
2 <i>Impeded access</i>	24
3 <i>Reduced effort</i>	25
Conclusion	25
Bibliography	26

Introduction

Innovation is crucial to economic growth, itself the essential path for lifting much of the world population out of dire poverty and for maintaining the living standard of those who already are. To realise just how important innovation is by comparison to fine-tuning the economy for efficiency, consider this question by Robert Cooter at the beginning of his recent book on law and development:

What do you think was more important for improving agricultural productivity, finding ways of using horses more efficiently or inventing the tractor?

His answer is:

"A better allocation of horses for ploughing the fields increases agricultural production marginally, whereas inventing the tractor caused a jump in production."¹

Many innovations have been realised by private actors in the course of the ordinary activities, driven by the sole prospect of improving their own productivity. As the more obvious innovations were discovered and implemented, further ones required more sustained effort, but could be useful to a great number of actors. As a thought experiment, one could imagine the latter banding together and contributing part of their prospective gains from a potential innovation to pay possible innovators to focus their efforts on discovering it and then sharing it. All of society would be better off. Innovation required special stimuli.

In the course of history, a whole range of institutions have been deployed to create such stimuli: employment contracts, pensions and annuities, grants, scholarships, sponsoring, lotteries, awards, medals and other honours, tax incentives, monopolies, procurement contracts (for military inventions in particular) and intellectual property rights (IP).² There is also secrecy and confidentiality, which give titleholders exclusive access to information and possibly allow them to share it selectively through contract. Moreover, the time required to establish a new way of producing a product gives a head start to the persons who got the idea first so that they can make the invention pay off before being imitated by competitors. This is known as the *first mover advantage*.

Each of these methods has strengths and weaknesses – none of them is

¹ Cooter 2014.

² Mokyr 1990, 177.

perfect, but it would be a mistake to think we could do without. Current wisdom has it that intellectual property generally outperforms the other institutions as a stimulus for invention and innovation.³ One may wonder whether we know this to be true empirically. In the affirmative, we may wonder furthermore whether that remains true as we extend the reach of intellectual property rights, which is what we have been doing over the past half century. To examine these questions, we look at economic theory regarding intellectual property (I), then at what empirical studies can tell about its critical aspects (II).

I Intellectual property rights – economic theory

Economics looks at rules through the incentives they create for individuals to prefer certain courses of action over others. A person made to face the prospect of liability in damages for negligent behaviour may be expected to react by being more careful. For any given rule, economics focuses on its foreseeable social effects. It judges rules by those social effects.

The technique used in intellectual property rights to create the incentive effect for creative effort is to set up an individual right in an "information structure" embodied in the creation. Intellectual property rights here borrow some of the logic of property rights in physical objects. Property rights in a physical object arise when the object becomes scarce in the sense that a newly invented use makes us realise that it can be used for different, incompatible purposes. The property right is one technique of solving the disputes or even conflicts that may arise over which of the incompatible uses should prevail. It has the virtue of being entirely decentralised and of incorporating an automatic feedback mechanism: the owner decides how to use the object and is informed on the quality of the choice made by the returns or losses flowing from such use. Where the right is transferable, a market for it may develop and this will tend to reinforce the feedback mechanism and move objects into the hands of those who make the most profitable use of them.⁴

But there is a problem with the transposition of property rights logic to information structures in intellectual property rights: unlike material objects, information is not naturally scarce; it can normally be used by multiple users all

³ See for instance Gallini 2002, 51-78.

⁴ See generally Mackaay 2013, 232-298.

at once without the original form losing its value. Often it can be reproduced at little or no cost. Indeed as information and communication technologies expand, the creation and distribution of information is becoming ever cheaper and in many circumstances abundant, so that selection, rather than access, is of the essence ('on the internet, point of view is everything'). Furthermore, most creations build on earlier creations: information "cumulates" and so access to information is essential for creating new information (invention). Where rights on information extend too far, their monopolising effect starts to dominate, which may hamper innovation. These "public goods" characteristics cause problems for the creation of rights and lead one to wonder whether property rights are desirable at all and if so, how to ensure that their object can effectively be reserved to the titleholder.

As regards the first question, whilst information itself is not naturally scarce in the economic sense of the term, human talent to create it may well be. Where particular forms of creation are not a natural by-product of ordinary human activity undertaken for other reasons, but require particular talents to be directed to producing them, there may be a point to setting up legal institutions that create special incentives to that effect. To put it differently, human talent is scarce and hence triggers the creation of forms of property rights to direct it to its most productive deployment.

If we go for individual rights as incentive structures, we face the challenge of reserving – by legal fiat – the informational object to the titleholder – a condition for any property right. For physical goods, whose consumption by one person prevents consumption by another, control over usage is ensured by some form of "fence" that shuts out anyone but the title holders and persons admitted by them. Fences can take a variety of forms: ditches, locks, armoured doors, electronic registration for software that triggers automatic updating, contractual schemes, etc.⁵ Where no effective fence can be put in place, the objects in question risk being left in open access and hence over-consumed and under-produced, as the examples of fish in the open sea and unpolluted air illustrate. This risk is known as the "tragedy of the commons" following Hardin's article of that title.⁶

For information goods, "fences" are more difficult to put in place because of their "public good" character. Once you share an information good with someone

⁵ Mackaay 2013, 239f.

