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*Scientific and Technological Options
Assessment*

STOA

Background document for the STOA Workshop on:

Policy options for the European patent system

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STOA Workshop on Policy options for the European patent system

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- Policy options for the improvement of the European patent system’

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Introduction to the project and the workshop

This document is a background paper for the workshop on Policy options for the European patent system at the European Parliament in Brussels on November 9th 2006. The document contains a background analysis on the European patent system and a number of papers on policy options for the patent system submitted by the workshop speakers. The contents are a basis for discussions at the workshop.

The purpose of the project and the workshop is to point at policy options for the improvement of the patent system within three focus areas: a) Flexibility and dynamism of the patent system, b) Patents and access to market c) Governance of the patent system.

The project is carried out by a cross-disciplinary working group consisting of the following members:

- Mr. Wim Van der EIJK, Principal Director of the International Legal Affairs and Patent law Department, EPO
- Mr. Peter LOTZ, Head of Department of Industrial Economics and Strategy, Copenhagen Business School
- Mrs. Geertrui Van OVERWALLE, Professor of Law at the Katholieke Universiteit Leuven
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The invited speakers are:

- Mr. Dominique GUELLEC, OECD
- Mrs. Bronwyn HALL, University of California
- Mr. Reto HILTY, Max Planck Institute
- Mr. Hanns ULLRICH, European University Institute
- Mr. Peter DRAHOS, Australian National University
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Bjørn Bedsted

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Background analysis

Background analysis and presentation of the European patent system

The general premise of this background analysis of the European patent system is that overall the patent system *per se* is a positive factor in promoting innovation. It is not the objective of this report to evaluate whether a patent system should or should not exist. Instead, the report works from the starting position that the European patent system may be operating in certain ways and within certain sectors such that improvements to the system can be made.

This paper is a preliminary draft intended to be further modified before being presented as a part of a final report which will be delivered and presented to the STOA panel in the European Parliament during June 2007.

The chapter is structured as follows:

Section 1 provides an introduction to Intellectual Property Rights (IPRs) and patents in particular; including the historical background of the European patent system, a definition of patent rights, geographical issues and a discussion of the socio-economic balance of the system and its value to society. Section 2 discusses the relationship between patents and competition law, and to other IPRs. Section 3 presents information concerning emerging patterns and innovation development trends. And finally, Section 4 discusses the need for policy options to improve the patent system as it currently stands, and to do so, presents the three focus areas selected by the working group responsible for this background analysis.

1. An introduction to IPRs and the patent system

1.1 Introduction: The importance of IPRs and the patent system

We live in a ‘knowledge society’. Politicians, business leaders, researchers and citizens often make this remark. What is meant is that the growth and wealth of societies are no longer products of natural resources or sheer effort alone, but increasingly of science and education, leading to formalized innovation.

The advancement of this new kind of society relies on the use and accumulation of knowledge resources more intensively and strategically than has previously been necessary. Production is increasingly based on the refinement and deployment of ideas rather than on physical products. The economy is becoming ‘weightless’ and ideas-based in this respect. More and more firms no longer sell products in the traditional sense, but choose to offer information goods and services through consultancy and advice. In addition, the licensing of intellectual assets held has assumed greater significance as part of recent changes in trade.

Within the knowledge society, the role of the law includes cultivating, nurturing and realising this intellectual capability, so that it adds to the collective wealth. IPRs are central to this policy and patents and the patent system even more so, primarily because they are an important part of society’s support for the innovation process. Ideally, society would wish that the benefits to be gained by the generation of new ideas are maximised at both a private and public level, and that there is a level of fairness and balance.

It is here that regulatory tools, IPRs such as copyright, trademarks and designs, and patents in particular, need to operate, and continuously adjust in order to adapt to changes in society. For instance, the quickening development of science and technology, the subsequent impact this has within the wider economy, and the possible alteration of business methods as well as many other related aspects means that the relevant laws have to be carefully planned, applied, and, if necessary, revised. In particular, they must be capable of responding to change as quickly and as appropriately as possible. In patent terms, this not only places demands at a private level, namely on firms participating in and depending on the patent system, but also at a public level, namely on the agencies administering the patent process, as well as the patent system itself.

1.2 Historical aspects

The origins of patents for invention are rather obscure and no one country can really claim to have been the first in the field with a patent system. However, Italy and England do have some of the longest continuous patent traditions in the world. Origins can be traced back to the 15th century, where in Italy for instance, the provision of exclusive rights to skilled craftsmen who mastered strategic technologies began with the advent of book printing in Venice. During this time, the English Crown also started making specific grants of privilege to manufacturers and traders.

Many countries have been motivated to introduce a patent system by the hope that it will act as an enticement to attract foreign technology, which also meant that systems were opened up to foreign applications. Thus, patent rights began as instruments used by governments mainly as a way to induce the transfer and disclosure of foreign technologies.¹ This was achieved by granting to importers various degrees of monopoly rather than specific rewards for inventive activity. Not until the Industrial Revolution of the 18th and 19th centuries did IPRs emerge as a universal and strategically important legal discipline – with the fields of patent, copyright and trademarks

¹ See David, “The Evolution of Intellectual Property Institutions and the Panda’s Thumb”. This paper was prepared for presentation at the Meetings of the International Economic Association in Moscow, 24-28 August 1992. See also Kurz, “Weltgeschichte des Erfindungsschutzes”, Köln, Carl Heymanns Verlag, 641 p; WIPO, Introduction to Intellectual Property, Kluwer Law, 1997.

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materializing in the forms we largely know today. And by the end of the 19th century most industrialised countries had fairly efficient IPR systems.

Patents soon became established as means for rewarding invention, although their function as ways to import and diffuse technologies were still visible, in both the disclosure principle and in the national boundaries attached to legal protection (which allowed for patents to be granted to different inventors in different countries). In general, catching-up countries adopted weak IPR legislation which provided enough incentives for foreign technologies to be imported, but also left room for quick imitation by local firms.

Current patent systems therefore are not the product of the current economy and in a number of cases date back to before the Industrial Revolution. Even though many systems were significantly updated during the 19th and 20th centuries by national governments and international conventions – in order for example, to meet the needs of new technologies and organizational forms as well as reduce the inefficiency of certain patent procedures – founding principles still operate in many instances today. For example, the disclosure provisions of modern patent systems were an essential part of the effort to induce foreign inventors to reveal their ideas and thus aid the training of domestic craftsmen.²

These sorts of changes were supported by the principle that welfare is created through new ideas and their strategic use, and that the patent system is a device to help creating economic welfare. It does so by providing incentives to research and improve the efficiency of the market for knowledge and ideas.³ Ideally, society would wish that the benefits to be gained by the generation of new ideas are maximised at both a private and public level, and that there is a level of fairness and balance. It is here that among other regulatory tools, IPRs and patents in particular, need to operate, and continuously change in order to adapt to changes in society.

1.3 The patent system, and the patent right

The fundamental purpose of the patent system is to increase economic welfare by speeding up technological change, which in turn requires more innovations to be introduced, and faster innovation diffusion within the economy. In order to achieve these objectives, patent systems rely upon two pillars: (i) they grant inventors or their employees exclusive property rights over the inventions they produce (if truly novel and susceptible of industrial application); (ii) they impose on patent applicants the duty to disclose all the technical information on the claimed invention which average experts in the field may find it necessary both to understand and possibly imitate the invention in full.

In fact, the definition of a patent has changed over time – reflecting among other things, changes in society and economy. Today, patents are recognised as exclusive rights granted in respect of inventions, to prevent those other than the grantee from exploiting the invention without consent. The patent right does not automatically give the patent holder the right to exploit it, which is often subject to additional rules. For example, patented drugs cannot be marketed unless and until they have been approved by the relevant authorities. Thus as will be seen, judging the overall efficiency of the patent right, and more widely the patent system, requires also some understanding of how these interact with other legal institutions and regulations.

The exclusive right is the key to the system. Since an exclusive right shields the patent holder against competition from firms which may wish to copy the invention, an opportunity is provided to demand higher prices than would otherwise be the case. Viewed in isolation, such a result is undesirable for the economy and society, since it imposes short-term welfare loss onto

² See David, *ibid.*

³ OECD (2004): *Patents and Innovation: Trends and Policy Challenges*. Paris.
<http://www.oecd.org/dataoecd/48/12/24508541.pdf>.

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consumers. Yet these increased earnings constitute a powerful incentive to invest in the production of new technology and may also attract new entrants to the market, thus generating long-term welfare gains.

But the exclusive right comes with some strings attached – and three specific points merit note here. First, it is not everlasting. And usually a patent can be valid only for 20 years. Second, simply in order to know what is protected and to gain protection, the invention is meticulously described in the patent documentation – thus revealing what might otherwise have been kept secret. This provides an opportunity for everybody else to know all the technical details relating to the invention – though the exclusive right prevents non-grantees from using it (unless permitted by the grantee). In turn, this “access” facilitates the dissemination of (technical) knowledge which arguably may inspire others to build further inventions. The structure of the patent right also means that imitation of the innovation is permitted as soon as the patent expires, and so restoring competition where the patent had previously established a monopoly. And third, in many countries, the exclusive right comes with an obligation to actually use the invention. In cases of obvious non-use, the authorities may maintain this rule to demand compulsory licensing of the invention.

1.4 Geographical issues

As with other IPRs, the geographical scope of a patent’s legal effect is limited. The initial structure for the international regulation of IP was laid down by the dominant IP countries at the end of the 19th century. In the field of patents, this was in the form of the Paris Convention for the Protection of Industrial Property (1883).⁴ Broadly, this convention ensured that nationals of signatory countries would be guaranteed the same treatment abroad as they received at home.

Today, there are many regional and international structures for gaining patent rights. Asia, the US and Europe are generally considered the most important patent markets. Regrettably however, some of the most significant rules regulating the registration and infringement of patents differ within these markets – though basic rules implementing international conventions are largely the same. In Europe, the law is becoming increasingly harmonized as part of the Internal Market programme. And this is especially since the conclusion of the European Patent Convention (EPC) in 1973, which is designed to standardize patent requirements.

Box 1: The EPC

To gain patent rights in EPC member states, a grant may be applied for both at the relevant national patent authority and the European patent authority (the European Patent Office (the EPO)) for a European patent. Whichever route is taken, actual patent grants are made by the EPO. The EPC system comprises 31 countries which means in principle that a European patent may be valid in a few, many or all EPC states, plus some non-EU states such as Switzerland and Turkey. Its legal effect is still subject to national patent legislation.

