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SIEPR Discussion Paper No. 05-15

**Reflections on the Patent System and
IPR Protection in the Past, Present and Future**

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April 2006

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An Extended Interview for the EPO*

Has there been an historic defining incident or event that has been especially influential in shaping the way that patents are perceived and managed today?

Two defining events that took place a quarter century ago had a powerful formative effect by broadening of the sphere of patent protection so that it came to apply in key emerging areas of technology and new business enterprise. I'm referring here to the pair of watershed rulings handed down by the U.S. Supreme Court: in *Diamond v. Chakrabarty* (1980), a case regarding the patentability of a "new, human-made single-celled organism" –namely a bacterium that ate oil slick; and in *Diamond vs. Diehr* (1981), which affirmed the patentability of a mathematical algorithm that produced a "technical effect in a machine." In 1985 the first of these decisions was generalized by the U.S. Patent and Trademark Office Board of Appeals as holding equally for multi-celled organisms, and was soon followed by the award in 1988 of the first patent for a genetically modified animal: Harvard's "OncoMouse." It took rather longer for the precedent created by the Supreme Court's ruling on Diehr's algorithm to be extended, but in 1994 the patentability a software program running on a general-purpose computer was confirmed by the Court of Appeal of the Federal Circuit in *Re Alappat* (33 F.3rd 1526).

Those two decisions were transformative in many respects, some of which were obviously positive in their economic effects. But, as the positive usually is emphasized, I should perhaps remark first on one of the less happy consequences. These legal decisions opened up patenting activity in two fields in which the USPTO had virtually no previous experience. Clearly, in the areas of genetically modified living organisms and software, the patent office in the U.S., like patent offices elsewhere, had little patented prior art. This left examiners ill-equipped to make judgements about key issues such as the extent of novelty, the extent of

* This text is based upon material originating in an extended interview with the author conducted by Shirin Elahi, in Oxford on 28 April 2005, for the "Scenarios Project" of the European Patent Office – a book entitled *Interviews for the Future*, forthcoming from EPO in Summer 2006. The views expressed do not represent those of the EPO, or, indeed, any of the institutions with which the author is affiliated.

obviousness, and the issue of defining a utility in an economically and socially meaningful fashion. The result was the award of many patents that should not have been granted, which called into question the technical competence of more than one national patent office. But, perhaps more worrisomely, this gave the holders of unwarranted patent rights an ability to threaten to obstruct the enterprises of others by bringing infringement suits, and so to press for payments that were in effect a “tax” on on-going technological innovation-based business. (There is an obvious parallel in the much more recent Appeals Court decision on the patentability of “business methods” in *State Street Bank and Trust vs. Signature Financial Group, Inc.* (149 F. 3d 1525 (Fed.Cir. 1998), but is rather too recent for me to venture to comment on the consequences.)

But, the world of business and finance was not so unprepared to respond to the newly-declared patentability of inventions in these fields, which thus created a powerful set of economic incentives for the launching of new start-up businesses, fuelled by venture capitalists betting on the new science. This was particularly the case in biotechnology, where an investment boom that was already underway in the 1970’s –sparked by the 1973 patent application for the restriction enzyme (“gene splicing”) technique invented by Cohen and Boyer – gained greater impetus from the ensuing wave of patents on genetically modified organisms. Financiers have the view that patents are important, perhaps based in large part on the long experience of the pharmaceutical industry. There are only a few industries where patents have been historically as important as in chemicals, fine chemicals and pharmaceutical industries, where the link between the chemical entity and the product is a short one.

The more general situation, however, is one in which new applied, commercially relevant research rests upon the availability of tools and research techniques, rather than the synthesis of a molecule that gives you a new product. Of course, in the case of pharmaceuticals, there is the question of establishing that its effects are not injurious, as well as being beneficial for the user, and that is a distinct clinical trial process which often is very costly. In the U.S. legislation was passed to extend the life of drug patents, to compensate firms for the time consumed during these expensive clinical trials. But that is not the only way that the problem might be addressed. Inasmuch as clinical testing has two main purposes, one to establish efficacy and appropriate application (dosage) of the new drug, and the other to protect the public who use it from harmful effects, it could be argued that the second of these is really a public health matter that might well qualify for independent, public supervision and financing from public funds – contingent on the product being approved by the regulatory authority (e.g., the Food and Drug Administration, in the U.S.). Then, in compensation for the public funding, it would be appropriate to mandate compulsory licensing of the tested and approved products and/or reduce the term of patent protection by rescinding the special legislation that extended in case of pharmaceutical products. This proposal would not be very popular with the drug companies, but that is not a sufficient reason for it not to be considered.

Granting a longer monopoly for exploitation of the inventive step is, undeniably, an administratively more convenient way to induce private investors to finance the “testing” process. But it has drawbacks. Because the tests are then a private research activity, supervision and publication of the data often will be incomplete. Furthermore, since the basic molecular “inventions” often are tools that have other uses, granting patents for these imposes a “tax” on further research and technological development. In addition, in the biomedical field, patents have been

granted on “tests” for the presence of specific molecular structures, which have made possible the monopolization of some diagnostic kits, and the consequent imposition of very high prices on the diagnostic testing.

Q.: Apart from the application of the patent system into new fields, do you see other changes having taken place in recent years?

The patent regime has acquired a life of its own, independent of the system’s original purpose, namely the encouragement of invention and the public revelation of novel and useful products and means of production. Patents traditionally have provided a template for other inventors, by disclosing the idea and stimulating the creation of alternative ways to achieve its technical effects, and further elaboration on the basic invention. Simply showing that a particular addition to the state of the arts was feasible often proves to be an effective goad to the ingenuity of other inventors. In this way, the system not only tended to promote technological progress, but did away with the wastage of resources involved in the rediscovery of knowledge that had already been gained.

The whole idea of the patent system as an information system is terribly important because its implementation provides information resource to individual inventors, and supports a cumulative feedback process generating novel technological systems by the recombination of available constituent elements. But, it is not exploited as fully as it might be. Unfortunately, not all the world’s patent offices have embraced this aspect of the patent system and undertaken to make the information contained in their patent files as readily accessible as the USPTO and the EPO patent databases. In a globalised world with Internet communications, it is remarkable that WIPO has not made it a priority to seek universal publication of the work of national patent offices, and to encourage them to harmonize their information procedures and render this mass of data more readily accessible in federated databases. Rather, WIPO has construed its mission as one of promoting the harmonizing of patent laws across national jurisdictions, a process that almost invariably turns out to raise the level of protection globally—since no negotiator for a sovereign state is likely to surrender a right that its citizens (and corporations) already hold.