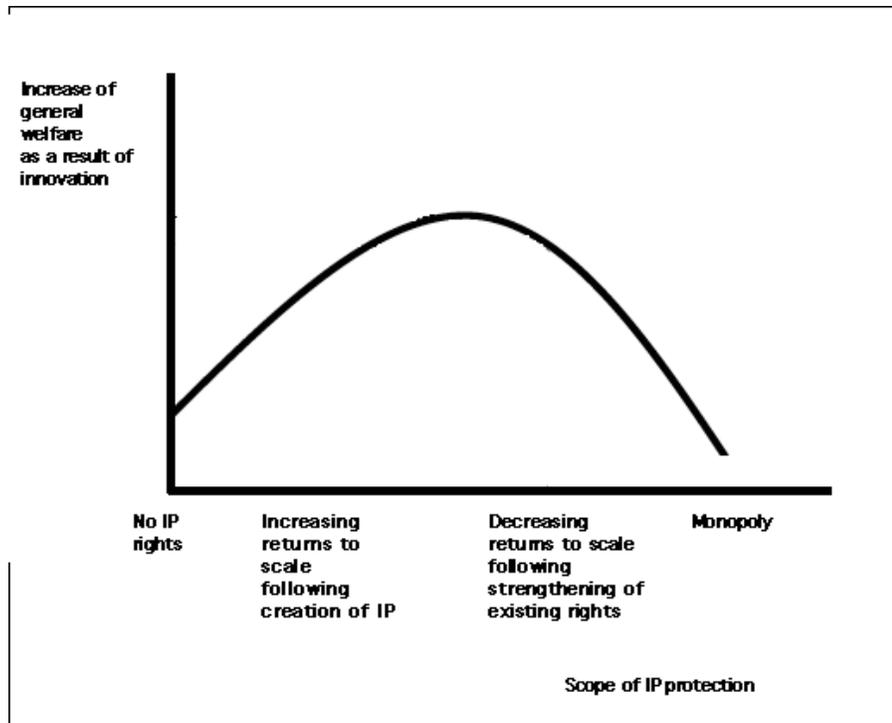
⁶ Hardin 1968.

else, there is little to stop it from spreading to third persons: copying it is becoming ever cheaper and does not deprive the original holder of use. Besides the danger of consumers free riding, one must also expect competitors to copy the good and bring to market a lower-priced version of it competing with the original, thus undermining the client base of the original creator. The two effects combine to lead to a risk of shortfall in revenue and hence to a reduced incentive to create: talents would tend to be directed elsewhere. For this reason it is felt that the law needs to step in to shore up the fences as required to create an exclusive right for the original creator and so to ensure that more creative work will be forthcoming.

To the extent that fences are successful, they restrict the possibility for others to build on existing works for follow-on creation and this tends to slow welfare growth. To judge a particular intellectual property regime one has to know the composite effect of these two opposite forces: that of stimulating (rewarding) creators whose creations are now visible and that of restricting access for creators whose creations are yet to come. We should like to set this trade-off so as to maximise overall creativity in society in the longer run. As regards this trade-off, we are fairly confident that the relationship has the general shape of an inverted U-curve displayed in Diagram 1.

Diagram 1 Relationship between the strength of intellectual property and the increase of general welfare (as mediated by the level of innovation) (IP trade-off curve)⁷

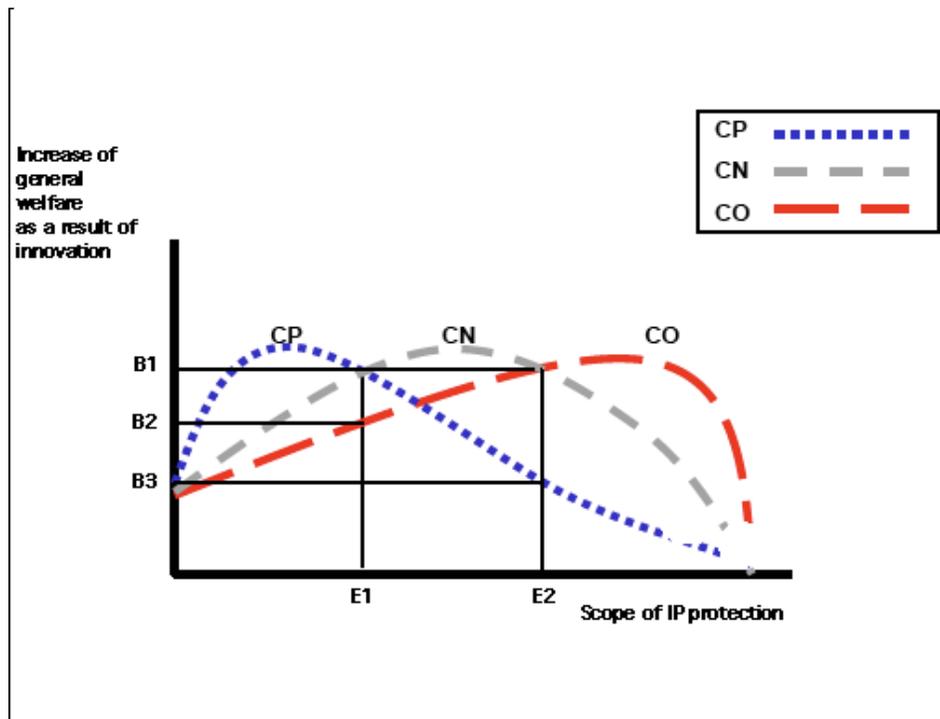
⁷ This presentation draws on Sag 2006, fig. 1 and 3, and on Valkonen 2006.



In the absence of formal protection of intellectual property, interested persons can still secure their creation by keeping it secret and insisting on confidentiality agreements when giving access to it, or relying on informal forms of protection. So the left hand side of the graph does not start at the horizontal axis. When formal IP protection is weak, strengthening it should have the effect of improving overall creativity in society. Beyond a certain point, however, strengthening it further will reduce overall creativity as the monopolising effect of the rights crowds out follow-on innovation.

Whilst we may feel confident that the relationship has the form of an inverted U, we do not know how to "measure the curve", and hence cannot yet ascertain in practice where the optimum lies. To illustrate what this means, consider Diagram 2.