It is not yet possible to obtain a global patent via a single patent application filed with one of the leading patent authorities such as the EPO, the Japanese Patent Office (JPO), or the United States Trademark and Patent Office (USPTO). However, it is possible to obtain a one-fit-for-all patent examination at any of these three offices through the Patent Co-operation Treaty (PCT), signed in Washington in 1970 and operative since 1978 (amendments in 1979, 1984, and 2001). The PCT harmonizes the examination procedures (at a cost for the applicant), and not the kind of protection granted. The objective of the PCT is to facilitate the granting of patents that are applied for in

⁴ See Kurz, *supra*.

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several countries – the main principle is that the national patent authority must agree to consider an application on its merits if it meets the requirements of the treaty as to form and content. Overall, it provides a useful tool for applicants who wish to establish an international patent right to cover many countries – at relatively low expense. The Paris Convention and the PCT make the patent system more workable for everyone, including small enterprises, private inventors and researchers.

In addition, the Patent Law Treaty (PLT), completed in 2000, seeks to harmonize internationally formal procedures, such as the requirements to obtain a filing date for a patent application, the form and content of a patent application, and representation. There are also ongoing, intense negotiations under the auspices of WIPO to devise a Substantive Patent Law Treaty (SPLT), within the Paris Convention framework. The aim is to expand the PLT and possibly at a later date lay the foundation for a more comprehensive, global harmonization of patent law.

The strongest step towards international harmonisation patent protection was taken through the conclusion of the Agreement on Trade-Related Aspects of IPRs (TRIPS Agreement) of 1994, part of the Uruguay Round Agreement under the auspices of GATT, now the World Trade Organization (WTO). The TRIPS Agreement sets a global standard for the development of IPRs and ensures that the patent system is replicated in more countries – WTO currently has nearly 150 members, including the EU as a single member, the US and China. The TRIPS Agreement includes requirements for the national administration and enforcement of IPRs.

Box 2: The TRIPS Agreement

The TRIPS Agreement establishes minimum standards for the level of protection, and enforcement, of IPRs. This does not prevent a country introducing higher levels of protection, which is often taken up. The TRIPS Agreement ensures that patents are available for any inventions, whether products or processes, in all fields of technology, provided that the invention is new, involves an inventive step and is capable of industrial application. Patents must be available and patent rights enjoyable without discrimination as to place of invention, the field of technology and whether products are imported or locally produced.

1.5 The socio-economic balances of the patent system

To fulfil societal objectives, social costs and benefits must be balanced. In the context of a patent system, this means that broadly speaking, any costs society incurs by granting an exclusive right are set-off or matched by the level of technological development arising as a result of the motivation that the system provides in the first place. Yet in this regard, it is a reasonable question to ask why most countries have patent laws at all, and why is it that a free market does not provide the best outcome to society?

The theoretical answer is that the market by itself does not provide sufficient incentives to inventors to invest in the development of new technology, and without a sufficient level of innovation, society would suffer and stagnate over time. The patent system is necessary therefore, as without some kind of protection many investments in new technology would not make sense economically for the inventor. Competitors might imitate the invention, and by bringing an identical or very similar product to the market, the original inventor may have no way of recouping the investment. Knowing this risk already before investing might easily lead the inventor to not to invest at all. An important exception to this situation occurs if the inventor is able to protect his invention by keeping it secret. In some situations that may work, at least for so long as it takes to earn enough to justify the investment. However, in many instances, secrecy is a mediocre instrument. Thus, by providing a viable alternative to industrial secrecy, the patent system helps

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turn present additions to knowledge into a public good, because it makes it easier for society as a whole to exploit the new technology in a cumulative fashion.⁵

Governments have several ways to mitigate this problem. A classical way is simply to pay for new technology out of the government budget. That is what happens in universities and government research institutions. Taxpayers pay universities to do the kind of research that governments find important for the society. This works fine for the kind of scientific knowledge of very fundamental nature, useful to many, and which definitely would not be produced by private organizations. However, for many other investments in new technology, there is a direct, potential market for the products that may be generated by the technology. Here, it is more reasonable to let government not take part in the choice of which technologies to support. And so, patents offer a solution by granting an “artificial” or government supported property right to the inventions. The patent institution is a “social technology” that aims at bringing forth “real technology”.

Such a scheme does not come for free, though. The incentive that is created by the exclusive right stems from the market-place, where the exclusive right supports the creation of monopolies. In fact, to help achieve balance in the market involves an estimation of the impact of the essential patent system features of incentive and monopoly.⁶ A monopoly allows the monopolist to establish some degree of monopoly power in the market place and gain economically from the ensuing higher prices. This is highly appreciated, of course, by the monopolist, but the customers of the products would rather pay the lower prices that prevail under normal conditions of competition. They are in a sense “taxed” to provide the incentive for invention.

What are economic benefits to the inventor, and thus what are the costs to others: had there been no exclusive rights, the inventor would have had no chance of obtaining monopoly power, and prices would thus have been lower. Customers of products building on the invention in this way pay an over-price, compared to a situation without patents. But, alas, without patents the product might never have materialized.

When deciding on whether to carry out certain university research, the government – more or less explicitly – carries out a cost-benefit analysis. In so doing, it tries to estimate the costs of the research and compare it to the benefits; the research results. The same analysis must be carried out for the patent institution. Only if the results, i.e. the technology created because of the patenting possibility, are greater than the costs, i.e. the higher prices that customers have to pay, should patents be allowed. This goes for the patent system in general and its application to specific areas.

For cumulative innovations to materialize it is also necessary that patent breadth and scope (i.e. the number of applications of the same idea over which the patent grants exclusive rights) to be limited: too “broad” patents grant their inventors too many rights over any foreseeable applications of her invention, thus discouraging other individuals and companies to follow in the same line of research. Too “narrow” patents do not provide enough incentives to invent, but too “broad” ones means that society will have to rely solely on the inventors for any development of the protected invention, and not on a collective effort.

An efficient patent system requires both an ex-ante examination process of patent applications that guarantees protection to worthy new ideas, and an ex-post legal system that

⁵ Scotchmer, S. (1991) “Standing on the Shoulders of Giants: Cumulative Research and the Patent Law” *Journal of Economic Perspectives*, Vol. 5, No. 1, pp. 29-41

⁶ For example, since the publication of Nordhaus’ fundamental work on patent duration (also known as patent “length”), economists agree that the best way to balance the short-term welfare losses and long-term gains is to grant patents of finite length; that is patents which expires after a limited number of years (20 in most countries) and are also subject to renewal fees. See Nordhaus, W. (1972) “The Optimal Life of Patent: Reply” *American Economic Review*, 62, 428-431; and also, Scotchmer, S. (2001), ‘On the optimality of the patent renewal system’, *Rand Journal of Economics* (32), 181-196.

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guarantees that granted IPRs can be effectively exercised, i.e. traded among firms and if necessary upheld in court. In order to understand this, one needs to recognize that patent-related incentives to research and entry are both direct and indirect. The possibility to achieve patent protection spurs basic and applied research whose products consist of “proofs of concepts” and prototypes that patent offices reward with exclusive rights. The possibility to defend and trade effectively those rights (which has to be guaranteed by an effective judicial system) spurs further research aimed at developing the protected inventions, in order to turn them into viable new process and product technologies.

A way to summarize the theoretical debate surrounding patents may be as follows: strong patents (i.e. patents of enough length and breadth, properly enforced by the legal system) are necessary for invention, but too strong patents (too long and broad ones, possibly not matched by strong disclosure rules) will stiffen innovation.

Proceeding from the basis that a patent system exists – the crucial issue is the impact on the market and its balance that is created by patent-related exclusive rights. Thus when deciding on patent legislation, the lawmakers have the objective to increase the rate of technological progress by providing potential inventors with incentives to do more research and development and to disclose the technology. But since incentives are paid by the customers, there is a balance to strike between the benefits and the costs of the incentives. Only if the incentives actually generate more inventions, are they worth paying for.

1.6 Empirical evidence: Is the patent system valuable to society?

No conclusive evidence exists on the social value of patents. No one can state with certainty that, even in the absence of a patent system, or in the presence of a weak one, innovation and technical change would decline. Thus, it cannot be stated beyond all doubt that patents are detrimental to innovation and ought to be scraped or limited. Fritz Machlup’s conclusions to his 1958 study are notable, and remain valid today:

“If one does not know whether a system ‘as a whole’ (in contrast to certain features of it) is good or bad, the safest ‘policy conclusion’ is to ‘muddle through’ – either with it, if one has long lived with it, or without it, if one has lived without. If we did not have a patent system, it would be irresponsible, on the basis of our present knowledge of its economic consequences, to recommend instituting one. But since we have had a patent system for a long time, it would be irresponsible, on the basis of our present knowledge, to recommend abolishing it.”⁷

Subsequent research has hardly added better or clearer evidence. For instance, it remains unclear whether, if society had the chance to design from scratch the basic rules of society, ‘a patent system’ should be included. Suffice to say that stating we should keep the system, given it is there already – is a safe recommendation. The crux is that it is not obvious what the optimal configuration of the patent system should be.

It may well be asked why we cannot investigate these matters empirically, and conclude from such analysis. There are, however, sound reasons why general conclusions are difficult, if not impossible to draw. The main problem is one of “counter-factual observations”, which bothers much research in the social sciences. That is to say, we cannot do ‘real experiments’ in which entire societies are observed with and without patent systems. Even in rare situations where countries implement new patent systems or change elements to an existing one, the effects cannot be easily estimated simply because meanwhile, the society has changed on so many other dimensions.

⁷ See Machlup, F. (1958): An Economic Review of the Patent System. Study no. 15. Committee on the Judiciary. United States, Senate. Washington, D.C.

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Thus, only indirect evidence can be applied, either in the form of historical research (evidence from one period in time is “stretched” to later periods) or cross-country and cross-industry comparisons. All such generalizations are open to criticism, but still no better tools are available.