Interestingly, the technical possibilities of digitized information processing and online access of material contained in patents have combined to create a new opportunity that some companies in the U.S. and elsewhere are exploiting: inferring the focus of the R&D activities of business competitors, or of potential competitors from a knowledge of which inventors are assigning patents to the companies in question. The patent data and journal publication archives provide a basis for creating profiles of the specific research capabilities of the inventors currently employed by a firm and from the grouping of individual specialities it is reasonable to draw some inferences about the direction and extent of the investment being committed to particular research trajectories. In this way, the increased availability of patent-derived information about human resources has become a legal alternative to industrial espionage. This development reflects just another aspect of the broader shift toward indirect uses of patents for competitive business objectives that are primarily strategic – guiding firms’ investments away from areas where rivals appear to have already to have established an R&D lead, discouraging rivals from attempts to penetrate one’s existing market niches, or raising a rival’s costs by bringing suit for infringement of one’s own patents..

Indeed, in some industrial fields the rapidly growing volume of patenting in recent years reflects the rise in the use of patents as strategic tools in business competition, not as a source of information about inventive possibilities, and not even as a means of reducing the uncertainty of investing in creating new, commercially applicable knowledge through science and engineering research. The impetus for this increasing resort to patenting is not the opening of a richer technical field for innovation. Rather, the impulse is a defensive one – protecting existing market position and profit streams by threatening potential entrants to one’s profitable lines of business, raising existing rivals’ costs by forcing them into expensive litigation, and protecting oneself against such threats by acquiring a patent portfolio that represents an apparent “retaliatory capability.” These offensive and counter-offensive strategic deployments of monopoly rights granted under the patent system are interlocked and mutually reinforcing, inasmuch as the expectations of attack (and retaliation) induces defensive investments.

Thus, in those branches of industry such as the manufacture of semiconductors and microelectronic equipment – where the pace of technical advances have been spectacular and product cycles typically are short – patenting in former times had played almost no role in allowing firms to appropriate the benefits of invention and product innovation. Yet, even there, patents have come to be used as a means of capturing super-normal profits and protecting economic “rents”. In the 1980s developments in Japan of manufacturing capacity in random access memory chips led American companies (IBM, Bell Laboratories, Texas Instruments) to the discovery that they had valuable unused assets in their inventories of patents - they were major producers of chips although they didn’t sell them, but they had obtained patents as part of the process of managing R&D activities (sometimes, it was said, because engineers “wanted the patents on their CVs”.) On the basis of these accumulated “patent portfolio” infringement suits were filed against Japanese companies, and some large settlements were won.

Although previously not a part of the standard repertoire of American business competition, these R&D-intensive firms soon enjoyed the benefits of this way of exploiting their intellectual property assets; and other firms in the affected industry came to recognize that avoiding infringement suits – whether by avoiding entry into established product niches, or by taking out patent licenses – was the better part of business discretion. The threat of patent infringement suits is an especially potent one to deploy against rivals in lines of business characterised by high-fixed cost manufacturing operations: infringement suits, or even talk of being such actions, raises the spectre of court injunctions that can shut down production lines and thereby inflict substantial (non-) operating losses. The severity of the threat, however, can be mitigated if the targeted firm has undertaken prior investments in building up its’ own patents, creating a base from which to file suits in retaliation. The role of this mechanism in driving a self-reinforcing cycle of patenting has been well analyzed and carefully documented by economists. In their research on the U.S. semiconductor industry, economists Bronwyn Hall and Rebecca Ziedonis,¹ found that patent portfolios began to grow rapidly during the 1980s not as the result of increased investment in R&D to take advantage of new inventive opportunities, but as part of the firms’ self-protection strategy for patent trading and cross-licensing.

¹ B.H. Hall and R. Ziedonis, “The Patent Paradox Revisited: An Empirical Study of Patenting in the US Semiconductor Industry, 1979-95”, *The RAND Journal*, 32(1), 2001p 101-128

Patents in this industry were found to have a new set of uses that were unrelated to innovation, and which diffused among the firms in a self-reinforcing strategic dynamic. This was the emergence of a proto-typical “patent arms race,” which, symptomatically, came to replace the race to be first to enter the market and gain the first-mover advantages of lower production costs by travelling down the learning curve; emblematically, it was a far cry from the idea of the “patent race” in which rival firms sought to pre-empt a dominant market position by being first to invent. One consequence of this transformation has been the epiphenomenal rise patent portfolio-building through the negotiation of purchase and cross-licensing agreements, rather than by means of R&D investments; and the exploitation of those portfolios, not in production and marketing of new goods, but through intellectual property licensing agreements. In the process, as one may imagine, budgets for legal services tend to expand at the expense of those for research laboratories and personnel.

Encouraged by a sea-change in the disposition of the courts, which came to favour plaintiffs in patent infringement suits more markedly after 1979 in the U.S. -- when the Appeals Court of the Federal Circuit was formed as a specialised venue for patent litigation, the patent regime has thus moved from the encouragement of inventive activity to the protection of exploitative activity. In some branches of industry this tendency has been evident for quite a long time, and its economic foundations are more immediately visible. In the pharmaceutical industry, as a prime example, research costs are 20% of the overall R&D costs, and the bulk of the other 80%, the “development” part of R&D are spent on very costly and often extended clinical trials. In the interest of recouping these large, fixed expenditures, the industry’s business strategy has moved to the marketing of a small number of billion dollar drug therapies. That is just the beginning, however, because pharmaceutical companies today spend more for advertising to build markets for these “major” prescription drug products than on research. As well as advertising designed to prompt prospective patients to “ask the doctor” about particular newly available medications, considerable creativity is devoted to providing prescribing physicians with persuasive “product information” at subsidized and tax-deductible conferences and seminars held at exotic vacation resorts; it was recently reported in the *New York Times* that the most preferred demographic and educational qualifications for winning employment with drug companies as a sales representative visiting doctors’ offices in the U.S. is: “female, former college cheer-leader.”

Having sunk enormous sums in the distribution channels for a patented “block-buster” pharmaceutical product, there is a correspondingly great incentive for the company to use whatever strategy will maintain its revenue-generating capacity as long as possible. Consequently, it is observed with increasing frequency that the economic lives of drug patents are being extended by marketing the product for uses not approved originally (so-called “off-license” use) – in other words, finding a new array of “utilities” for existing drugs as the end of the original patent’s life approaches. The renewal of the patent for novel purposes, even when the latter do not themselves generate substantial revenues, has a dual effect, the other half of which has been found to be particularly lucrative in the case of drugs for chronic conditions like stomach ulcers, and hypertension: with the item still in the company’s distribution channels, the sales force can continue persuading doctors to go on prescribing it to patients who have been taking the drug, rather than letting them switch to a much less expensive but unfamiliar generic product.