Diagram 2 Optimistic and pessimistic views of the relationship between the strength of intellectual property and the increase of general welfare (as mediated by the level of innovation)



The grey curve (CN) is the same we used in Diagram 1. An optimistic view of current intellectual property rights (CO; the red curve) might hold that present protection is still below what would be optimal and hence that, if we are currently at E1, further strengthening (moving from E1 to E2, for instance) would enhance economic welfare. It appears to correspond to the view generally expounded by the cultural industries. The opposite, pessimistic view (CP) is represented by the blue curve. It holds that at point E1, copyright is extended beyond what is socially optimal and that moving from E1 to E2 would reduce overall welfare. By contrast, tightening (moving to the left of E1) the criteria for eligibility for intellectual property rights (and hence leaving more work ineligible for it and in the public domain) would enhance economic welfare.

So far no one has succeeded in reliably establishing the form of the IP trade-off curve. We now review the empirical studies that are available on aspects of that trade-off.

II Intellectual property rights – empirics

A *Starting up intellectual property rights*

Some empirical support for the inverted U-shape curve may be found in Lerner's survey of patenting over a 150-year period.⁸ Lerner uses as dependent variable the number of patents taken out and relates this to the scope of the legislation protecting patents, as the explanatory variable. He finds that where the protection is weak, legal changes strengthening it will lead to more patents being taken out (the left side of the curve in Diagram 1); where protection is already strong (middle of the curve), further strengthening it will have little or no effect.

Scherer has carried out an original study on how the creation of music was funded in the 18th and 19th centuries, when the first legislation on copyright appeared. It was a period during which musicians and composers went from being employees of courts and churches to becoming more like free agents, who were hired for performances and for short-term contracts. Scherer identifies 646 composers born between 1650 and 1849, and on whom there is enough information for research purposes.⁹ One of the fascinating observations in his study concerns the number of composers per million inhabitants during the 18th century. That was the century at the beginning of which, in 1710, England legislated copyright, but the rest of Europe had not. One might have expected an increase in the number of individuals choosing to become composers in the period after England adopted copyright legislation, and more composers in England than in countries where copyright was not formally protected. Yet, when he compared 1700–1752 with 1767–1849, Scherer found the opposite. In the first period, the United Kingdom had proportionately fewer composers than Germany, Austria and Italy, and this was still the case during the second period. The ratio of the second period to the first was around 40 per cent, whereas in both Italy and Germany it was 73 per cent and in Austria even 95 per cent. The thesis that copyright protection has an incentive effect is in no way supported by these observations!¹⁰

⁸ Lerner 2002.

⁹ Scherer 2004a, 7.

¹⁰ Scherer 2004a, 195–196.

In a recent study Moser and a colleague look at the creation and performance of operas in Italian states between 1780 and 1821, comparing those that introduced copyright during Napoleonic occupation, to those that did not.¹¹ They find that the copyright states had more and better opera than the others and that composers born elsewhere moved to those states. This would tend to support the thesis that where no formal protection for musical creations existed, the introduction of copyright has initially a stimulating effect.

In different work, Moser looked at the stimulating role of patents.¹² She studied world trade fairs between 1851 and 1915: the Crystal Palace Exhibition in London in 1851, the Centennial Exhibition in Philadelphia in 1876, the World's Columbian Exposition in Chicago in 1893, and the Panama-Pacific International Exposition in San Francisco in 1915. Her objective was to determine whether the availability of patent protection stimulated inventiveness in terms of participation and prize winning at these fairs. What she found is that countries where, as in the Netherlands and Switzerland, no patent protection existed delegated more than their proportional share of exhibitors to the conference and won more than their proportional share of the prizes. But these countries focused on inventions where protection by means other than patent could be reasonably effective, in particular scientific instruments and food processing.¹³

In her 2013 study, she adds: "Advances in scientific analysis, which lowered the effectiveness of secrecy, increased inventors' dependency on patents."¹⁴ This suggests that where initially first mover advantage and trade secret were sufficient to ensure revenues to inventors, given the difficulty of reverse engineering, that advantage disappeared as scientific knowledge advanced, in particular in chemical analysis, which severely tilted the balance between the time needed to develop a new product and that required to reverse engineer it and bring it to market in competition with the inventor. This would drive inventors to patent. But Moser adds, pessimistically: "Overall, the weight of the existing historical evidence suggests that patent policies, which grant strong intellectual property rights to early generations of inventors, may discourage innovation. On the contrary, policies, which encourage the diffusion of ideas, and modify patent laws to facilitate entry and encourage competition, may be an effective

¹¹ Giorcelli 2014.

¹² Moser 2005; 2012; 2013.

¹³ Moser 2005.

¹⁴ Moser 2013, 20.

mechanism to encourage innovation. Carefully executed historical analyses can help to shed further light on these pressing issues of patent policy."¹⁵

B IP as an unfair lottery – the pot of gold logic

Inventing and innovating is a highly uncertain business: the reward available depends on the success of the invention and the willingness of consumers to pay for it. Schumpeter has drawn attention to an important implication: "Spectacular prizes much greater than would have been necessary to call forth the particular effort are thrown to a small minority of winners, thus propelling much more efficaciously than a more equal and more "just" distribution would, the activity of that large majority of businessmen to receive in return very modest compensation or nothing or less than nothing, and yet do their utmost because they have the big prizes before their eyes and overrate their chances of doing equally well."¹⁶ One might call this the "pot of gold" logic. It applies to all forms of intellectual property.

A study by Scherer and a co-author confirms that the rewards for successful creators are highly skewed. He studied returns to innovation in the consumer market. It concerns both patents (patents in general and those on pharmaceutical products in particular) and copyright (with respect to music) in both the United States and Germany. Significantly, the study's name is 'The Innovation Lottery'.¹⁷ In all fields, the findings seem to support Schumpeter's thesis. Distribution of profits is extremely skewed: many participants earn very little or nothing, whilst a minority of superstars hits the jackpot. In order to play in the lottery, one has to be risk-loving. These findings find support in other studies.¹⁸

These studies suggest that the "pot of gold" logic has extraordinary power to draw persons into innovative activity, which is, in general, a highly unfair lottery. Scherer writes: "the important social function of such extreme rewards is not simply to induce the effort of the most successful recipients, but to act as a beacon luring others to try their hand at the game and, with a lot of luck, to

¹⁵ Moser 2013, 20.