1.6.1 *International comparisons*

Historical studies have been especially important for international comparisons, which have addressed the issue of the interaction between patents, research, economic growth and competition. For example, Lerner has examined historical evidence over a 150-year period for a large number of countries.⁸ From this, he suggests that three factors concur to explain differences in patent legislation across countries: (i) the extent of patent protection may be determined by the relative economic strength of the nation; (ii) the internal political situation – in particular, the degree to which power is centralised among a ruling group – may play an important role; and (iii) the historical origins of the nation’s commercial legal system may be a determinant. The research finds evidence that is consistent with these views, but also suggests greater complexity. Relatively wealthier nations are more likely to have patent systems, to allow patentees longer to put their patents into practice, and to ratify treaties assuring equal treatment of patentees from other nations. But they also tend to limit patent protection in some important ways, whether through requirements that protect earlier innovators or through charging higher fees for patent awards. Countries with democratic institutions are consistently more likely to have patent protection and longer awards.

Even after controlling for these differences however, other variances in legal traditions are generally significant and persistent. To cite several examples, countries of civil law origin, while early to adopt patent protection, have consistently discriminated against foreign patentees. In general, they have greater restrictions on the rights of patent holders, including shorter “working periods” (the maximum period before the patent must be employed in practice) and a variety of other curbs (such as the prevalence of compulsory licensing provisions in German and Scandinavian nations). Fees are significantly higher in these nations as well (with the exception of the Scandinavian countries) than in common law countries.

It is apparent then that the explanation from Lerner’s research suggests that existing national IPR legislation owes at least as much to historical circumstances (and the related political balances and ethical issues), as to careful economic planning of the kind described in section 1.3 above. Lerner also examined 177 changes in legislation in a number of countries, which occurred over the 150 year period. The conclusions indicate that a strengthening of patent protection had a lesser impact on innovation when the particular nation already had strong patent protection, and when its per capita gross domestic product lags further behind other nations. In other words, according to this research, countries which already have in place IPR protection will not gain much from a further strengthening, especially if they have depressed or underdeveloped economies. These results are consistent with previous work, albeit based on more limited data sets.⁹

Studies undertaken on national innovation systems have also disputed the existence of a direct and positive connection between the adoption of strong patent laws on the one hand and innovation and development on the other. Such studies demonstrate that countries like Germany and Japan have managed to achieve regional technological leadership well before adopting strong patent legislation.¹⁰ This is also true for certain Asian countries during the second half of the twentieth

⁸ Lerner J. (2000), “150 years of patent protection”, NBER working paper 7478; Lerner J. (2000), “Patent protection and innovation over 150 years”, NBER working paper 8977

⁹ See Lerner *ibid.* for references.

¹⁰ See Bach, C.F. (2002): *Intellektuelle ejendomsrettigheder og økonomisk udvikling - Konflikt eller katalysator? Nordiskt immateriellt rättsskydd*, 71(3): 209-225. <http://www.friisbach.dk/fileadmin/cfb/publicat/Patent-NIR/Patent->

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century. And similarly, several leading international food and drug companies developed their market position around 100 years ago by exploiting the absence of patent rights.¹¹ Other research results have come about from international trade studies investigating whether stronger patents help to attract increases in foreign direct investments, possibly with high R&D and innovation contents. So far however, these studies have not reached solid conclusions.¹²

1.6.2 Cross-industry comparisons

Recent research on Victorian Britain has suggested that the effectiveness of the same patent legislation may vary across different industry sectors.¹³ From the theoretical viewpoint, this is not entirely unexpected since the social outcome of the patent system depends on the interaction of the system itself with environmental conditions, which vary across sectors. On a closer look however, this conclusion creates another complication, namely: when it comes to measuring the societal benefits of patents, it might well be that patents divert inventive activity away from sectors where patents are not very effective to those sectors where they are. If this is the case, the relevant measurement of the benefit side is not the technological development in the sectors with patents, but the entire country's technological development. In addition, as industries change over time it is extremely difficult to know to what extent the inner workings of inventive activity remain the same, for example 150 years after the cases that were investigated.

Another line of enquiry explores the impact of patents across different industries through questionnaires submitted to selected firms. A number of cross-sectional surveys suggest that, in most industries, patents are not perceived by firms as the most important way to protect inventive activity – though with the notable exception of pharmaceutical and chemical companies.¹⁴ In the semiconductors industry for instance, and more generally in industries relying upon complex technologies (where an individual product is the result of a very large number of components, all susceptible to patent protection), the recent boom in patenting observed by many researchers is largely explained not by the firms' drive to innovate more than before, but by their needs to accumulate large enough "patent thickets". These "thickets" work as an insurance against legal actions from other companies: so if company A fears that its products will infringe one or more patents owned by company B, by holding a large "thicket" company A makes sure that company B will also inevitably infringe one of its patents; negotiations will follow in order to avoid court action and likely obtain mutual cross-licensing.¹⁵

NIR.pdf. See Murmann J.P. (2003), *Knowledge and Competitive Advantage. The Coevolution of Firms, Technology, and National Institutions*, Cambridge Univ. Press; and: Odagiri H. and Goto A. (1993) 'The Japanese System of Innovation: Past, Present and Future', chapter 3 in R.R. Nelson (ed.) *National Innovation Systems. A comparative Analysis*, Oxford University Press, Oxford. An interesting case is that of Norway: Basberg, B.L. "Patenting and Early Industrialization in Norway, 1860–1914. Was there a Linkage?" 2006.

¹¹ Schiff, E. (1971): *Industrialization without National Patents: The Netherlands, 1869-1919, Switzerland 1850-1907*, Princeton University Press som citeret i Det Etske Råd (2004).

¹² Maskus, Keith, 2000, "Lessons from Studying the International Economics of Intellectual Property Rights," *Vanderbilt Law Review*. 53, 2219-2239.

¹³ See Petra Moser, *How Do Patent Laws Influence Innovation? Evidence from Nineteenth-Century World's Fairs*, *The American Economic Review*, Vol. 95, No. 4, September 2005).

¹⁴ See Levin et al, *ibid.* See also the results of all editions of the Community Innovation Survey (<http://cordis.europa.eu/innovation-smes/src/cis.htm>). See also Reitzig (2004): *Litteraturstudie foretaget af lektor Markus Reitzig, CBS for Patent- og Varemærkestyrelsen*, som citeret i Patent- og Varemærkestyrelsen (2005).

¹⁵ Hall B. (2004), "Exploring the Patent Explosion", *Journal of Technology Transfer* 30

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1.6.3 Firm-level studies and comparisons

Many studies report a positive correlation between the number (and quality) of patents owned by a company and its performance, which is typically measured by its market value.¹⁶ Again though, this is at best a very indirect indication of the efficiency of the patent system. For one thing, holding a patent provides the basis for a monopoly and so the fact that companies with patents are performing better than companies without should certainly be expected – otherwise the patents' exclusive rights are without any economic value. And so it is not easy to infer from such studies any specific indications as to whether a given industry sector performs better in terms of inventive activity with or without patents; and if so, to what extent either way.

The issue remains disputed therefore and it is difficult to know exactly what all this research indicates. However, it is apparent that patents alone, and the registration of other types of exclusive right, are no guarantee of commercial success.¹⁷ The studies also demonstrate the need for a broader understanding of the barriers and opportunities offered by the patent system to firms generally, and especially small and medium-sized enterprises (SMEs)¹⁸.

Many firm-level studies focus on whether patents are considered by companies to be better alternatives or useful complements to the many other tools at hand for protecting ideas and inventions, and thus crucially, to aiding recovery of the related R&D costs. These tools include: secrecy; the benefit of being first to the market; the establishment of marketing channels; the advantages of early production; the use of trademarks and branding; certification; and product approval. At first sight, patent protection seems to be a highly attractive option. And yet, this is not always reflected in practice. Most research based on questionnaires submitted to firms indicates that patents play only a minor role in companies' strategies for reaping the benefits of their innovations.¹⁹ Studies undertaken recently show that firms' perception of patents, as the preferred method of protecting innovation, is decreasing – while other methods, primarily secrecy, are enjoying increased use.²⁰

Another key aspect of the patent system worth noting here is the publication and dissemination of knowledge about new inventions. Free access to public records provides a constant flow of information which may be the inspiration for new R&D and/or may decrease redundancy and repetition.²¹ It is likely that considerable research costs can be saved at least through the publication of patent related information, i.e. the description of the invention. In this way, the patent system can contribute to limiting research expenditure while simultaneously enhancing its efficiency. But it is

¹⁶ D Harhoff, F Narin, F M Scherer, K Vopel, "Citation Frequency and the Value of Patented Inventions" - The Review of Economics and Statistics, 1999; BH Hall, A Jaffe, M Trajtenberg "Market Value and Patent Citations", - Rand Journal of Economics, 2005. See also: Reitzig (2004): Litteraturstudie foretaget af lektor Markus Reitzig, CBS for Patent- og Varemærkestyrelsen, som citeret i Patent- og Varemærkestyrelsen (2005).

¹⁷ Oxford Research (2004), *ibid*.

¹⁸ Lanjouw J., Shankerman M. "Protecting Intellectual Property Rights: Are Small Firms Handicapped?" Journal of Law and Economics (April 2004), 45-74.

¹⁹ Levin, R.C; Klevorich, A.; Nelson, R.R. and Winter, S.G. (1987): Appropriating the Returns from Industrial Research and Development. Brookings Papers on Economic Activity, 3:809; Mansfield, E. (1986): Patents and Innovation: An Empirical Study. Management Science, 32(1):173-181; Mansfield, E; Schwartz, M. and Wagner S. (1981): Imitation Costs and Patents: An Empirical Study. Economic Journal, 91:907-918; Scherer, F.M and Ross, D. (1990): Industrial Market Structure and Economic Performance, Houghton Mifflin Company, Boston; Cohen, W.M., Nelson, R.R. and Walsh, J.P. (2000): Protecting Their Intellectual Assets: Appropriability Conditions and Why US Manufacturing Firms Patent or Not, NBER Working Paper 7552. <http://www.nber.org/papers/W7552>.

²⁰ IFO (2002): Undersøgelse vedr. virksomheders anvendelse af enerettigheder. Undersøgelse for Økonomi- og Erhvervsministeriet og Kulturministeriet gennemført af Institut for Opinionsanalyse; Cohen et al. (2000), *ibid*.

²¹ See Sideri, S. and Giannotti, P. (2003), *supra*.

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also important to note that, among other things, the sheer scale of information flow inherent in modern patent systems makes it difficult for SMEs to exploit and manage the system effectively.