Today we have the possibility of creating new things by recombining existing goods and services for the use of customers who can take an active role as creative agents as well consumers of the final commodity. Yet, the recent thrust of the intellectual property regime is to stop this – to leave the end-user in the situation of a passive customer whose option is to buy the product or service, or not, at the price at which it is offered to her. In the fields covered by copyright especially, the trend is toward having everything, down to the byte and bit owned and watermarked, instead of allowing elements of texts, sounds and images to be capable of continual refinement and re-mixing in new creative combinations that suit the special requirements, or tastes of the purchaser. The emerging rental service model in the film and sound recording industries seems based upon the view that customers should be kept from being producers of cultural goods – and, indeed, incumbent vendors must worry that they the new technologies have created many potential entrants who can by-pass the existing hierarchically controlled channels of distribution and reach the market – themselves and their peers – much more directly and at lower unit costs. The potentially disruptive effects of the digital information technology revolution has thus imparted a powerful impetus to the contemporary movement for stronger and more comprehensive legal protections for intellectual property in all its forms, and for more draconian measure to enforce the rights of intellectual property owners.

This institutional gambit for protecting the profitability of existing lines of business against the effects of “creative destruction” at the hands of entrants equipped, as never before, to engage in competing lines of business, paradoxically, casts the intellectual property regime in a role inimical to the inventive and innovative process. In the view of some observers and critics of these developments, perhaps most notably Stanford law professor Lawrence Lessig, the campaigns for stiffer enforcement measures to protect the rights of intellectual property owners is being carried to extremes that may well ignite popular disaffection for the whole property regime. The argument of Lessig’s 2004 book, *Free Culture*, focused upon the efforts of the major media firms in the motion picture and recorded music industries, to enforce copyright protection in ways that vitiate the potentialities for digitally encoded images and sound to be re-used creatively, by an emerging “re-mix culture.” But, Lessig’s important critique of the direction in which the copyright regime has been evolving really is much broader in its relevance: it raises issues about the perverse effects that the wider movement towards a regime of more comprehensive and stronger IPR protections – in the area of patents, and database rights as well -- may have on the conduct of scientific research. The implications of the latter go well beyond the effects of the struggle to protect the rents of the entertainment media companies upon the vitality of cultural production. The “collateral damage” that misguided and over-zealous “intellectual property rights protectors” in the legislatures and courts may already be inflicting the domain of research affecting the advancement of science and technology seems to me to have become a matter for serious concern. So many aspects of modern societies depend now, and for the future, upon the long term vitality of science, engineering and medical research – in which open access to data and information and the recombination of ideas and tools is critical – that this consideration might be carefully weighed against the social gains to be achieved by successfully suppressing sales of pirated DVD’s and unauthorized peer-to-peer sharing of music files.

Therefore, I believe that interjecting these remarks about the present day campaigns of the RIAA and allied business associations enforce the legal monopoly awarded by copyright is not really an extraneous digression from subjects with which the EPO should be concerned. There is a quite direct connection to the question of the future evolution of the patent regime, which may be seen in the issue surrounding the patentability of computer programs, a policy question that recently has stirred intense debate in Europe. As I suggested, earlier, one of the watershed events in the development of the patent system during latter half of the twentieth century was the precedent that the U.S. Supreme Court set in 1981 by upholding the awarding of patent protection to algorithms that produce “a technical effect in a machine.” Even though other industrialized countries did not rush to follow the 1994 U.S. Patent Office Board of Appeals’ affirmation of the patentability software for general purpose computers, the legal formula employed by the Court’s ruling in *Diamond v. Diehr* has been embraced more widely, even by national patent offices in Europe and the EPO that have been issuing *de facto* software patents under the rubric of “computer-implemented inventions.” There is every reason to suppose that this practice will not be altered in the wake of the European Parliament’s recent rejection of an effort by the European Commission to promulgate a software patent directive that would have codified (and in some measure harmonized) these national policies and practices throughout the EU.

To properly appreciate the potential consequences of this for continued advances in software, a technological field upon which modern society is becoming increasingly dependent, it must be recognized that the characteristics of the innovation process affecting computer software are polar opposites of those that hold in the case of integral inventions such new chemical entities; they are more akin to the “re-mix culture” of digital music, or the recombination of shared ideas and techniques in “open science” research. Software systems typically exemplify the creation of complex functionalities through a process of technological innovation that is incremental and cumulative; with novel “technical effects” achieved through the recombination of numerous existing sub-component inventions—namely computer sub-routines. The latter process implies an extraordinarily degree of complementary among inventive contributions, and this is reflected in the emphasis that best practice software engineering has come to place upon modularity in software system architecture. These special attributes of software – and others that derive from the fine granularity of the digitally encoded components of these “machines implemented as text” -- are in considerable measure shared with a broader class of digital information goods. Their existence challenges the validity of presuming that because patents are effective in encouraging inventive activities *elsewhere*, their use should be more widely extended into this domain.

Indeed, the opposite is closer to the truth. Distributing patent rights involving many complementary programming tools among many different inventors (or first claimants), is a recipe for greatly encumbering software developers with the costs both in time and legal expenses of conducting patent searches and negotiating multiple licenses; otherwise, it would leave them and the users of their software products exposed to the significant economic risks of infringement suits and injunctive relief. This point was forcefully underscored by Professor Donald Knuth, a pioneer in the field of computer programming languages, in a letter he addressed to the U.S. Commissioner of Patents and Trademarks in 1994 following the Patent

Office Board of Appeals' decision on the patentability of software for general purpose computers:²

“... I developed software called TeX that is now used to produce more than 90% of all books and journals in mathematics and physics and to produce hundreds of thousands of technical reports in all scientific disciplines. If software patents had been commonplace in 1980, I would not have been able to create such a system, nor would I probably have ever thought of doing it, nor can I imagine anyone else doing so.... When I think of the computer programs I require daily to get my own work done, I cannot help but realize that none of them would exist today if software patents had been prevalent in the 1960s and 1970s.”

The open source movement has demonstrated the feasibility of mobilising resources and sustaining cooperative production and distribution of new, large and complex software systems by utilising the rights granted copyright owners to license their creations on terms and conditions such as those of the GNU General Public License. But those engaging in this mode of producing information-goods are likely to be caught in immobilising “patent thickets.” Europe’s commercial software developers, facing the same prospects can be expected to become drawn into a cycle of defensive patenting and patent portfolio acquisition, a process much the same as that which overtook the semi-conductor industry. Thus, an effort to emulate the “anti-piracy” campaign of the media companies against unauthorized copying and sharing of digital content (by stiffening the enforcement of existing and future software patents covering widely used algorithms) is likely to be especially injurious to the continued success of Europe’s smaller commercial software producers. It also will be damaging for “free and open source software” developers, for the rapidly growing businesses based upon their “libre” software packages, and for the broader swath of industrial users of “embedded Linux” devices.