¹⁶ Schumpeter 1976, 73-74.

¹⁷ Scherer 2001, 3-21. Kretschmer 2005 gives similar findings for the music markets in Germany and Great Britain.

¹⁸ Schankerman 1986; Schankerman 1998; Scherer 2000; Bessen 2008a.

emulate the success — measured both in income and the opportunity to enjoy leisure — of the super-stars. I believe this phenomenon explains why so many try their best not only in cultural activities, but in the creation of new high-technology ventures, at least in the United States."¹⁹

C *Industries with differing degrees of IP protection*

We owe to Raustiala and Sprigman an extraordinary survey of industries that remain innovative with only informal protection of novelty (1) or with none at all, a free for all in piracy, of which the fashion industry appears to be the example (2), or, as in the music industry, with formal IP protection that appears to be somewhat ineffective in practice.²⁰

1 INDUSTRIES WITH ONLY MINIMAL PROTECTION

The recipes of haute cuisine. Fine cooking is an industry doing \$604 billion in the US alone.²¹ Recipes for fine food cannot be directly protected and so can be freely copied. The number of eateries is too large for community norms to stop copying, although within the narrow community of top chefs, unduly "stealing" someone else's recipes may be sanctioned, not very effectively, by blacklisting and denial of access to further creations.²² How then do the best chefs succeed in getting rewarded for their creativity?

Chefs may make their recipes sufficiently sophisticated so as to defy easy copying. They also use a variety of other strategies. The essential point of these is that what the consumer buys is not so much the recipe of a chef, as the total experience of consuming the dish in the restaurant where the chef prepares it or supervises its preparation. The recipe is "fenced in" by being tied to the restaurant where it is served. The restaurant itself is protected more easily by its physical location, its trademark and (under the American Trademark Act of 1946) its "trade dress", i.e its appearance, decoration and so on, constituting the "look and feel" of the restaurant. The Chef's reputation can be used as a booster: if chefs publish their recipes, this may draw people to the restaurant; the chefs may vary their own recipes served there.

Essentially what happens here is that an information good which is not itself

¹⁹ Scherer 2008, 13.

²⁰ Raustiala 2012.

²¹ Raustiala 2012, 58, quoting numbers given by the (US) National Restaurants Association.

²² See also Fauchart 2008.

easily fenced in is tied to another good that is. Rewards for creativity are collected by "selling" the two jointly. Essentially the same formula is used to collect on the creation of new formulas for (alcoholic) cocktail drinks.

Stand-up comedians. For stand-up comedians, fresh jokes and routines are the stock in trade. They must be invented; once told to an audience they can be freely retold and lose their value quickly as they are repeated. So the driving force in this trade is the ability to invent or get one's hands on fresh jokes. This makes it imperative to stop competing comedians from copying these jokes for their own shows ("plagiarism")

How is "plagiarism" dealt with? Within the small community of stand-up comedians, there is a norm against mounting a show consisting of other persons' jokes. If one person is transgressing the norm by stealing a particular other performer's material, the latter may in the first instance take this up with the plagiariser. Should they be unable to settle their differences, community sanctions of attacks on reputation (with third persons who could employ the performers for their shows) and refusals to deal may follow.

The industry as a whole is subject to great pressure to come up continually with new jokes and routines. Within the small community of stand-up comedians, fencing against outright plagiarism is successfully accomplished by community norms.

*Sports strategies.*²³ In any sport, competition for the top consists in part in inventing new strategies that take the opponent by surprise and allow one to win. This advantage is temporary because the frustrated opponents or their supporters will figure out the magic formula and implement it, possibly improved or "tweaked", as well. So the protection required to cash in on one's creativity stems here from (1) keeping the formula secret, where that is possible (2) first mover advantage for as long as it takes opponents to figure it out. On the whole, competitive sports are quite innovative. Competition for the prizes drives continual innovation in strategies.

*Type fonts.*²⁴ Until a century and a half ago, type faces were extremely costly to develop (in lead metal, by professionals) and equally costly to copy. As a result, there were few of them and protection was not a problem. Advances in technology made it possible in the early twentieth century to photograph a font and then to transpose it onto metal and thence onto lead type letters. Copying

²³ Raustiala 2012, 123 f.

²⁴ Raustiala 2012, 145 f.

became less costly. With the advent of computer, the cost of designing new typefaces came down radically as did the cost of copying them (a click away). Copying typefaces was no longer an activity restricted to professionals, but could be done by anyone with a computer.

Ease of copying creates an "open access" space and might signal the need for some form of fencing to secure reward for the efforts involved in designing a type font. Legal protection was not available because of the functional character of type fonts, excluded in copyright legislation. No effective private form of fencing arose, probably due to the huge community of potential copyists. Did this mean the death knell for creativity in typefaces? Not at all. Raustiala and Sprigman report current estimates that put the total number of typefaces in circulation at a quarter of a million.²⁵ How can this work? In part, it is due to the cost of developing a new typeface being radically reduced by computer technology. This weighs all the more as most new fonts are minor variations ("tweaks", as the Raustiala and Sprigman call them) on existing ones. Fonts are often provided with computer operating systems or design software (Adobe), in which case tied sales logic operates to reward the creators.

*Financial innovations.*²⁶ The financial industry develops new financial "products" (derivatives) and new computerised ways of managing financial portfolios. The latter are patentable in the US following a Court of Appeals decision in *State Street Bank and Trust Co. v. Signature Financial Group Inc.*²⁷ There has been debate about the advisability of allowing patents on software, but, according to the Raustiala and Sprigman, allowing it has not changed much within the financial industry. New financial products, at all events, cannot be protected by intellectual property. So how is innovative spirit rewarded here? Raustiala and Sprigman contend that the industry relies on two mechanisms: trade secret within very large firms (backed-up by protective clauses in employment contracts) and first mover advantage.