2. Patents and related topics

2.1 Patent and competition law

Patents provide protection against the unauthorized use of a patented invention by, for instance, a competitor. Therefore, patent law may have a significant effect on competition. The aim of patent law is to advance technological development for the benefit of society. The overriding objective of competition law is to promote and maintain a process of effective competition so as to achieve a more efficient allocation of resources and maximize consumer welfare. A patent does not automatically imply a monopoly as defined under competition law. However, patents may help create or foster a dominant market position. To some extent, this may seem to be in conflict with the goals of competition law. Yet competition law respects exclusive rights and allows the existence of monopolies based on patents and other IPRs. Patent owners are free to determine how a patent is exploited, including whether or not licenses are to be granted. Generally, licenses are considered important drivers of competition in comparison to those situations where no licenses are granted. Competition policy concerns can prompt certain limitations on misuse of the exercise of exclusive rights. To a large extent though, patent law and competition law will complement one another. The basic aspects of European competition law can be seen in Box 3 below.

Box 3: Competition law

The main rules of competition law can be found in the national competition acts and in Articles 81 and 82 of the EC Treaty. These rules prohibit anti-competitive agreements between undertakings, on the one hand, and the abuse of a dominant position in the relevant market, on the other hand. With regard to the first aspect, competition law contains a specific regulation on patent licenses and on similar “technology transfer agreements.” The abuse of a dominant position may in principle include charging unreasonably high prices. In special circumstances, such as where a patent covers a technology which is totally closed to competition, the case law of the European Court of Justice of the EC indicates that competition law may be used as a basis for granting a compulsory license which forces the patent holder to issue a license.

Nevertheless, patents can have a positive influence on competition as well by making it easier for entrepreneurs and start-ups to facilitate their market entry, to gain a foothold in the market and subsequently protect their market position. They can also facilitate the diffusion of new technology which in turn may encourage positive competition.²² Studies have shown that some firms make extensive use of published patents as a source of information.²³ Moreover, patents can be a decisive factor in attracting venture capital for entrepreneurs and start-ups from external investors. They can also be influential in strengthening cooperation with other firms²⁴ as well as bolstering negotiation positions with competitors and helping to appropriate large revenues through licenses. For instance, IBM takes out the most patents in the world, and reports annual revenues of more than US\$1.5

²² OECD (2003), *ibid*.

²³ Sheehan *et al.* (2003), *ibid*.

²⁴ Gans, J., Hsu, D.H. and Stern, S. (2002): When Does Start-up Innovation Spur the Gale of Creative Destruction? The Rand Journal of Economics, Vol. 33, No. 4.

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billion from licenses.²⁵ Estimated revenues from licenses have risen globally from around US\$10 billion dollars a year in 1990 to more than 100 billion in 2000.²⁶

In cases the competition authorities have traditionally intervened, like where a patent holder attempts to “transfer” a monopolistic position in a product market based on a patent, to one of the firm’s other product markets,. An example of such abuse is tying; if a license is only granted by a patent holder if the licensee buys other services from the patent holder. In general, such “conditional licenses” may distort competition and thus their validity will usually be subjected to scrutiny by the competition authorities. The authorities have ensured licensing to third parties in merger cases where the two merging companies would otherwise acquire a dominant position based on the ownership of all the relevant patents.²⁷

It is broadly accepted that the presence of many interrelated patents will normally make it more difficult for competitors to penetrate a market, especially new entrants. Fears that a proliferation of patent rights hampers competition are particularly strong in electronics and ICT industries. Such negative market impact is magnified by patents that are obtained solely to block access by competitors, which is a noted and widespread practice in the semi-conductor industry.²⁸ Interestingly, a study of ICT firms in the OECD countries indicates that 75% of those asked said they would patent technology today which they would not have patented a decade ago even if it had been possible.²⁹

Thus, in specific circumstances competition law may operate as an emergency brake that may be applied in those rare instances in which the relationship between society’s interests in effective competition conflict with the exclusive rights of patent holders. For instance, this would occur where the market effects of a patent are different than normal or anticipated, such that excessive and anti-competitive power is captured by the patent holder and wielded in the market.

2.2 Patents and other IPRs

There are a variety of ways in which the results of inventive or creative activities can be owned. Besides patents, the other major rights are copyright and trademarks. While there are similarities among these three main kinds of IPRs, they are different in many important respects. Let us first state the basic elements of copyright and trademarks.³⁰ Copyright relates mainly to literary and artistic creations, such as novels, music, paintings, cinematographic works, etc. The right of “copyright” includes the making of copies of the literary or artistic work, or by making the work available to the public, such as a book or a photograph, which may be made only by the author or with his authorization. The right to make copies can be exercised by other persons, for example, a publisher who has obtained a license to this effect from the author. Trademarks are the signs, or any combination of signs, that are capable of distinguishing the goods or services of one undertaking from those of other undertakings. These signs can take a variety of forms, though mainly in word form, but also including personal names, letters, numerals, figurative elements and combinations of colours. Broadly speaking, the law ensures that third parties are prohibited from using the trademark

²⁵ OECD (2003), *ibid.*

²⁶ OECD (2004), *ibid.*

²⁷ Shapiro, C (2002), *Competition policy and innovation*, STI Working Paper 2002/11, OECD.

²⁸ Hall, B.H. and Ziedonis, R.H. (2001): *The patent paradox revisited: an empirical study of patenting in the U.S. semiconductor industry, 1979- 1995.* RAND Journal of Economics, 32(1): 101-128.

²⁹ Sheehan, J., Guellec, D. and Martinez, C. (2003), “*Business Patenting and Licensing: Results from the OECD/BIAC Survey*”, in *Patents Innovation and Economic Performance*, proceedings of the OECD conference on IPR, Innovation and Economic Performance, 28-29 August 2003, OECD.

³⁰ See WIPO book, *supra.*

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or a sign similar to it, at least in connection with goods for which the trademark was registered or with goods similar to such goods, without the authorization of the owner.

An important distinction between patents and copyright is that patents are capable of providing rather extensive protection whereas copyright protection is more limited. This is because the thing that is copyrighted is normally not protected against independent creation, i.e. similar ideas expressed in different ways – possibly from other parties ‘stripping down’ the original copyright creation and effectively using it as the basis for another creation. Copyright protects the expression of ideas and not the ideas themselves. A patent right is attached to the invention and the information behind it. The patent right is different to copyright, in some respects it is stronger – as patent holders are able to prevent all other parties from using that property within the relevant geographical market.

With respect to patents and trademarks, similarities exist in terms of protection against independent creation, and that formal registration is necessary to obtain rights, which is not the case with copyright. Further, trademark rights attach to specific products within specifically defined areas – in a similar way as patent rights are limited to the claims made. However, many distinctions exist, such as in relation to the term of protection – a trademark can effectively be perpetually renewed, whereas patent rights are limited (usually to a maximum period of 20 years). The processes for obtaining rights also differ – for a trademark, a single registration can result in EU-wide protection, and the process is generally shorter and cheaper than for patents.

There are many practical occasions where the main IPRs are connected. Consider for instance, a marketing campaign for a new technological (patented) product – which may introduce a distinctive (trademarked) mark or slogan for use with the product, and features creative messages and artwork in advertisements (which attracts copyright). Together IPRs are forming a critical part of the decision for a rising number of firms to being publicly traded and priced according to their intangible assets, which inevitably puts additional need for well-functioning IP systems.³¹

Whilst collectively therefore, IPRs may be used by organisations to enhance their position relative to others, and that governments may have IP policies oriented to promote trade and economic activity, substantive and procedural differences are marked between the main tenets of IP and they serve different purposes.

3. Patent development trends

3.1 *Some emerging patterns*

Patent rights have continued to be strengthened and developed over recent years. Traditionally, studies into the effects of patents concentrated on identifying the optimal patent length. More recently, literature on the social welfare effects of patents has also concentrated on patent breadth and height – which include the standard of inventive step necessary for gaining protection. This is reflected in some of the important areas of emerging trends that are listed here.

- The patent system has expanded to include a variety of new fields, such as biotechnology (biotech) and information and communication technology (ICT), and consequently, the number of patents awarded has risen significantly in recent years.
- Related to this, there has been an increase in university patenting – covering both university-owned patents and university-invented patents. Many more inventors and firms are granted patents. The patent system has spread to cover more countries, and public research

³¹ See Patent- og Varemærkestyrelsen (2005) and OECD (2004).

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institutions are now in a better position to patent their inventions than has previously been the case.

- Patent protection terms have been lengthened. International harmonization has resulted in a general extension of the term of protection in many countries. Also, the introduction of supplementary protection certificates for pharmaceuticals and plant protection agents has extended protection terms beyond the standard 20 years.
- Arguably, it is now administratively easier to obtain a patent – as a result partly of patent application procedures having been subject to streamlining and harmonization, particularly at the regional and international levels. As well as this, costs associated with pre- and post-grant of applications have generally stabilised or been reduced.³²
- The protection and enforcement of patents is stronger than before. Use of the court system to enforce patents is now more widespread, and international enforcement procedures have been strengthened by the WTO dispute settlement mechanism.

In Europe, Japan and the US, there has been an increase of more than 40% in patent applications to 850,000 per year during the period from 1992 to 2002. As Figure 1 shows, the USPTO receive approximately three times as many applications as do their European counterparts, the EPO – though the growth rate is the steepest in Europe.

Figure 1: Patent applications

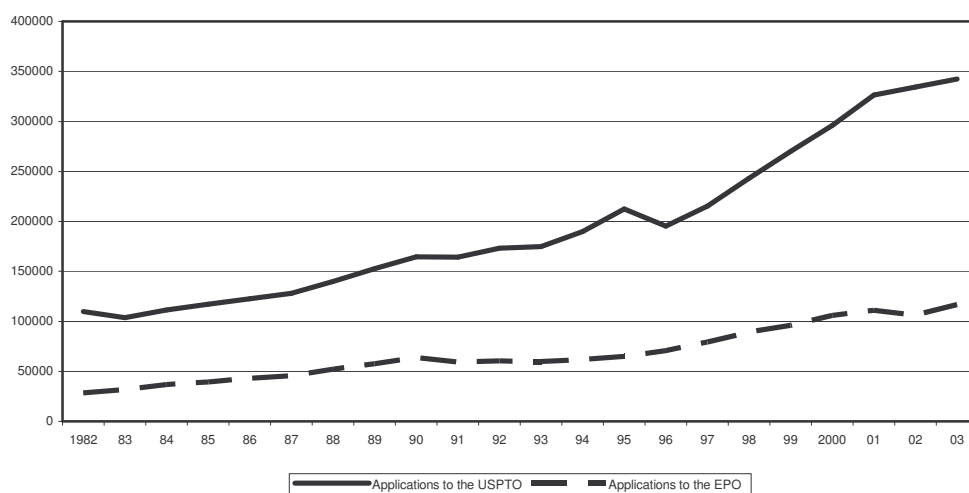


Figure 1: Patent applications³³. Source: OECD Patent Database, March 2005, and USPTO and EPO annual reports.