Is this just an alarmist, nightmare scenario? Aren’t the owners of software patent portfolios unlikely to use them in emulation the exploitative large media companies’ anti-piracy campaign? The recent support from industrial firms in the telecommunications equipment field for an EU directive on software patents (which would have wider application than the 25 members, by affecting the policies of the many potential “accession” states) appears to be related to visions of the commercial future resembles those which now animate the film and music industry associations’ “war” on IP piracy. One of the “futures” envisaged in this field is an eventual discontinuation of the sale of digital information appliances for downloading free content, and of information goods that are fixed in tangible (and readily copied and reproduced) media; what would replace those businesses is the marketing of encrypted *information services* that consumers could access under rental contracts, but would be physically prevented from copying for redistribution or modifying and manipulating for their own use. If it is technically feasible to implement in the case of

² Letter from Donald E. Knuth to Commissioner of Patents and Trademarks, USPTO, February 1994. The full text of this letter is reproduced as an addendum to P. A. David, D. Foray, B. H. Hall, B. Kahin, and W. E. Steinmueller, “Is there really a sound economic rationale for the proposed EU Directive on Software Patents?: A Response to the Report of the European Parliament Committee on Legal Affairs and the Internal Market on the proposed Directive of the European Parliament and of the Council regarding the Patentability of Computer-Implemented Inventions,” July 14, 2003. Available at: <http://www.researchineurope/review/draft.htm>.

digital images and sound, that business model would be equally applicable to a wider variety of Internet based services, including word-processing, spreadsheet and graphics programs. Offering these as variably priced services to identifiable customers who would access them by means of “trusted” by mobile telephones, PDAs, I-Pod-like devices, and laptop and desktop computers, presents attractive profit prospects – not least because it would facilitate rather sophisticated forms of price discrimination by the owners of patent monopolies.

Software is the key to implementing such systems, but software copyrights will not protect the idea of the computer programs (including the programs embedded in the chips for the hardware devices), only the specific expression of the idea in the code. An interest in extending the patentability of software *globally* thus flows from the obvious desirability – from the vantage point of the would-be vendors of such services – of establishing a universally strong regime of patent protection for the technical ideas that can be held to define the specific nature of the global distributed digital information services that they eventually bring to market. In short, the underlying rationale is not so much that of further augmenting the incentives for investment in new technologies that would deliver these novel services. Instead, it is the erection of more effective legal means of increasing their sustained profitability by blocking future entry by competitive service providers – including those who might be furnished with alternative, open source software technologies. Why wouldn't patent owners make common cause with the big copyright-holders in order to equip themselves with more powerful weapons to deploy against infringers of their property right?

Q.: What do you see to be key factors that will influence the way the patent and IPR regime might unfold over the next twenty years?

To speak of the unfolding of “the IPR regime” it would be necessary to say something about the prospects for global harmonisation of patent statutes, of international commitments to greater uniformity of enforcement on the one hand, and, on the other hand, of reforms of the TRIPs agreement that would codify simpler and less costly procedures under which individual countries could invoke compulsory licensing powers to address the pressing needs of their respective populations. These are really complicated processes that are driven by the political economy of international trade and domestic agricultural subsidies, as well as by intricate issues arising in the law of international conventions and treaties; obviously the outcomes will turn upon the alignment of political and economic power that can be brought to bear on specific issues at particular junctures in time, by various national governments and multinational corporate groups, each having their own agenda. Although these are not subjects about which I would have any particular claim to possess insights or expertise, it does strike me as wildly optimistic to suppose that the course of institutional and political changes in the foreseeable future will reflect – any more than it has in the past – a collective willingness of the contending parties to accept specific reforms on the grounds that they are the ones most conducive to an economically more efficient use of the world's resources, or because they would lead toward a more equitable global distribution of income and wealth. So, I will be more comfortable directing my comments to a much narrower question, one that concerns the way that prospective developments in the intellectual property rights regime may

affect the global production of public goods in the form of reliable scientific and technical information.

New and exciting capabilities for sharing information and collaborating in the pursuit of scientific understanding and cultural creativity have been emerging, and are expected to continue to flow from advances in information and computer-mediated telecommunications technologies. The question of the extent to which the potentialities of those technical breakthroughs will be utilized by scientific and engineering research communities is narrower than some of the issues upon which the foregoing discussion has touched, but it is not easier to answer on that account. Indeed, the future course of the co-evolution of intellectual property institutions and information technologies useful for the generation of new knowledge is presently very uncertain. We seem to be poised at a particular juncture, where policy developments may go in either of two very different directions: either towards a regime of global "intellectual capitalism" featuring more complete and more strongly enforced control for the purposes of profit-driven private exploitation of digital information assets, or, alternatively towards increasing openness and sharing of benefits of the "public goods" properties of information that can be accessed, transformed and distributed using new, more technical means.

A brief tour d'horizon might therefore be found useful in highlighting some of the main cross-currents and tensions that make the course of "the patent regime's unfolding" in this regard as hard to forecast as it is important. In Europe the omens for the future seem to point firmly in opposing directions. On the one hand, there appear to be clear signs of hesitation, if not of outright resistance on the part of the EU to follow the U.S. lead in issuing software patents (even where such might be effected by regularizing the award of patents the imprecisely delimited category of "computer-implemented inventions"); or into the patenting of business models that are not implemented by computer-implemented technical devices. But, on the other hand, the unabated drive for ever-stronger measures of IPR enforcement, suggests that policy commitment to an extreme form of "intellectual capitalism" is well entrenched in some circles in the UK and other EU member states and has found ardent champions within the European Commission.

To take a concrete case in point, the EC's latest proposal for an "Intellectual Property" Rights Enforcement Directive (IPRED2) goes beyond its previous Directive mandating national legislation for the prosecution of commercial copyright infringement as a felony. The new proposal calls for all forms of IPR infringement to be similarly prosecuted, and therefore would require criminal law punishment of the guilty, in addition to continuing to allow those whose property rights were infringed to seek remedies under civil law.³ The framers of this proposal appear to be committed to ensuring the sanctity of property rights, treating patents and other intellectual property as "absolute property" rather than a species of (conditional) economic subsidy that has been instituted to achieve desirable societal purposes through the promotion of invention and innovation. It is truly difficult to think of any other single step in the patent regime's evolution that could have more adverse effects on

³ "Member States shall ensure that all intentional infringements of an intellectual property right on a commercial scale, and attempting, aiding or abetting and inciting such infringements, are treated as criminal offences." See Article 3, p.6 at [com\(2005\)276](http://com(2005)276). The first IPR Enforcement Directive was adopted by the Council of Ministers and promulgated last year as 2004/48/EC. For overview of recent enforcement initiatives, see <http://www.wipo.int/enforcement/en/cooperation.html#specific>.

the future vitality of technological innovation and long-term economic growth in Europe. This recommendation clearly passes the basic test for “policy fanaticism” – fanatics being people who, having lost sight of the original objective, redouble their efforts.