*Databases.*²⁸ These are huge electronic collections of materials organised for easy search and retrieval. Generally they are regularly updated with new material so as to keep current. Databases are not protected by copyright in the US and in Canada, where court decisions have judged that the facts they

²⁵ Raustiala 2012, 150

²⁶ Raustiala 2012, 155.

²⁷ 149 F.3d 1368 (Fed. Cir. 1998), leave to appeal to the US Supreme Court denied 119 S Ct 851 (1999)

²⁸ Raustiala 2012, 162.

assemble do not pass the test of originality required for such a right to arise.²⁹ In both cases, the contents of telephone directories were considered to be out of bounds for copyright and in the public domain. By contrast, the European Union has adopted a Directive obliging member states to enact legislation protecting databases with a sui generis right less encompassing than copyright.³⁰

Significantly, the lack of copyright protection did not spell the (slow) death of the American database industry, as industry spokespersons feared. On the contrary, the database industry is growing in North America and stagnant in Europe. The database industry in part protects itself against copying by contractual clauses in the contracts with users. Users will want to subscribe to have on-line round-the-clock access to up-to-date material. As users log on, the validity of their contract granting them access is checked on the fly. Behind this apparently simple procedure lies an important logic: because copying cannot be prohibited, the industry protects itself by continuing to innovate in order to keep their customers and keep them happy.

Altogether, the brief survey of different non-copyright industries by Raustiala and Sprigman shows that where the law is not available to shore up fences thought necessary for innovators to get their reward, innovation does not necessarily grind to a halt. The innovators protect themselves by a variety of informal fences : first-mover advantage, secret, community norms, contractual norms and electronic fencing. In some instances, they seek their reward by innovating faster than competitors, thereby ensuring niche market superior revenues until competitors catch up, which may take a while. Competition, rather than stifling innovation by shaving away the innovator's reward, may on the contrary be the very condition that stimulates it most.

Silicon Valley's winning compromise. Boldrin and Levine report other findings they interpret as casting doubt on need for legislation ensuring strong exclusivity to protect innovation.³¹ The study was carried out by Gilson and concerns non-

²⁹ US: *Feist Publications v. Rural Telephone Service Company*, 499 U.S. 340 (1991), 113 L.Ed.2d 358, 18 U.S.P.Q.2d 1275; Canada: *Tele-Direct (Publications) Inc. v. American Business Information Inc.*, (1994) 58 C.P.R. (3d) 10 (CF); [1998] 2 CF 22 (CFA); leave to appeal to the Supreme Court of Canada denied.

³⁰ Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases. OJ L 77, 27.3.1996, p. 20–28;
<http://old.eu-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1996:077:0020:0028:EN:PDF>

³¹ Boldrin 2008.

competition clauses.³² Such clauses are used in employment contracts in high technologies industries. In Massachusetts, these clauses are recognised as valid and enforceable in the courts. In California, in contrast, they have been declared invalid as incompatible with individuals' basic right freely to use their talents, aptitude and knowledge.²¹⁹³³

What has been the result? In 1965, employment in the 'Route 128' area in Massachusetts was three times that in Silicon Valley, California. By 1975, 500 per cent growth in Silicon Valley had resulted in them having 15 per cent more jobs than Route 128. From 1975 to 1990, Silicon Valley created three times more jobs in new technologies than Route 128, and exported twice as many electronic products. By 1995, Silicon Valley was the urban area with the strongest concentration of technology in the US, while Route 128 was no longer even amongst the top five.

Was this result due only to differences in legislation? In 1994, Saxenian published a study in which she highlighted a culture of sharing in California that never emerged in Massachusetts.³⁴ In California, business models were based on loose networks of small units that could be combined in many different ways, whereas the culture in Massachusetts remained stuck in large vertically integrated firms.³⁵ It is difficult to say how much is due to the legislative difference, but it is clear that the lower level of protection for company know-how in California did not prevent the development of a culture of innovation – quite the contrary.

This conclusion is further supported by Saxenian's more recent study.³⁶ Here she explains how many immigrants who had worked for companies in Silicon Valley returned to their countries of origin and created there analogous 'bubbles' that, thanks to the Internet and shared culture, are networked symbiotically with Silicon Valley. This would explain the spectacular development in Taiwan, Bangalore, some areas in China and Israel. In contrast, countries such as Germany, France and Italy, which still employ the vertically integrated major corporation model, are very far from such explosions of innovation.

³² Gilson 1999.

³³ *California Business and Professions Code*, section 16600: Except as provided in this chapter, every contract by which anyone is restrained from engaging in a lawful profession, trade, or business of any kind is to that extent void.
(<http://caselaw.lp.findlaw.com/cacodes/bpc/16600-16607.html>).

³⁴ Saxenian 1994.

³⁵ Saxenian 1994, 36–40.

³⁶ Saxenian 2006.

2 THE FASHION INDUSTRY – WITHOUT IP PROTECTION

In a 2006 paper, Raustiala and Sprigman reported that the fashion industry then sold more than \$ 750 billion worth of apparel in the US alone.³⁷ This is more than the cultural and software industries combined. The fashion industry is continuously innovating, very competitive and highly segmented, with a high end, where design dresses sell for prices in the six figures, through upscale ready-to-wear designs to mass produced confection and cheap knock-offs. Many firms operate within this industry; older ones disappear and new ones appear all the time.

What is remarkable about the industry is that designs are not protected by copyright or another intellectual property right in most countries. Copying or imitation is widespread and very rapid: an attractive and possibly trend-setting dress shown at the Oscar ceremonies may be copied and imitated in short order to appear in less expensive form offered to a different segment of the apparel market. The industry itself has adjusted to this rapid copying phenomenon and is as innovative and competitive as any.