³² Reference to EPO report. website

³³ Dates are recorded as the time of application. The EPO data for 2003 has been estimated by OECD.

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Figure 2 - Patent applications in new fields: Number of applications to EPO

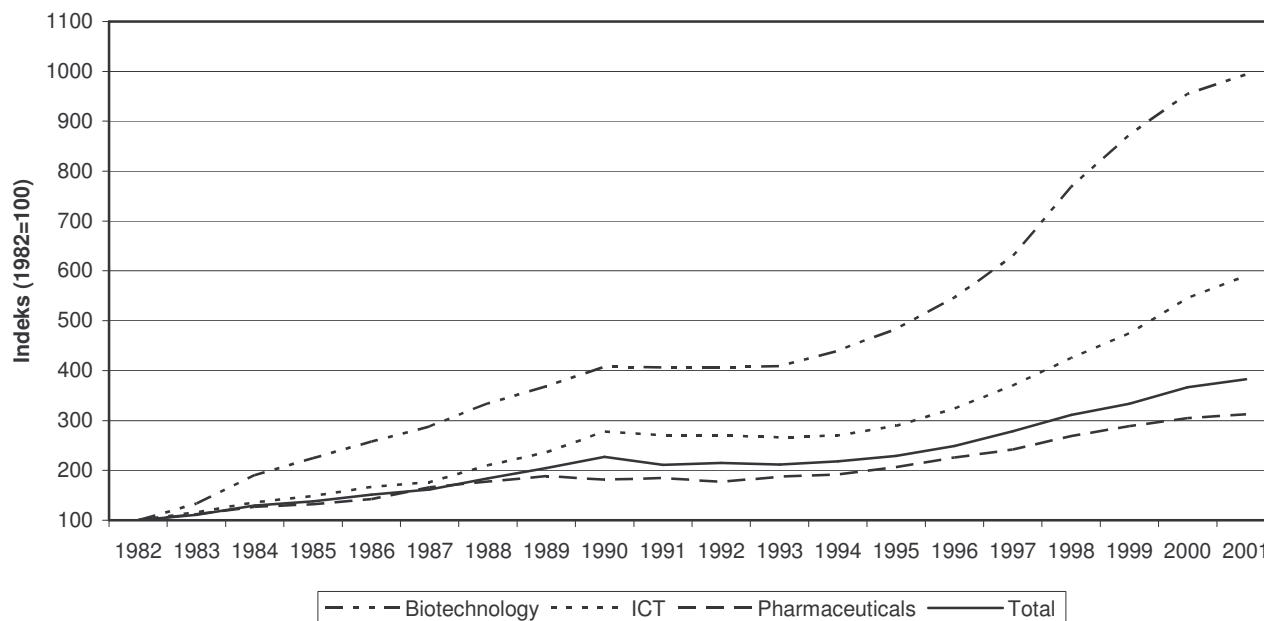


Figure 2: Patent applications in new areas, in numbers of applications to EPO³⁴. Source: OECD, Patent database, March 2005.

Patent applications in the fields of biotech and IT have particularly contributed to this increase.³⁵ It shows the growth rate for three selected areas. Biotech, fairly narrowly defined, has multiplied a staggering 9 times since 1982 and ICT has grown 6 times, with pharmaceuticals tripling.³⁶

It is common now, in the US, to refer to this strong increase in patent applications as a true “patent explosion”. Many researchers are still searching for its explanation, but most are concerned that it may result from the patent system, at least the US one, having spun out of control, and not delivering any more high-quality, truly novel inventions.

3.2 Specific innovation trends

The striking growth in the number of patents during the last decade is a reflection of the fact that innovation processes are changing. Innovation is more competitive and yet more cooperative. It is dependent on new, high-tech firms as well as on knowledge networks and markets. Nowadays, more and more firms are competing through innovation – using global networks and partnerships, and reorganizing their value chains and employing sub-contractors.

³⁴ Figure 2 is based on the IPC codes of the applications which indicate the technology type of the patent. The definition of the categories of ICT and biotechnology follows OECD classifications (See OECD, “Compendium of patent statistics, 2004”). The drugs are defined on the basis of IPC classes A61K, C07C, C07D, C07F, C07G, C07H, C07J and C07K. Because most patents have several IPC codes, it is very difficult to divide all patents into mutually exclusive technological classes. Double counts are thus inescapable. An extreme case is a bio-informatics patent which will have IPC codes from the categories of biotechnology, ICT and drugs.

³⁵ OECD (2004), *supra*.

³⁶ As the Figure shows, drugs are defined as patent applications which are classified by at least one of a number of drugs-related technology codes (IPC codes). The raw data reveals that the number of new chemical compounds is growing slowly, while the number of completed chemical preparations is growing rapidly.

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The realities of the knowledge economy also mean high start-up costs, mainly for the R&D necessary to create and develop new technologies that provide opportunity for market entry. This applies to high-tech products such as drugs, computer technology, industrial aircrafts, telecommunications, genetic research and nanotechnology. High cost structures can mean patents are vital for the protection of investments and for the creation of a competitive edge.³⁷

At the same time, there are heightening safety requirements for consumers, raising ethical and moral considerations, and more stringent environmental concerns. All of which make the journey from idea to production more treacherous and most notably in the drugs industry, where requirements for documentation, testing, control, approval and patient care have increased costs and time spans. Such requirements may hamper innovation and increase the commercial pressure for stronger patent protection to justify increased resources needed. Stricter requirements to develop even the cheapest drugs, stronger corporate market strategies and increased competition from generic producers also mean that pirated products challenge existing patents much more aggressively – even before they expire – which may dilute the financial benefit of a patent. Yet the drugs industry is better at optimizing, and thus shortening, the process from idea to production and pharmaceutical firms continue to find ways to extend the protection period through supplementary patents, such as for derivatives and processes.

The challenges faced by the patent system are equally illustrated by the software industry where the number of patents has risen dramatically. Of particular significance has been Open Source – which describes practices in production and development that promote access to an end product's sources. Open Source is well-known, and mostly so in the ICT field, where Open Source software products such as the operative system Linux and the web server Apache, enjoy wide dissemination.³⁸ Open Source software is computer software whose source code is available under a copyright license that permits users to study, change, and improve the software, and to redistribute it in modified or unmodified form. Under such a regime, free access is provided to the source code for any purpose under the condition that any derivative work must enjoy the same, no-royalty basis of conditions and rights.³⁹

Open Source software is the most prominent example of this development trend. The basic idea behind it is very simple: when programmers can read, redistribute, and modify the source code for a piece of software, the software evolves. And this can happen at a speed that compared to the slow pace of conventional software development, is rapid. The rise in use of Open Source strategies can be viewed as a response to the growth in IP protection,⁴⁰ and the technologies involved are typically protected by exclusive rights. This concept of so-called “copy-left” makes it possible for example, for copyright holders to force subsequent product developers to follow the same open use policy. The nature of software development makes it difficult however, to avoid being caught in the copy-left “trap” because technological change typically occurs through improvements of existing software already containing thousands of lines of software text, some of which could be open source and which would be impossible to re-write.

In spite of the problems of building a profitable business concept around Open Source, it has produced a wealth of good software, to the surprise of many. Under certain circumstances, traditional firms can also benefit greatly. For example, Netscape opened the code to its main

³⁷ Sideri, S. and Giannotti, P. (2003): Patent System, Globalization, Knowledge Economy. WP. n. 136. Centro di Ricerca sui Processi di Innovazione e Internazionalizzazione.

³⁸ For example, Apache's market share of web servers was almost 70 percent in May 2005. See Netcraft Web Server Survey, see <http://news.netcraft.com>

³⁹ An example is “The GNU General Public License”. See <http://www.gnu.org/licences/gpl.html>

⁴⁰ Cowan, R. and Harison, E. (2004): Revealing Obscure Sources: The Paradoxical Evolution of Software Appropriation Regimes. Paper presented at the Department of Industrial Economics and Strategy (IVS), Copenhagen Business School. <http://web.cbs.dk/departments/ivs/events/harison.pdf>

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browser; IBM with its development system Eclipse; Sun released its Office Suite, StarOffice to become the open source OpenOffice; the Macintosh operating system is based on the open sources BSD. Having released this code, all these firms, and many others, now contribute human resources to the Open Source community in further development of these products. All of which suggests that the strong exclusive rights of copyright or patents, and Open Source development, are not necessarily incongruent. It is the terms of the license that really matter.⁴¹ And the Open Source concept has also spread to other areas, such as biotech. CAMBIA, a non-profit biotechnology research group based in Australia, has developed technology to insert new genes into plants and made the methodology available to others through an Open Source license.⁴²

Another widespread trend is the publishing of a potential invention in order to keep others from obtaining a patent (so-called 'defensive publishing'). Examples are the development of large public genetic databases in which many universities and private firms disclose sequences of genes and other data to block future patents.⁴³ And for a long time, firms such as IBM also have used defensive publishing in software.⁴⁴

4. Patent Policy

4.1 *The need for policy options*

It is apparent that patents have an important role to play, yet it is difficult to accurately assess the scope of that impact. Detailing the relationship between IP laws and levels of innovation is an ever present and challenging empirical question for economists.⁴⁵ What can be said is that given the close relationship between patents and competition at various levels, the importance of creating and sustaining balance is clear. Broadly speaking, the patent system as a whole has to try to weigh up the positive effects gained from providing incentives to innovation against the negative effects incurred from the grant and exploitation of monopoly rights. Article 7 of the TRIPS Agreement states that, "The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and diffusion of technology, to the mutual benefit of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations."⁴⁶

⁴¹ Within copyright, more flexible license terms have been developed by the Creative Commons movement. See <http://creativecommons.org>

⁴² The Economist (2005-02-12): The triumph of the commons, p. 55. and CAMBIA (2004): The CAMBIA BIOS Initiative: Biological Innovation for Open Society. CAMBIA, Australia, www.cambia.org. The technology was first patented by CAMBIA, and then offered for use with a special BiOSlicense. See VAN OVERWALLE, G., VAN ZIMMEREN, E., VERBEURE, B., MATTHIJS, G., 'Models for facilitating access to patents on genetic inventions', 7 Nature Review Genetics, February 2006, 143-148.