Anyone even slightly acquainted with the modern realities of R&D-intensive industries should understand that business companies that compete by investing in new products and processes must take account of the economic risks of patent infringement suits. They make decisions that balance the latter against the costs of exhaustive patent searches among the exponentially growing volume of applications and awards; and against the risks of losing first-mover advantages by delaying development, production engineering and marketing investments until a comprehensive patent search can be completed. The prospect of criminal prosecutions for research managers and corporate executives that could be triggered by infringement suits would upset the present balance of such calculations. It would work to reduce R&D investment most notably in the more innovative small and medium size firms that have limited resources to devote to legal defenses, and fewer IP assets to deploy in counter-suits. Correspondingly, it would amplify the relative threat power of the large incumbent firms, especially those having extensive portfolios of un-worked patents. Companies that today sell software-based products and services often carry insurance to indemnify their customers and clients from the effects of potential infringement suits; their insurance premia would become unaffordable under the proposed legislation, even if their own executives were willing to risk being charged with a felony.

The anti-competitive effects of this proposal therefore can be expected to yield adverse short-run consequences for consumers, because the pressure to hold profit-margins below entry-inducing levels would have been lessened; and because the competitive entry based upon inventive activity would be specifically affected, consumers over the long-term too would lose the benefits of improvements in product quality stemming from inventions that were not commercialized because of the risk of infringement.⁴ But, that is hardly the totality of the untoward consequences. Only a few years ago the European Commission was urging national governments to direct universities and other public research organizations to be more vigorous in patenting new discoveries and inventions and finding existing business firms, or launching start-up companies, to take exclusive patents that would protect the profitability of commercially exploiting the innovations. Will the next mission for those institutions then be to carry out the exhaustive patent searches needed to guarantee the licensees that their business will not be shut down and their management prosecuted for criminal patent infringements, indeed, quite possibly infringements of another university’s patents? The foregoing offers just a sample of the more immediately foreseeable generic implications of this latest ill-considered proposal. Could the proponents of IPRED2 not recognize that once the EU had taken the lead in criminalizing patent infringement, Europe’s entrepreneurial spirits would have been given yet another reason to decamp to the U.S. or other jurisdictions in

⁴ Many other specific objections to the proposed directive, including legal obstacles to the harmonization of criminal law provisions across the EU member states, are presented in the European Consumers’ Union critique: BEUC/X/049/2005 (16 November 2005), available at: <http://plone.ffii.org/Members/coordinator/BEUC%20Ipred2.pdf>.

which infringement case continue to be dealt with under civil law? Indeed, in the U.S. the anti-competitive effects of the threat of infringement suits have prompted not only legal appeals against court injunctions, but also proposals to end mandatory injunctive relief for plaintiffs who bring suits alleging patent infringement.

For the unfolding of this particular perilous scenario to be averted, it might be sufficient just for the European Parliament to be attuned to the concerns of consumers and the innovative small and medium size enterprises -- who are likely to be joined in protest by voices from the active libre (free and open source) software movement. But, rejection of this latest enforcement measure would in all likelihood provide only a temporary respite from the forces seeking greater security for patent monopolies. If there is any prospect that a more balanced path will be found in the evolution of public policies affecting the operations of the patent system, it would seem to lie in the gradually growing segment of informed opinion on both side of the Atlantic that patent law and its enforcement are not simply arcane technical matters of interest to lawyers, patent brokers and the patent offices; that intellectual property rights should be viewed as part of the important regulatory functions of society; not as instantiations of "natural" or God-given rights to enjoy a secure stream of economic rents from the commercial exploitation of the results of creative and inventive activity.

The effects of patents on market competition, on the costs of goods such as healthcare products and services, and on the conduct of basic, open science research in public sector research institutions, are coming under serious critical scrutiny now for the first time in several decades. Experts in the areas of science policy and anti-trust (competition policy) have begun to delineate the conditions under which it would better serve the public interest for courts to not grant injunctive relief to plaintiffs in infringement suits. They also are asking whether, in cases where commercial rivals settle an infringement suit before proceeding to litigation, a cross-licensing agreement that restricts the licensee from marketing substitutes for the licensor's own products should be respected as contracts of confidentiality. Perhaps it would be better that all such agreements arising from IPR holders uses of legal protections examined by the competition authorities. Similarly, science and technology policy analysts have been advocating some forms of exemption or compulsory licensing (on reasonable and non-discriminatory terms) of patented research tools, particularly when the inventions in question were the direct results of publicly funded research programs. The common principle underlying all these "reform" ideas is simply that patents are not just another form of property, but are legal monopolies created by society to achieve particular objectives; that their terms and conditions therefore should be set within the context of those societal goals and the principles and instruments of regulation that also address those and related purposes.

Another straw blowing in the same wind is the explicit attention that now is being directed by external entities to the effects of administrative arrangements and practices in both national and regional patent offices. For example, the National Academy of Sciences report⁵ on the patent system in the United States has called

⁵ National Academy of Sciences (2004) *A Patent System for the 21st Century*. Committee on Intellectual Property Rights in the Knowledge-Based Economy. Washington DC: National Research Council.

for reforms in the way the USPTO operates, among them the introduction of an opposition system that would bring the American process more closely into line with European practice. These proposed reforms are likely to pit firms favouring reform, namely those in new industries and start-up companies that are especially dependent for financing on rapid and expert patent examination procedures, against opponents who better positioned to benefit under the existing system, particularly major companies with existing patent portfolios and large legal departments. But, if it succeeds, this reform movement could bring about considerable modifications in the U.S. patent regime that would have ripple effects internationally-- for example by narrowing the scope of patents, establishing an opposition process, and providing a basis for compulsory licensing to be triggered by the anti-trust ("competition") authorities.

The tensions created by opposing policy trajectories have appeared also in intellectual property domains other than patents. In regard to copyrights there is, as has been noted, an intensified legal enforcement campaign against digital piracy and investment in the development of technical encryption systems affording "self-help" to copyright owners – with backup sanctions against decryption being under the copyright statutes. But, concurrently one may observe the growing momentum behind experiments with "open access" on-line publishing, which already has become highly visible in the field of scientific and scholarly journals and pre-print repositories.