In an earlier age, upscale American clothiers attempted to protect their designs from cheap knock-offs by setting up a wholesalers association that would only sell to retailers who refrained from selling cheaper knock-offs and maintained certain prices for the association's upscale wares. Inspectors for the association would visit retail outlets to ensure the conditions were observed and if not, would trigger blacklisting of the infringer. By the late 1930s, the Federal Trade Commission looked into the scheme and brought suit for violation of antitrust legislation. In 1941, the Supreme Court of the United States found the scheme to be in violation of anti-trust laws.³⁸

End of creative fashion design? Not at all. The industry changed its business model to stress the value of owning a designer dress or one that is part of a fashion trend set by a conspicuous designer dress. While the trend is building up, it becomes desirable for the fashion conscious to join the movement. Once the trend has reached all corners of the market, it loses its appeal and is replaced by a newer trend. Freedom to copy accelerates the spreading of a trend (and the demise of the preceding one) and thereby promotes innovation in the industry. This in itself will promote sales for the industry as a whole. It is what

³⁷ Raustiala 2006, 1693.

³⁸ *Fashion Originators' Guild v. FTC*, 312 US 457 (1941).

Raustiala and Sprigman call the "piracy paradox".³⁹

In this set-up, having one's design copied by knock-off operators may be, paradoxically, a quality signal for fashion designers. It may bring them new wealthy customers for new possibly trend-setting designs. Fashion operators may actually encourage copying in as much as it contributes to setting a new trend. But the real money is made with the lower-priced mass produced knock-offs of these designs, when the trend takes off. In a sense, the haute couture serves as advertising for the knock-offs. Of course, it is important to keep the reputation for top-level design separate from that pertaining to lesser-priced designs. The fashion industry operators may be active in all segments of the market, but under different brand names. Hence, whilst no intellectual property right is available for the designs, the trademarks protecting brands in different segments in the market are extremely important and strictly enforced. The haute couture designer may sell its own designs in slightly modified form and under a different brand name in knock-off markets, where it faces competitors doing the same thing.

The fashion industry's business model appears to work quite well. Raustiala and Sprigman show how the price of *top-level* women's dresses has doubled over the period of 1998 till 2010, whereas for all other segments of the market the price of dresses has remained relatively stable or declined.⁴⁰ To explain the phenomena we observe here, Barnett and co-workers have proposed a model in which low level copying could lead to a stable equilibrium in the industry, with high revenues and lively competition.⁴¹

What should be noted about the fashion industry is that, whilst highly innovative and fiercely competitive, it is less concentrated than the cultural industries (book, music, film), where there is formal IP protection for creations. Could IP protection, when too strong, lead to higher concentration within the industry than would be desirable for maximising welfare?

3 THE MUSIC INDUSTRY - DRYING UP FROM PIRACY?

Musical creations are normally subject to copyright, automatically granted upon creation in countries that have adhered to the Berne Convention.⁴² The traditional business model provided that revenue for musical creations would be

³⁹ Raustiala 2006; 2012, 38, 44.

⁴⁰ Raustiala 2012, 46.

⁴¹ Barnett 2010.

⁴² Berne Convention for the Protection of Literary and Artistic Works of 1886, http://www.wipo.int/treaties/en/text.jsp?file_id=283698

secured through royalties on physical recordings or printed sheet music and through admission charges to live performances. Production of physical records involved substantial capital outlays, first for the recording (in specialised studios, with specialised personnel) and then for the printing of the records and for advertising and distribution. Until a few decades ago these "fences" would be secure enough to guarantee such revenue as the work could fetch, without much concern for unauthorised copying or recording. Copying, such as it was, resulted in copies of lesser quality – and hence desirability – than the original.

The advent of digital recordings of music and of broadband internet radically changed this setting. Music could be shared amongst consumers simply and without quality loss. As result it became quite common. The fences that were effective in the earlier period no longer worked so well. The watershed, in the eyes of the industry, was the advent, in 1999, of Napster, the system that allowed consumers worldwide to find and share music peer-to-peer in a radically simplified way.⁴³ The formula was wildly successful with consumers. Record sales, which in 1999 stood at a high of \$20 billion, no doubt somewhat boosted by the recent conversion from records to CDs, steadily declined from thereon to \$7 billion, in 2011, which is below the level attained in 1985.⁴⁴

The industry did not hesitate to attribute the decline to unauthorised file sharing or "piracy". Whether this causality can be proven empirically is disputed in the scientific literature.⁴⁵ Quite possibly shared music whets the appetite and leads to purchase of records. Be that as it may, the industry reasoned that an unauthorised copy represents a lost sale and that lost sales lead to lost revenue and in turn to lessened incentive to create. It sued the initiators of Napster and was successful in shutting the service down in 2001.⁴⁶ This led to the development of peer-to-peer sharing software without a central server and harder to trace: Aimster, Grokster, Gnutella and others. The industry sued their operators as well and won again. But consumers kept sharing files. So the industry sued individual consumers who shared files, and it won these battles too, obtaining cease-and-desist orders.⁴⁷ As this did still not stop file sharing, industry then tried to enlist Internet service providers to shut out customers who

⁴³ <http://en.wikipedia.org/wiki/Napster>

⁴⁴ Lunney 2014a, text at nt 21 f.; Lunney 2012, 2; Raustiala 2012, 216.

⁴⁵ Rob 2006; Peitz 2006; Liebowitz 2006; Oberholzer-Gee 2007, 2010; Waldfogel; for Canada, Andersen 2010, contradicted by Barker 2012.

⁴⁶ Lunney 2014a, text at nt 9 f.; Carrier 2012.

⁴⁷ Lunney 2014a, text at nt 11 f.

it deemed to be engaging in piracy activity.

All this did not, however, make a serious dent in file sharing amongst consumers. Based on Cisco data, Lunney estimates file sharing in 2012 to amount to the equivalent of 7.5 billion CDs per month, with the expectation that it would triple over the next four years.⁴⁸

If revenue from record sales is down, one may expect artists to change their business model and turn to other sources of revenue.⁴⁹ They could self-publish and sell on the internet (all the more successfully as the internet allows one to reach the "long tail"⁵⁰); rely on sales by convenient and simple on-demand services, initiated by Apple's iTunes⁵¹ and now offered by Amazon, Spotify, Netflix for films and many others; live performances, where access can be more easily fenced in and for which the records act as advertising;⁵² merchandising,⁵³ endorsement deals; contributions from fans wishing to favour particular artists specifically⁵⁴; or they could exit music creation altogether.