⁴³ See VAN ZIMMEREN, E., VERBEURE, B., MATTHIJS, G., & VAN OVERWALLE, G., 'A Clearinghouse for Diagnostic Testing: the Solution to Ensure Access to and Use of Patented Genetic Inventions?', Bulletin of the World Health Organization, 2006, 352-359].

⁴⁴ Merges, R.P. (2004): A New Dynamism in the Public Domain. The University of Chicago Law Review, 71:XXX pp. 1-20.

⁴⁵ This challenge was probably most famously noted by Penrose, who commenting on the impact of national patent laws stated that if they "did not exist, it would be difficult to make a conclusive case for introducing them; but the fact that they do exist shifts the burden of proof and it is equally difficult to make a really conclusive case for abolishing them." See Penrose (1951), "The Economics of the International Patent System". Baltimore: John Hopkins University Press. Recent research confirms this fundamental difficulty. See the literature review undertaken by Mazzoleni and Nelson (1998), "Economic Theories About the Benefits and Costs of Patents," Journal of Economic Issues. 32, 1031-1052.

⁴⁶ GATT (1994): Trade-Related Aspects of Intellectual Property Rights. http://www.wto.org/english/docs_e/legal_e/27-trips_01_e.htm. Such statements though may tend to hide a number of theories and assumptions about the patent system which often emerge in more specific and empirically based discussions about its relative costs and benefits. See Mazzoleni and Nelson, supra.

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Yet an accumulation of some of the trends identified above reveals that innovation and technological development in some technological areas can be fostered without necessarily the use of traditional methods to exploit IPRs. This naturally leads to a questioning of the current patent system, its role and impact. A general concern is that the present system of protection is not well-suited to technological advances and challenges and that the basic foundations of the patent system – exclusive rights and territoriality – are being increasingly exposed and subject to pressure. A more specific concern is the rapid speed with which technology develops compared to the slow adaptation and development of patent regulation, which could result in a mismatch between the reward offered and the costs incurred by the inventor. In gene technology for example, the identification and basic characterization of genes – something that was regarded as revolutionary research only a few years ago – is now part of routine laboratory procedures in combination with the use of large centralised databases.⁴⁷

Technological development may increase therefore, the need for a more differentiated approach to the protection of IP. The Open Source movement points to new strategies for developing innovation. Shorter patent periods may be necessary, as well as cheaper and faster patenting processes for products with a short life span and high rate of turnover. On the other hand, a longer patent period may be desirable for products that involve heavy legal and process requirements that push up the costs for R&D. The balance between traditional exclusive rights and a more flexible right of remuneration should also be explored, as should the development of faster and more efficient methods of protection, such as the utility model system, to register new inventions can also be looked at. But it may be difficult to administer more flexible systems and supplementary strategies might be needed to reduce the negative effects of patent legislation through various limitations on protection.⁴⁸

It is apparent that fuller investigation is needed and within Europe there has been an on-going debate as to the fairness and viability of the current patent system.⁴⁹ And as a result, a number of challenging questions are worth mentioning:

- Will the current patent system lead to increased economic growth, more robust competition and stronger research – or the reverse?
- Has the strong increase in the number of patent rights awarded promoted or blocked innovation and economic performance?
- Have the increased possibilities for and use of patenting in public research institutions aided or hampered the development of knowledge, particularly in the basic sciences?
- Are the various protections that are available both within and outside the patent system adequate to counter any potential negative market effects?
- Is the patent system sufficiently flexible and efficient to house the fluid environment brought about by innovation and technological advancement?
- Does the present regime ensure a smooth patenting process, with the result of high-quality patents accompanied by effective enforcement procedures? And,
- Are there or should there be any limits to what can be patented and what can not?

⁴⁷ Sommer, T. (2004): Bilag 1: Patentret og det humane genom. I "Patent på menneskers gener og stamceller." Redegørelse fra Det Etske Råd.

⁴⁸ The report will examine these areas more closely in the chapters below.

⁴⁹ In the US, analyses which highlight possible negative market effects are encouraged before new areas of technology are included as being patentable within the patent system. See Federal Trade Commission (2003): To Promote Innovation: The Proper Balance of Competition and Patent right and Policy. <http://www.ftc.gov/opp/intellect/index.htm>

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4.2 Focus areas

These are pivotal questions in any discussion about the future of the patent system in Europe and this report was inspired by these sorts of issues together with the continuing expansion of the system and the rapidly increasing number of patents awarded. The patent system is a central part of our institutional infrastructure and it is very important that it functions well so as to serve a range of private and public interests. However, there is mounting worry about the system and thus it has become more and more the subject of public debate, and while it is not possible to deal with all the issues that may be worthy of further investigation, three specific areas have been identified, within which policy options are sought: these are the focus areas. The three focus areas put forward have been carefully chosen in areas which reflect the overall goals of the patent system, and are a means of addressing the consequences of current trends in the system and ultimately therefore, about improving its output.

1. *Flexibility and dynamism of the patent system*

There is growing concern that the current patent system is in some areas blocking rather than stimulating innovation. Given the overall purpose of the patent system, this is absolutely critical. The concern reflects a perceived level of inherent inflexibility which means the system is unable to accommodate the diversity of technology innovation, especially in certain industry sectors such as biotechnology and ICT. And the rapid speed at which science and technology continues to develop puts constant additional pressure on the system. It might thus be, that the current regulatory framework could result in a mismatch between rewards offered to, and costs incurred by, patent applicants. Related to this is the increasing practice of system users to build-up large patent portfolios for purely strategic purposes, rather than for the reason of innovation – defensive patents.

This focus area is important because it is about facilitating a more efficient distribution of rights and a greater optimisation of market effects. The overall desired impact of the policy options proposed within this area is that the patent system would have more flexibility than the current ‘one size fits all’ approach which reduces the speed that the system can respond to technological change. The result should mean a more dynamic and sequential level of innovation.

2. *Patents and access to markets*

At present, more innovations seem to be protected with a multiplicity of patent rights owned by an increasing number of holders. This increase of patents might lead to a dense and non-transparent web of patent rights, and an accumulation of royalties. Observers are concerned that this may further complicate access to the market, particularly for smaller and up-coming enterprises, and other non-commercial institutions. It is necessary to deal with this effect of the patent system.

The policy options proposed within this focus area aim at facilitating a greater use of patented technology, which should result in a more rapid exchange of knowledge. The cumulative effect may be to stimulate higher levels of scientific and technological innovation, especially among smaller and up-coming enterprises. This in turn should bring about certain perceived benefits for the wider society as a whole, such as greater levels of innovative competition.

3. *Governance of the patent system*

The patent system should reflect not only the needs of industry but also the values of society at large. To do so, the system must have transparency and representation within it. In this respect, it is desirable to involve a variety of actors in developing the patent system. Such participation will encourage the examination and discussion of the system, its attributes and possible reform from the perspective of a wider group of stakeholders. This area also mirrors a re-prioritisation in recent

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years within the EU on issues of governance, such as accountability, transparency and better law making.

The policy options proposed within this focus area aim at facilitating improvements in accessibility to the system. The aim is to stimulate greater and more informed levels of participation so that system users and affected parties will come to feel more involved and part of the processes. This in turn could lead to more pluralism, legitimacy and democracy within the European patent system.

The policy options within these three focus areas will be developed by the working group, partly based on the ideas, comments and opinions presented and debated at the workshop at the European Parliament on 9 November 2006. They will be presented as part of the final report to be delivered and presented to the STOA Panel at the European Parliament during June 2007.

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Programme

8.15 – 9.00 Registration

9.00 – Welcome by Philippe Busquin, MEP, Chairman of the STOA panel

- Presentation of the project by Bjørn Bedsted, project manager, ETAG

9.20 - Opening session (Chaired by Bjørn Bedsted, ETAG)

30 minutes: Presentation of background analysis and focus areas by members of the working group:

- Wim Van der Eijk, Principal Director of the International Legal Affairs and Patent law Department, EPO
- Robin Cowan, Professor of Economics of Technical Change at the University of Maastricht
- Peter Lotz, Head of Department of Industrial Economics and Strategy, Copenhagen Business School
- Geertrui Van Overwalle, Professor of Law at the Katholieke Universiteit Leuven
- Francesco Lissoni, Professor of Applied Economics at the University of Brescia, Faculty of Engineering
- Jens Schovsbo, Professor, University of Copenhagen, Faculty of Law
- Matthew Elsmore (rapporteur), Assistant professor, Aarhus Business School

9.50 – Economic session (Chaired by Francesco Lissoni)

20 minutes:

- Dominique Guellec, senior economist, OECD
- Bronwyn Hall, Professor of economics, University of California

30 minutes: Questions from working group and audience

15 minutes: Questions from MEP's

10 minutes break

11.05 – Legal session (Chaired by Wim Van der Eijk,)

20 minutes:

- Reto Hilty, Professor, Max Planck Institute, Munic (not finally confirmed)
- Hanns Ullrich, Professor, European University Institute, Law Department

30 minutes: Questions from working group and audience

15 minutes: Questions from MEP's

10 minutes break

12.20 – Governance session (Chaired by Geertrui Van Overwalle)

20 minutes:

- Peter Drahos, Director of the Centre for Governance of Knowledge and Development, The Australian National University
- Ingrid Schneider, Professor, University of Hamburg

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30 minutes: Questions from working group and audience

15 minutes: Questions from MEP's

13.25 - Lunch

14.35 – Stakeholder session (Chaired by Dominique Guellec)

45 minutes:

- Tim Hubbard, The Sanger Institute
- Thierry Sueur, Vice-President, Intellectual Property Air liquid, rep. UNICE
- Michelle Childs, Head of European Affairs, CPTech, rep. BEUC
- Hans-Werner Müller, Secretary-general of UEAPME
- Thomas Schweiger, Greenpeace
- Roger Burt, Intellectual Property Law Counsel, IBM Europe
- Lars Kellberg, Vice President, Corporate Patents, Novo Nordisk

40 minutes: Questions from working group and audience

20 minutes: Questions from MEP's

16.20 - Wrap-up session (by Geertrui Van Overwalle)

Conclusions from today's debate

16.35 - News from the Commission

10 minutes: Mirjam Söderholm, Deputy Head of Industrial Property Unit, DG Internal Market

16.45 – Closing by Bjørn Bedsted, ETAG

CVs of the workshop speakers

Wim van der Eijk

Mr. Wim van der Eijk is since 2005 Principal Director International Legal Affairs & Patent Law at the EPO. Before joining the EPO he was manager of the Patent Division and chief legal officer of the Netherlands Patent Office. He also worked in the Ministry of Economic Affairs of the Netherlands in a variety of legal posts. Mr. van der Eijk was chairman of the Patent Law Committee of the European Patent Organisation and chairman of a working group that drafted the European Patent Litigation Agreement (EPLA). He assisted as a honorary judge the District Court of The Hague in dealing with patent cases.