When one turns to the field of databases, similarly divergent legal developments are in view. The *sui generis* database right -- promulgated by the EU Directive (March 1996) for the legal protection of databases -- was recently re-confirmed with little public discussion, following a perfunctory European Commission review of the workings of the national laws mandated by its Directive. On the other hand, the judgement handed down in November 2004 by the European Court of Justice in the infringement suit *British Horseracing Board v William Hill* ⁶ (and also in a several related cases involving unauthorized extraction of database contents about football fixtures) surprised many legal observers by its restrictive interpretation of the protections available under the law. The assembling of content that was essentially incidental to, or a by-product of other activities, was held not to qualify as a substantial investment deserving protection. Further, repeated extraction of contents that did not enable the extracting party to replicate something approaching the full contents of the database also was held not to constitute infringement.⁷ At the same

⁶ ECJ Case c-203/02: Judgement of the Court (9.11.2004), See *Official Journal of the European Union*, c 6/4: 8.1.2005.

⁷ The effect of EU adoption of the proposed directive (IPRED2) mandating criminal prosecutions for all forms of IPR infringement, obviously, would turn on the way that these and other ECJ's rulings affected prosecutorial and judicial interpretations of the database right in the national jurisdictions. This is a matter of considerable complexity, and of important not only for the commercial database industry in Europe, but one that also could affect publicly funded scientific researchers who create new annotated databases by assembling un-copyrightable material from other collections, particularly in fields such as molecular biology, genomics and proteomics, where the resulting database contents can be licensed to commercial research firms. Although the matter lies outside the scope of the present remarks, I would venture to observe that the overall effect on such activities is likely to be a "chilling" one --especially given prevailing view (from the European Court of Justices) that the database right is not exhausted by the authorized extraction and publication of non-copyrightable contents, and the substantial uncertainties that still surround both of the extent of the "investment" that

time, across the Atlantic a much modified database protection bill (H.R. 1815) that was sent to the Congress (after many years of Committee deliberations and negotiations) has not been able to move closer to being debated, let alone enacted. Here too it might be remarked that after some decades during which intellectual property experts in Europe looked askance at the more aggressive legislative and judicial positions that were being staked out for IPR-owner's protection by the U.S., the pro-protection tide seems already to be ebbing on the western side of the Atlantic ocean just as it is reaching full flow in the EU. This lack of coordination simply adds to the difficulties of predicting the future trajectory of development for the "global IP regime" –by calling into question the very meaning of that conceptualization.

Q. In terms of IPR and patents, what do you think are the most significant challenges to the formulation or enactment of policy?

If we are talking about the formulation of IPR policies that would sustain innovation and human creativity over the long-run, and maximize the benefits derived from the resulting knowledge by the mass of humanity, then the challenges are many and deeply rooted.

A problematic aspect of the intellectual property regime that is not frequently discussed, and consequently is not as salient as it should be in policymakers' consciousness, is the relationship between copyright and patents, and the ways that the two regimes may interact with and reinforce each other. With that in mind, I have already taken the opportunity of commenting on this issue in regard to the protection of rights in computer software -- where the problem of distinct systems having overlapping application is well recognized. But, considering the situation more broadly, the degree to which legal specialization has reinforced a "balkanization" of concrete policy discussion is striking. Today we have national patent offices, and the EPO, and their legal advisors thinking exclusively about patents; WIPO thinking about copyright and patents, but separately from each other; and, similarly, national and international bodies that concern themselves with database rights as distinct from their effects when conjoined with the protections afforded by copyright statutes. Admittedly, a reluctance to conjoin discussion of the two subjects in the latter case may be reinforced by the obvious fact that the EU's *sui generis* database Directive transgressed several widely accepted precepts that had been established for international conventions affecting copyright protection: it is hard to square the principles enshrined in the Berne Convention with an indefinitely renewable right, with protection against extraction of material that is already in the public domain (including non-copyrightable content), and with the explicit disavowal of "national treatment" guarantees.

The overall effect has been to render the process of policy in the field of intellectual property peculiarly *ad hoc* and, consequently prone to systemic incoherence. One symptom of this condition is the cascade of protections that have piled up around material that falls under copyright. Leaving aside the patentability of some copyrightable material (software), and the possibility of placing copyrighted content inside a protected database, the use of purely technological means of securing

is necessary to qualify a database-owner for legal protection, and the frequency and volume of extractions from any single database that would be found to constitute infringement.

protection for copyright and non-copyrightable content have been reinforced by the EU Digital Copyright Directive, which mimics the U.S. Digital Millennium Copyright Act (1998) in criminalising production or distribution or use of de-cryption technologies. Presumably, in the 25 member states of the EU, and in the EFTA countries that have implemented the Database Directive (as well as candidate states for future accession to the Union), databases that contain copyrighted content, presumably, would also enjoy legal reinforcement for the protection of information by technical means. This particular legislation—one of the few instances in history of legislating against possession of a specific piece of non-lethal technology—is emblematic of the drift of IP policy away from the granting of temporary monopoly rights in order to achieve socially desirable ends, namely the encouragement of creativity in cultural and technological pursuits. It follows, instead, from the political endorsement of “absolute property” doctrines in the sphere of intellectual property: information possessed—in the sense of guarded against trespass while being made available for authorized use—is to be accorded the same status as real property as *matter of principle*, rather than on evidence that to do so has demonstrable efficacy in serving the needs of society.

Perhaps the most striking manifestation of the transformation that has thus been brought about in contemporary policy thinking concerned with intellectual property protection is to be read in the conclusions that issued recently from the “evaluation” of the impacts of the EU Database Directive that was conducted by the European Commission—DG Internal Market and Services (as called for by the language of the Directive itself).⁸ While the principle of requiring assessments of the efficacy of mandated legislation is an entirely commendable one—and, indeed, might well be applied more generally, even to the workings of existing patent laws—the actual practice in this case has left a lot to be desired. The EC’s evaluation focused on two questions: firstly, whether the European database industry has had the intended positive effect of stimulating the production of databases in Europe in the period since 1998, when the Directive was implemented in national laws; secondly, whether members of the industry felt that their new, *sui generis* legal protections were on balance beneficial and should be retained.

The findings on the former question will, perhaps, come as more of a surprise than the tenor of the opinions the EC evaluators received from beneficiaries of this legislation. Although, in the summary words of the report (*Ibid.*, p. 6), “the ‘*sui generis*’ right [was]...introduced to stimulate the production of databases in Europe, the new instrument has had no proven impact on the production of databases” — either in absolute terms or in relationship to the U.S.⁹ Nonetheless, of the 500

⁸ Commission of the European Communities, “First evaluation of Directive 96/9/EC on the Legal Protection of Databases,” *DG Internal Market and Services Working Paper*, Brussels, 12 December 2005. http://europa.eu.int/comm/internal_market/copyright/docs/databases/evaluation_report_en.pdf.