There is evidence that revenues from these sources have gone up.⁵⁵ We do not know directly whether additional income from these sources is sufficient to offset the decline in record sales, and neither do we know whether the total amount of music consumed has increased. But if industry doomsayers are correct, one would expect reduced incentive to lead to fewer new creators entering the market and fewer new creations being offered. On these we do have data.

As regards new albums being brought out, it should be noted that the cost of recording music and of distributing it has gone down dramatically. Scale economies are no longer a *conditio sine qua non*: home recording with ordinary software does the job.⁵⁶ This in itself would tend to increase the number of new albums brought out.

As regards new artists attempting entrance into the highly competitive world of music, revenues from creative endeavour are distributed in a very skewed

⁴⁸ Lunney 2014a, text at nt 18 f.; see also Oberholzer-Gee 2010.

⁴⁹ Darling 2014 documents such a shift for the adult entertainment industry.

⁵⁰ Anderson 2007

⁵¹ Raustiala 2012, 220. Apple's iPod and the associated iTunes store were a runaway success. They still occupy 75% of the market for paid downloaded music.

⁵² Oberholzer-Gee 2010; Lunney 2014a, text at nt 24.

⁵³ Lunney 2014a, text at nt 9.

⁵⁴ Lunney 2009; this paper (25) relates how Stephen King used this method for his book *The Plant*.

⁵⁵ Raustiala 2012, 222.

⁵⁶ Raustiala 2012, 215.

manner, with top performers earning fortunes, some others earning a living and the tail end of the distribution losing their shirt.⁵⁷ By all accounts, it is an "unfair lottery". One must presume artists attempting entrance into this unfair lottery to be driven by the idea of a "pot of gold" if successful.⁵⁸ If revenue drops as a result of piracy, one may expect the pot of gold to be less rich and so its incentive potential to be smaller, and hence to see some potential music creators directing their talents elsewhere. In this regard, it would be particularly significant to find new creators making hits on first trial, outclassing established creators.

Several field studies have attempted to measure new musical creations in the post-Napster era.⁵⁹ Various dimensions may be relevant. For established artists lesser revenue might lead to renewed creative effort, reversing a tendency to substitute leisure for work as they raked in revenue earlier.⁶⁰ If new creations and new creators are less numerous, one might expect more musicians to resort to producing new renditions of existing success numbers, the so-called "covers".

The tricky part of the measurement is that, because of widespread copying, one cannot rely on sales figures supplied by the industry. Copying is likely to focus most on popular hits. In his fieldwork, Lunney relied on songs that appeared in the Top 50 of the Billboard Hot 100, played by radio stations, over the period 1985-2013. Over this period the proportion of new artists appearing in the Top 50 with their first creation remained relatively constant,⁶¹ as did the proportion of new artists appearing on the Top 50 list with a second or later creation.⁶²

As regards "cover songs", which might be substitutes for original creations where incentives are insufficient for the latter, Lunney finds a clear and steady decline over the period studied.⁶³ The proportion of new songs in the post-Napster area remains relatively constant and in the same range as before Napster.⁶⁴ And the number of hits by new artists remains roughly the same

⁵⁷ Scherer 2001.

⁵⁸ Raustiala 2012, 204; Oberholzer 2010, 22; Scherer 2001.

⁵⁹ See Rob 2006; Waldfogel 2011a, 2011b, 2012; Oberholzer-Gee 2007, 2010; Lunney 2012, 2014a and b.

⁶⁰ Leonard Cohen, having been swindled by his manager, had to engage in new creation and new touring efforts. These turned out to be extremely successful, in terms of live performance attendance as well as record sales, and largely sufficient to wipe out the losses suffered from swindling. See also Lunney 2014a, 13.

⁶¹ Lunney 2014a, Fig. 3.

⁶² Lunney 2014a, Fig. 4.

⁶³ Lunney 2014a, Fig. 5.

⁶⁴ Lunney 2014a, Fig. 6.

between pre- and post-Napster.⁶⁵ To this it should be added that the number of new albums brought out yearly more than doubled between 2000 and 2007, a third of which appeared as digital albums in 2007.⁶⁶

Taken together, this evidence suggests that significant new music creation and widespread filesharing can coexist.⁶⁷ In a sense, widespread filesharing might be seen as a natural experiment reducing the scope of copyright.⁶⁸ Looked at this way, it suggests that for significant music creation to take place, we do not need as extensive a copyright as we now have. In particular, there is little reason to think that extending copyright duration from fifty years after the creator's death to seventy years has any useful effect in bringing forth more original creation.⁶⁹ The main beneficiaries are likely to be found disproportionately amongst superstars, who might follow the backbending supply curve discussed earlier. These copyright extensions seem to result from highly successful lobbying by the cultural industries in the face of unorganised consumer interests.⁷⁰ Moreover, as streaming is becoming the new way of distributing music, the success of Spotify signals, as the Financial Times sees it, that consumers can be made to pay for music they consume.⁷¹ Apple's entering this market by the end of June 2015 appears to confirm this view.

D Too much IP

Economic theory would lead us to expect that when we extend intellectual property rights beyond their optimal scope, we should expect (1) innovation to be reduced or directed further away than is necessary from existing (and protected creations) (2) access to existing creations to be impeded, interfering with follow-on innovation (3) reduced creative effort by star innovators who are subject to the backward bending supply curve.

1 REDUCED OR REDIRECTED INNOVATION

Bessen and Meurer, surveying the US patent scene, conclude that the

⁶⁵ Lunney 2014a, Fig. 7.

⁶⁶ Oberholzer-Gee 2010, 24; see also Waldfogel 2012.