Robin Cowan

Robin Cowan is currently Professor of Economics at the Bureau d'Economie Theorique et Appliquée (BETA), at the Université Louis Pasteur, and Professor of Economics of Technical Change at the Maastricht Economic Research Institute on Innovation and Technology, MERIT, at the University of Maastricht. He is also an adjunct professor at the Economics Department at the University of Waterloo. He has several varied research interests, such as:

- Modelling the Economics of Technology Adoption
- The Dynamics of Networks and Network Structures
- Economics of Knowledge Generation
- Technology Competitions and Standardization
- Consumption Dynamics

Peter Lotz

Office

Department of Industrial Economics and Strategy, Copenhagen Business School

Current and Past Positions

1999- Head of Department, Department of Industrial Economics and Strategy, Copenhagen Business School

1995- Associate Professor, Department of Industrial Economics and Strategy, Copenhagen Business School

1997-1998 Visiting Scholar, Berkeley Roundtable of the International Economy (BRIE) and Haas Business School, UC Berkeley

1991-1994 Assistant Professor, Department of Industrial Economics and Strategy, Copenhagen Business School

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1988-91 Research Fellow, Institute for Industrial Research and Social Development, Copenhagen Business School

Research Areas

Industrial organization, technology strategy, user-driven innovation, industrial and competition policy, intellectual property rights, the economics of science, university governance.

Current professional activities

Member of the board of directors for the Danish Lawyers' and Economists' Pension Fund (JØP) (from 2001).

Treasurer for the international association European Policy for Intellectual Property.

Geertrui Van Overwalle

Professor Geertrui Van Overwalle works at the Centre for Intellectual Property Rights (CIR) of the Catholic University Leuven (KULeuven, Belgium).

Geertrui Van Overwalle teaches 'Patent law' and 'Intellectual Property Rights in the

Biomedical Sciences' at the KULeuven and 'Plant Breeder's Rights and Biotechnology' at the KUBrussel.

She has been visiting professor at the United Nations University (2000-2003), the Renmin University of China, Beijing (2001) and Monash University, Melbourne (2003).

Geertrui Van Overwalle is author of numerous articles and various monographies relating to patent law and biotechnology. Her main fields of research are: patent law, plant breeder's rights law, patents and biotechnology, IPR and biodiversity, IPR and ethics.

Geertrui Van Overwalle has recently been appointed as a member of the European Commission's Expert Group on Biotechnological Inventions.

Francesco Lissoni

Francesco Lissoni is Associate Professor of Applied Economics at the University of Brescia and Deputy Director of CESPRI, the research centre on the economics of innovation of Bocconi University, Milan. He received his PhD from the University of Manchester. His research interests cover technology adoption, the geography of knowledge diffusion, university-industry technology transfer, and the economics of science. Recent publications include: "Networks of inventors and the role of academia: an exploration of Italian patent data", Research Policy 33/1, 2004 (with M. Balconi and S. Breschi); "The reaper and the scanner: indivisibility-led incremental innovations and the adoption of new technologies", Cambridge Journal of Economics 29, 2005, pp. 359-379; "From publishing to patenting: Do productive scientists turn into academic inventors?", Revue d'Economie Industrielle, 110, 2005 (with S. Breschi and F. Montobbio); and "Mobility and Social Networks: Localised Knowledge Spillovers Revisited", Annales d'Economie et de Statistique, forthcoming

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2006 (with S. Breschi). From 2003, Francesco Lissoni directs ESSID, the European Summer School of Industrial Dynamics.

Department and University Affiliation: University of Brescia, Dept. of Mechanical Engineering.

Personal or Institutional Website URL: <http://www.cespri.unibocconi.it/lissoni>

Jens Schovsbo

Jens Schovsbo, dr.jur., is professor in IPR at the The Faculty of Law, University of Copenhagen. He was a member of the Danish Board of Technology's working group on "Recommendations for a Patent System for the Future".

Work

2003 Professor of Intellectual Property Law, University of Copenhagen

2001 Senior Associate Professor of the Law of Property, University of Copenhagen

1999 Associate Professor of the Law of Property, University of Copenhagen

1995 Research assistant, University of Copenhagen

1995 Assistant Professor of the Law of Property, University of Copenhagen

1992 Postgraduate fellow, University of Copenhagen

Dominique Guellec

Dominique Guellec is senior economist in the Economic Analysis and Statistics Division of the Directorate for Science, Technology and Industry (DSTI) of OECD. He works on productivity and innovation. In 2004 and 2005, he was Chief Economist of the European Patent Office. From 2001 to 2003 he was head of the science and technology indicators unit of the OECD, and he coordinated the revision of the Frascati manual (R&D statistics) and the Oslo manual (innovation surveys). He has published extensively, books, reports and academic articles on economic growth, productivity, R&D, technological change and patenting. His latest publications include *The Economics of the European Patent System* (Oxford University Press, 2007); *From R&D to Productivity Growth: the Sources of Knowledge Spillovers and their Interaction* (Oxford Review of Economics and Statistics, 2004); *The Value of Patents and Patenting Strategies: Countries and Technology Areas Patterns* (Economics of Innovation and New Technology, 2002).

Bronwyn Hall

Bronwyn H. Hall is Professor in the Graduate School at the University of California at Berkeley and Professor of Economics of Technology and Innovation at the University of Maastricht, Netherlands. She is a Research Associate of the National Bureau of Economic Research and the Institute for Fiscal Studies, London. She is also the founder and partner of TSP International, an econometric

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software firm. She received a B.A. in physics from Wellesley College in 1966 and a Ph.D. in economics from Stanford University in 1988.

Professor Hall has published articles on the economics and econometrics of technical change in journals such as *Econometrica*, the *American Economic Review*, the *Rand Journal of Economics*, and *Research Policy*. Her current research includes comparative analysis of the U.S. and European patent systems, the use of patent citation data for the valuation of intangible (knowledge) assets, comparative firm-level investment and innovation studies (the G-7 economies), measuring the returns to R&D and innovation at the firm level, analysis of technology policies such as R&D subsidies and tax incentives, and of recent changes in patenting behavior in the semiconductor and computer industries. She has also made substantial contributions to applied economic research via the creation of software for econometric estimation and of firm-level datasets for the study of innovation, including the widely used NBER dataset for U.S. patents.

Reto Hilty

Function:

Managing Director

Full Professor of Law at University of Zurich (additional position)

Professor of Law at Ludwig-Maximilians-University of Munich

Curriculum Vitae:

Study of mechanical engineering at the Swiss Federal Institute of Technology Zurich (ETH Zurich; first intermediate diploma), Study of law Univ. of Zurich school of law, doctorate Zurich (1989), head of department and member of board of directors at Swiss Federal Institute of Intellectual Property, Berne (1994-97), Post-doctoral degree (habilitation) in civil, intellectual property, competition and media law Univ. of Zurich (2000), full professor for technology and information law at Swiss Federal Institute of Technology Zurich (ETH Zurich), Director and Scientific Member at the Max Planck Institute for Intellectual Property, Competition and Tax Law (since January 2002), additional position: full professor of law at Univ. of Zurich, professor of law at Ludwig-Maximilians-University of Munich.

Hanns Ullrich

Hanns Ullrich, Jena 1939, Referendar 1964, Assessor 1970, Dr. iur. (Freie Universität Berlin) 1969; M.C.J. (N.Y.U. 1975); Dr. iur. habil. (Ludwig-Maximilians Universität, Munich 1982); professor Universität der Bundeswehr Munich 1985 - 2004 (civil law, commercial law and business law), ordinarius 1992; head, Institute of comparative economic law, technology law and public procurement law; visiting professor College of Europe, Bruges, since 1991; 2003 - 2006, professor of competition law and intellectual property law, European University Institute, Florence; chief editor *Revue internationale de droit économique*.

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Peter Drahos

Peter Drahos is a Professor in Law at the Regulatory Institutions Network, Australian National University. He is also a Professor at the Centre for Commercial Law Studies at Queen Mary, University of London.

Peter Drahos holds degrees in law, politics and philosophy and is admitted as a barrister and solicitor. He has published widely in law and social science journals on a variety of topics including contract, legal philosophy, telecommunications, intellectual property, trade negotiations and international business regulation. His publications include *A Philosophy of Intellectual Property*, Dartmouth (1996), *Global Business Regulation*, Cambridge University Press, (2000), *Information Feudalism: Who Controls the Knowledge Economy?* Earthscan (2002).

Ingrid Schneider

Dr. Ingrid Schneider is a Political Scientist working since 2002 as a Senior researcher and lecturer at the Research Center on Biotechnology, Society, and the Environment (BIOGUM), Research Group on Medicine/Neurosciences at the University of Hamburg (Germany). She received her diploma in Political Sciences in 1987 and her PhD in 1996, and has collected professional experiences as scientific staff in the state Senate of Hamburg, and in the media. From 2000 to 2002 she was a member of the German parliamentary commission (Enquete at Deutscher Bundestag) on "Law and Ethics of Modern Medicine". She has written extensively on Technology Assessment in biomedicine, on Intellectual Property Rights, and has acted as advisor to hearings of the German and Austrian Parliaments. Currently she is writing her habilitation thesis on the governance of biotechnology and the European patent system.