⁹ The EC’s study (*Ibid.*, pp. 20-24) reports that the number of Europe-based commercial databases listed for 2004 in *The Gale Database Directory* was no larger than it had been in 1998, and that in relation to the corresponding number of US databases it had decreased markedly: the EU:US ratio had been 1:2 in 1996, and was 1:3 in 2004. Western Europe’s share in “global database production” (reckoned in terms of the number of entries, un-weighted by sales) was 24% in 2004, no higher than it had been in any year during 1992-95; whereas the corresponding share for the US was 68-69% throughout 1992-96, rising to 74% in 2004. These realities notwithstanding, according to the report (*ibid.*, p.23): “55% of the respondents to the Commission services’ on-line survey believe that the introduction of ‘*sui generis*’ protection for ‘non-original’ databases has helped Europe to catch up with US database production.”

business firms that were asked to fill out an online survey, more than half of the 100-odd industry members that responded believed (incorrectly) that the *sui generis* right had enabled the European database industry to “catch up with US database production.” Be that as it may, the evaluators appear to have been impressed by the fact that this consultation had elicited “strong [industry] submissions arguing that ‘sui generis’ protection was crucial to the continued success of their activities.”

On the basis of this evidence, the Commission’s report proceeds to offer conclusions that deserve quotation *in extenso*:

“At this stage, the evaluation concludes that repealing the Directive altogether or repealing the ‘sui generis’ right in isolation would probably lead to considerable resistance by the EU database industry which wishes to retain “sui generis” protection for factual compilations. While this resistance is not entirely based on empirical data (many factual compilations would, most likely, remain protected under the high standard of “originality” introduced by the Directive), this evaluation takes note of the fact that European publishers and database producers would prefer to retain the ‘sui generis’ protection in addition to and, in some instances, in parallel with copyright protection.” (*Ibid.*, p. 6)

“... the Internal Market and Services Directorate General has received strong representations from the European publishing industry that ‘sui generis’ protection is crucial to the continued success of their activities.... In the opinion of respondents, the ‘sui generis’ right has brought about legal certainty, reduced the costs associated with the protection of databases, created more business opportunities and facilitated the marketing of databases. While this endorsement of the “sui generis” right is somewhat at odds with the continued success of US publishing and database production that thrives without ‘sui generis’ type protection, the attachment to the new right is a political reality that seems very true for Europe.” (*Ibid.*, pp. 23-24)

Faced with this very real “political reality”, the Commission announced it would open a further consultation with “the stakeholders,” inviting them to voice their preferences among four policy options: (1) repeal the whole directive, (2) withdraw the *sui generis* right, (3) amend the *sui generis* provisions, (4) maintain the status quo. The policy principle here seems clear enough: when you have created the reality of vested property interests, be sure to thoroughly consult the vested interests on what to do next. Given the foregoing set of options, is there anyone who seriously expects that consensus of the industry members who will volunteer their preferences, and the EC interim recommendations, will fail to support retaining the status quo? I’m ready to take that wager, and will give any odds.

Unfortunately, the charade of “evaluating” the effects of granting new IPR protections by asking whether those who are given monopoly privileges wish to keep them is not the only perverse consequence of the retrograde drift into a policy that protects private (intellectual) property for its own sake, in the belief that assuring private profits for some segment of the economy must be a good thing for society as whole. Consider, as another case in point, the still more radical move against innovation and competitive entry that was entailed by the legislation adopted in the past decade which mandated criminal law prosecutions of individuals responsible for creating, distributing, or using decryption technologies that would defeat technological “self-

help” devices that could be deployed by IPR owners. Encryption, and “trusted systems” enable holders of data and information to act as “perfectly discriminating monopolists” – setting terms and conditions for prospective customers on an individual, “take it or leave it” basis (so-called one-sided contracting) that can extract the maximum economic surplus from each transaction. Applied to databases in jurisdictions where legal protection of the *sui generis* database right is available, this mode of exploiting monopolies of “public goods” paradoxically can be continued for an indefinite period. Thus, the recent concatenation of separately legislated provisions has brought about a further extension of the *de facto* duration of IPR protections, paralleling the historical trend towards longer and longer periods of *de jure* protection for the expression of ideas under copyright. It seems only reasonable to expect that the growing disparity between the copyright and the patent regime in this regard soon will give rise proposals from interested parties to further lengthen the effective term of patent protections, either by means of patent extensions, or lower real marginal costs of renewals. Perhaps, as a more politically intricate alternative, a statutory lengthening of patent life will be offered as part of a coalition-cementing compromise with to reformers who seek to narrow the scope of individual patent awards.

A more concrete challenge to the implementation of patent policy that deserves notice turns on the issue of the relationship between patent rights and the application of competition policy and anti-trust laws. A patent is an uncertain economic asset, the value of which is in large measure dependent on judicial interpretation and the nature of the litigation process in particular legal jurisdictions. Contractual agreements about licensing are the outcome of a private process, and patent licenses are essentially a property contract between two agents setting out terms under which they enjoy the use of their respective property rights. But competition law regulates economic activities by intervening into the sphere of business contracting, and viewed from that perspective is only one among many such interventions that are justified as being economically and socially beneficial. There are many instances of conditions being inserted in 'shrink-wrap', or 'browse-wrap' licenses that provide for the uncompensated withdrawal of the purchaser's access to the product or service if she utters public criticism of the vendor or the product. This may be construed as one among many other kinds of conditions of sale, or licensing that are potentially anti-competitive. While these issues do not involve the patent itself, the value of the patent “option” depends upon the features of the larger system within which they are created and used. The question is whether the welfare of the public can be served best by public regulation of those terms, rather than treating the patent as a private asset over which economic agents should be maximally free to contract.

Another connection between competition policy and patent policy arises where the adverse effects of the distribution of patent rights would be mitigated by the formation of “patent pools”, a form of cartel. The system level conflict between the two policy spheres has become more serious as patenting has moved into new areas of inventive activity, particularly genomics and software. But there is a potential for this issue to arise more generally where-ever innovation involves complex devices that require a bundle of complementary technological sub-systems. When bundles of rights are widely distributed, there is a potential for them to form a “patent thicket”: each IP owner acts independently in sets a price (a licensing fee) for the use of her patent as if it was the “last piece of the puzzle”. The best case result of working one's

way through the thicket is to emerge “bleeding” from many small cuts: if it proves possible to negotiate all the requisite licenses, the entrepreneur will have incurred a large number of individually modest royalty charges (or up-front payments) whose collective effect is to greatly reduce the expected profitability of the innovative project, or so raise its costs as to tightly restrict the number of customers that benefit from its adoption. The result in these conditions can be even worse than that which would arise were all the IP rights to be monopolised by a single owner.¹⁰

An alternative analogy may be drawn with the old system of European toll roads, in which every principality levied a fee for passage, with the net result that prospective travellers start to question whether the journey is worthwhile—but there is no single agent with whom they are able bargain for a charge that would still make the trip worthwhile. The collective outcome is therefore particularly socially inefficient, and because it may result in many potentially buyer’s being discouraged, it could ultimately be less profitable for the individual owners of the intellectual property as well. This is a form of “coordination failure” which comes about because of the way that the patent system distributed property rights, and it may be exacerbated by competition policies that restrain or punish attempts to arrange cartel-like agreements for the joint ownership and sale of bundles of products or services.