⁶⁷ Raustiala 2012, 7; Lunney 2014b, 296.

⁶⁸ Lunney 2014, nt 42; Waldfogel 2011.

⁶⁹ Lunney 2012, 19, 23-24; Mackaay 2013b.

⁷⁰ Lunney 1996, 629; Nimmer 2004 describes how the American Copyright Act has been transformed, largely for the worse, in his view, through such efforts.

⁷¹ *Financial Times* edition of 15 06 13, Arts Supplement, p. 1-2.

current patent set-up interferes significantly with innovation:⁷² " While patents do provide incentives to invest in research, development, and commercialization, for most businesses today, patents fail to provide predictable property rights. Instead, they produce costly disputes and excessive litigation that outweigh positive incentives. Only in some sectors, such as the pharmaceutical industry, do patents act as advertised, with their benefits outweighing the related costs."

On the side of the cultural industries, Carrier concludes that the Napster decision was a major mistake since it "reduced innovation and led to a venture capital "wasteland."⁷³ Instead, the industry should have absorbed the emerging technology, as, looked at from a 2015 vantage point, it actually has over time.

2 IMPEDED ACCESS

What a too long lasting copyright does was brought to light in a recent study by Heald dealing with the book industry and incidentally with the music industry.⁷⁴ Heald looked at a random sample of 2000 books available on Amazon.com.⁷⁵ As expected, he found that availability decreased steadily with the age of the book. But books published in the United States before 1923 were placed in the public domain. In the sample studied, the availability curve took a significant upturn for books originally published in the 1850s till 1923. This suggests that copyright prevents republication even though there appears to be a market for reissuance of older titles, as entrepreneurial initiatives in the public domain reveal. For older music, the availability is much better, thanks amongst others to Amazon and Youtube and in part no doubt because the pieces are shorter, the conversion simpler and the commercial risk smaller.

Copyright currently lasts for the life of the author plus 50 or, in some countries, 70 years. Is it useful during all that time? To find out, Landes and Posner looked at how often rights holders would renew their title, at a time when, under US law, they had to in order to retain their right (1934-1991). A decision not to renew presumably signals that the right has lost value to its holder, whereas before it had some. By extrapolating from the decisions (not) to renew Landes and Posner find that the useful life of copyright is on average about 14 years.⁷⁶ For trade-marks, they arrived similarly at a useful life of 15.7 years.

Pollock attempted to estimate the optimal term of copyright by means of a

⁷² Bessen 2008b.

⁷³ Carrier 2012.

⁷⁴ Heald 2014.

⁷⁵ Heald 2014.

⁷⁶ Landes 2003.

formal model.⁷⁷ For parameters of copyright other than duration, one could take welfare to be indicated by the number of works created and make this depend on the stimulating effect of copyright, on one hand, and on its deadweight-loss effect (on follow-on creators) on the other. For the copyright term, a richer model is necessary which includes the consideration that copyright work produces welfare increases over time, but these increases decline as time goes by ("cultural decay"). By building in the cultural decay factor as well as a standard discount factor for the value of money earned in the future, Pollock is able to estimate an optimal copyright term of 15 years in a steady-state model.⁷⁸ The estimate is, however, quite sensitive to the values of these parameters and putting them at the low end of the range, he arrives at an estimate of 52 years.⁷⁹

Valuable though this first attempt at empirical estimation may be, it is in itself not yet conclusive, in our view, as regard the optimal term of copyright. At all events, the values calculated here are averages; we do not know whether outlying larger values are required to attract star performers under the pot of gold logic.

3 REDUCED EFFORT

For confirmed superstars the IP lottery is not unfair: they know they are winners. Does it still have drawing power for them? Quite possibly we may here be entering the backward-bending portion of the supply curve.⁸⁰ given abundant reward for their efforts, creators may choose to reduce them without losing revenue. Scherer observes this effect in letters sent by Giuseppe Verdi⁸¹ and opera composers Gioachino Rossini and Gaetano Donizetti behaved similarly.⁸² After the creation of copyright, they slowed down their creative effort. Lunney observes a similar effect for Garth Brooks.⁸³

Conclusion

This overview article has attempted to set out the basic trade-off underlying all intellectual property rights between reward for creations we see and openness

⁷⁷ Pollock 2009.

⁷⁸ Pollock 2009, 52.

⁷⁹ Pollock 2009.

⁸⁰ Scherer 2008, 13; Scherer 2006; Lunney 2012, 17; Lunney 2014a, 2.

⁸¹ Scherer 2006, 138.

⁸² Scherer 2008, 11.

⁸³ Lunney 2012, 17

for creations to come that build on them. It has shown that besides IP, there are other informal and formal institutions that serve to reward creators for creative activity: employment contracts, pensions and annuities, grants, scholarships, sponsoring, lotteries, awards, medals and other honours, tax incentives, monopolies, procurement contracts (for military inventions in particular) as well as secrecy and first mover advantage. In a number of industries, these alternative protections are effective enough to ensure a high level of creativity, unsustainable if creators did not find proper reward. Most of these industries have low industrial concentration, which seem to confirm the economic wisdom that competition drives discovery. For the biochemical and pharma industries, it is doubtful whether, given the huge disproportion between development and imitation costs, these methods could be effective.

The evidence such as we have seen it does not allow us to conclude that the monopoly feature incorporated in intellectual property is a better stimulus (beyond the biochemical and pharma fields). There is evidence that in the initial stages after the creation of IP rights, they may have had this stimulating effect. To what extent they currently have it the evidence does not clearly show. What we do know is that there are great variations amongst industries and that the "one size fit all" IP rights may not be the best response. Where possible, it is advisable to bring rights holders to express the value they attach to their rights, by requiring explicit renewal for a fee, with the implication that non-renewed rights lapse into the public domain. Unbridled extension of copyright as has happened over the past half century under pressure from lobbying by cultural industries is unlikely to promote more creation.

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