I am particularly concerned about the effect of patent thickets, and royalty stacking in the case of copyrights, upon scientific research activities, and especially on exploratory science. Modern science is by its nature intrinsically an open process, based on collective production of reliable (tested) knowledge. Yet, maintaining the sharing of information that is the touchstone of “open science” is becoming increasingly difficult. Society has got to where we are today by a long process that began in the 17th Century, when a new collective set of attitudes pursued both knowledge and its distribution through competition among scientists for reputational standing based on disclosures of new discoveries. This led to the advance of technology on new and more reliable scientific foundations and extended the collaborative activity benefiting those who took the initiative. We appear to have forgotten the debt to that regime in our efforts to advance commercial innovation by providing individual contributors of new ideas or creative expressions with monopoly rights to exploit their specific contribution. Most useful ideas, and creative expressions build upon other ideas, and so require that inventors and users alike be able to access to other contributions; the demarcation lines drawn between ideas (and, one might add between musical compositions, and literary works), are rather arbitrary constructs that we require in order to designate discrete “contributions” so that the contributors can receive socially constructed rewards. The latter “discretizing” approach, which is carried to an extreme by the efforts of the patent examiners to distinguished the novel aspect of an invention from the “prior art”, takes as its premise the necessity of providing people with incentives for an (inventive) act that is recognized to be of social utility. But there is an abundance of evidence that people are naturally inventive --albeit in different ways, some more socially beneficial than others. In reality, much creative initiative does not need to be induced, although, typically, the individuals involved must be supported in some way because significant amounts of time and material are required to achieve a practical implementation of a

¹⁰ Refer to David, P. A and M. Spence, (2003) *Towards Institutional Infrastructures for E-Science: The Scope of the Challenge*. Oxford: Oxford Internet Institute. Refer to <http://www.oii.ox.ac.uk/resources/publications/RR2.pdf>

new idea, or a new expressive form. It seems necessary to remind policy-makers that the levels of compensation that would be sufficient to provide income maintenance and the wherewithal for inventive pursuits in question may not be at all proportionate to the socially value of the inventions that would result from those efforts. Yet, such is widely recognised to be the case in academic science.

Q. If I had a crystal ball and you were able to ask a question about the future, what would your question be?

Here is one question to which I would very much like to have the answer:

Will the patent offices and public organisations embrace the mission of re-examining and restructuring the patent system so that it more fully fulfils the public purpose for which it was created? Or will it remain captured by industry and those in the legal profession who see the system of property rights as essentially self-validating, and therefore worthy of expansion and reinforcement without reference to analysis of alternative ways in which public purposes and individual economic welfare could be advanced?

Yes, it is definitely rhetorical and a little provocative. But people were prepared to pose and debate such questions in the mid-nineteenth century “Patent Controversy,” which erupted during the heyday of the growth of industrial capitalism. The anti-patent movement did succeed in the 1869 repeal of Netherlands’ patent system, and patents were only reintroduced there in 1911 after the Dutch found themselves under international pressure to match their support for the Berne Convention by also joining the Paris Convention. In the United Kingdom the patent system found many laissez-faire critics, and leading economists who were more hostile to the granting of “artificial” (as distinguished from “natural”) monopolies. Modern historians of this episode contend that Britain’s patent system, which in the early 1850’s was sorely in need of drastic reforms, was saved from repeal largely by the intervention of patent brokers, lawyers and others who had an immediate professional or business interest in its perpetuation, and undertook an effective public relations campaign on its behalf. Since then the West has not seen another such full-scale movement for the repeal of the patent system, and my question was not intended to reopen one here. Rather, it pointed to the desirability of asking how the system should evolve if it is to remain aligned to continue to serve the social objectives that hitherto justified its retention, given that the historical circumstances in which the present system crystallized are now being supplanted by a quite different economic context.

There has been much talk in policy circles about the importance of adjusting our institutions to the requirements for successful performance of “the knowledge-driven economy,” in which new the generation of ideas and information will play a more central role than heretofore—especially in comparison with physical transformation processes such as are involved in the production and distribution of tangible commodities. This would seem to call for a “re-think” of inherited presumptions about the economics of intellectual property institutions. Ideas and texts do not wear out with use, the incremental costs of using an idea is negligible, and it is hard, except under extreme conditions to stop its use for someone's own benefit. One might therefore take the view that the provision of information, as it has the properties of public goods, might be best managed through a system of public subsidization – like other forms of public utilities. Once upon a time, in the years between the First and Second World Wars, when public welfare and the Swedish

model of state intervention in the economy were politically fashionable in the Western democracies, this seemed the “natural” approach to take. Indeed, it strongly influenced the initial provision of public radio and television broadcasting infrastructures, along with public sector investments to provide systems of dams for irrigation, flood control, and hydro-electric power generation.

But, perhaps due to the temporal coincidence between the accelerated development of digital information technologies and the ending of the Cold War marked by the disintegration of the Soviet Union, pursuing that alternative to private enterprise investment to create the new technical infrastructure of “the information society” became politically out of the question. In their place we have what I have referred to as the quest for a system of “intellectual capitalism” based on the ideological conviction that anything capable of generating a positive private rate of return should be owned as private property in a system that allows property owners greatest liberty to decide how it should be exploited. Although this strikes me as a mistaken response to the enormous opportunities created by digital information technologies, considering the functional role of the ideological shift in public policy suggests a more materialist interpretation—if not an explanation of how it came about. It has become obvious that the prospects of being able to extract significant profits from the business of transporting “bits” of information alone are vanishing; there are just too many alternative means of communication that permit the entry of competitors into that business. For the private sector to finance the infrastructure required for computer-mediated telecommunications, the solution being promoted today is the provision of a stronger legal-institutional infrastructure for business models that combine the distribution of “bit-streams” as services based upon control of the rights to use the intangible content. There is an aspect of absurdity in the present-day enthusiasm for erecting of monopolies that can extract profits from electronic content, and thereby raise economic barriers than replace the impediments to the sharing and wider re-use of information that the new digital technology infrastructure is intended to remove.

Considering our present situation from that perspective, I want to close by suggesting one further, and rather more basic answer to the question that was posed (and addressed) in the previous section. Perhaps the fundamental source of the most difficult challenges to the formulation and implementation of sensible intellectual property policies today is the prevailing ideology which accepts private ownership of information *content* as the “natural” and only feasible foundation on which to erect prosperous knowledge-driven economies.



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