Tim Hubbard

Dr. Tim Hubbard is Head of Human Genome Analysis, The Wellcome Trust Sanger Institute, Cambridge, UK.

Tim Hubbard is responsible for bioinformatics groups carrying out analysis and annotation of vertebrate genome sequence produced at the Wellcome Trust Sanger Institute, which was responsible for determining a third of the human genome sequence. He is joint head of the Ensembl project (<http://www.ensembl.org>), which is the world's leading database and access point for the human genome sequence. Following the controversy surrounding the ownership and access to the human genome sequence, he has become a leading advocate of the benefits of strong 'openness' for science and society as a whole (c.f. the open source software and open access publishing

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movements). Recently he has been involved in proposing new models for supporting healthcare research and development in a sustainable way that at the same time address the issue of access to essential medicines (Hubbard & Love, 2004: PLoS Biology 2, 147-150).

Thierry Sueur

Thierry Sueur, Engineer (chemical engineering) graduated from CEIPI (Law School) of Strasbourg. He is Vice-President, European and International Affairs and Vice-President, Intellectual Property of Air Liquide. He is Chair of the Intellectual Property Committee of Medef (French Industry), Vice-President of the patent group of UNICE, Member of the “Conseil Supérieur de la Propriété Intellectuelle” (advisory body to the French Minister of industry) and member of the administrative council of INPI (French patent office). He is a professor at Institut d’Etudes Politiques de Paris (Master Droit Economique). He is also a past-President and gold medallist of Licensing Executives Society International and Chairman of the Program Committee of AIPPI.

Michelle Childs

Michelle Childs is Head of European Affairs for the Consumer Project on Technology (www.cptech.org) Cptech is an NGO, with offices in Washington DC, Geneva and London, which focuses on solutions to Access to Medicine and Access to Knowledge problems . She regularly meets with EU,US and international Government representatives, NGOs and academics to discuss patent and copyright issues. Prior to that she was the Head of Policy Research and Analysis at the Consumers' Association UK (now known as Which?). She has advised Ministers on digital switch over, and was a member of the four person advisory panel to the Director General of the Office of Fair Trading. She has been a consultant to the Hong Kong Telecoms Regulator and a policy adviser at OFTEL (the then UK telecoms regulator) where she worked on strategy , convergence and digital television. She started her career as a solicitor at a City of London law firm.

Hans-Werner Müller

Since 1992, Mr Müller has been Secretary General of the European Association of Craft Small and Medium-Sized Enterprises (UEAPME). He has a Degree in Business Administration and a master craftsman’s certificate (Meisterbrief) in mechanical engineering. He is also a partner of the company ‘Müller Formenbau GmbH’, a tool-manufacturing firm.

During his political career, he has been a member of different local Governments and Committees. In 1976 Hans-Werner Müller became an MP at the Bundestag, a position he occupied for 18 years. During his last mandate he was appointed by the German Parliament to the European Parliament.

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At the same time, Hans-Werner Müller contributed to the setting up of UEAPME, and became secretary-general of the organisation, a position he has occupied ever since.

Mr Müller is multilingual, speaking German, French and English.

Thomas Schweiger

Thomas Schweiger has been involved in the debates around the creation of the EU's Biotech Patents Directive (98/44) as Secretary General of ECOBP - the European Campaign on Biotech Patents, a platform of some 40 environmental-, development-, patients-, and animal welfare-NGOs from around Europe and the rest of the world. He currently works for Greenpeace Germany's patent campaign.

Roger Burt

Dr Roger Burt is a Chartered Patent Attorney and European Patent Attorney and is the Intellectual Property Law Counsel for IBM in Europe. As IP Law Counsel he is responsible for IP Law departments in UK, France, Germany, Switzerland and Israel employing a total of 36 patent attorneys and trainees. He has been Head of the UK IP Law Department since 1999.

Before joining IBM in 1986 he spent two years with ICI, having started in the patent profession with (the then) Beecham Pharmaceuticals. He has been a member of the Council of the Institute of Professional Representatives before the European Patent Office (EPI) since 1999, serving as a member of the European Patent Practice Committee. He represents UNICE (European Employers' Federation) and TMPDF (the UK Trade Marks Patents and Designs Federation) on the Standing Advisory Committee before the EPO (SACEPO).

Lars Kellberg

*Lars Kellberg is European Patent Attorney and Vice President, Corporate Patents
Novo Nordisk A/S, Denmark*

Appointments

Vice President of Corporate Patents (present), Novo Nordisk A/S

Manager of Diabetes Patents (1996-2001), Novo Nordisk A/S

Patent Attorney (1993-1996), Hofman-Bang & Boutard A/S

Research Scientist (1992-1993), University of Aarhus

Higher Education

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European Patent Attorney (1998)

M.Sc. – Chemistry (1992), University of Aarhus

Presentations

Dominique Guellec

*Senior economist, OECD*⁵⁰

Policy measures for improving the patent system in Europe

For economists the patent system is aimed at encouraging innovation while not hampering the diffusion of technology, or even encouraging it. The starting point for any diagnosis and reform proposals is the recognition of this mission: To what extent does the system actually fulfil it, what could be done for enhancing its ability to do it?

The patent system has been strengthened world-wide over the past two decades, as patent holders have seen their position strengthened relative to users of technology; and the subject matter has expanded, as more technical fields are subject to patents now than before. As a result of that (and of other factors) the number of patent applications has exploded everywhere – it increased by 150% in Europe over the past ten years. This explosion in numbers has accompanied the largest wave in innovation for more than 100 years, and the development of new and useful uses of patents (for licensing, raising capital etc.): So it should not be simply dismissed as being “rent seeking”.

But it has had costs: i) the proliferation of patents has blurred the IP landscape in markets (what inventions are protected? Which are not? To whom do particular inventions belong? etc.). That situation of increased uncertainty favours strategic uses of patents, such as intimidating strategies based on titles protecting non inventive matters or of uncertain legal status (see a decision by the Paris Court –TGI- of January 2005, condemning a company having used patent applications it artificially kept pending for requiring payments from competitors); ii) Congestion at the EPO, which has increased the quantity of pending applications (used for intimidating competitors) and has apparently led to a reduction in patenting standards. In a survey conducted by the OECD in 2003, 25% of respondents (mainly large companies) declared it easier to obtain a patent from EPO at that date than 10 years before (15% declared it more difficult). This is confirmed by the testimony of many applicants. A reduction in patenting standards is not necessarily a bad thing, as no one knows what the optimal standards are. But it is somewhat paradoxical to strengthen the rights of patent holders and reduce patenting standards at the same time; it has to be noticed as well that this weakening in standards has encouraged the flow of applications, hence the congestion of the EPO, which has clearly a negative impact.

Proposal 1: Strengthen patenting standards:

This is needed even more as the EPLA and London convention will unify the European patent system, strengthening incentives to file patents and to litigate – i.e. the negative effect of bad patents will be magnified as much as the positive effect of good patents. Higher selectivity can be obtained through various means, notably:

⁵⁰ The opinions expressed in this document are purely personal and do not necessarily reflect the view of OECD or its member countries.

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=> Restrict the ability of applicants to “corner” examiners (in view of obtaining a grant) and to lengthen artificially the procedure. For instance the ability to file divisionals should be severely limited.

=> Give incentives to examiners to refuse bad applications: The current system is biased towards granting, as it is more time costly for examiners to grant than to refuse while they get no more reward. Rebalancing the reward system of examiners would help.

The extension of the patent subject matter to new areas, software and biotechnology has triggered difficulties and public debates. The most striking feature in these debates is the absence of economic evidence. Both in the legal decisions that led to this extension (notably by the Boards of Appeal of the EPO) and on the opponents side, economic arguments were either totally absent or, when used, based on no or extremely fragile evidence. We heard mainly purely legal and “philosophical” arguments. Is it good or bad for innovation and diffusion to patent genes and software? How broad should these patents be? There is no final answer to these questions, but the sure thing is that the administrative and legal system in place in Europe is NOT equipped for facing these new challenges from an economic perspective, both because the EPC gives no mandate to the EPO to take onboard any economic considerations, and because the EPO is insulated from the rest of European institutions.

Proposal 2: Equip the European Patent Convention with a preamble which would explain the missions of the patent system.

This preamble would state that the patent system is here to serve innovation and diffusion of technology. It would serve as a guide for judges, notably from the EPO Boards of Appeal and the future possible EPLA court; it would give them the mandate, when confronted to new situations, to investigate the economic sides as well as legal precedents in order to interpret the law.

Proposal 3: Open the governance of the patent system in Europe and make it more closely connected with bodies in charge of innovation and competition policy.

=> Strengthen links between the EC and the EPO.

=> Develop a “patent competence” in DG Competition, which would monitor the use of patents in strategies potentially anti-competitive.

=> Create a European patent high court (based on some version of the EPLA) integrated into the Luxemburg European Court of Justice system.

=> Create an independent body in charge of monitoring the patent (and other IPR) system in Europe, reporting e.g. to the European Parliament. This institution would act as an interface between political bodies and administrative and legal ones, as it would have both expertise and independence. It would have an advisory role; it would notably conduct regular evaluation of administrative bodies and do economic studies aimed at informing the legal process.

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Bronwyn Hall

Professor at the University of California, Berkeley

Paper not available at time of printing

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Reto Hilty

Prof. Dr., Managing Director Max Planck Institute for Intellectual Property, Competition and Tax Law, Munich

Pressures on a Unitary System

For decades, we have been observing a broadening of the scope of patent protection. This broadening occurred in different respects and it is due to different factors. However, one of the most important factors is the pursued expansion to new subject matters of protection. Starting from traditional inventions focussing on mechanical products and on processes, the extension of the protection to chemical products as such probably had the most important impact on the patent system. One of the crucial questions in that respect was whether the protection should be purpose-bound or extended to all possible – even unknown – applications (full product protection). That discussion rekindles currently, in particular with regard to one more recently educed layer of chemical product protection: the protection of “living material” (biotechnology). Another important extension of the patent system came about with regard to the protection of software – either to some extent (like in Europe) or even of software “as such”, e.g. in the U.S., going hand in hand with the protection of business methods. Currently we are about to experience a further extension; it occurs with respect to nanotechnology, however, up to now rather unrecognized by the public.

Interestingly, after more “internal” debates with regard to the patentability of chemical products within the sectors of industries concerned, the discussions on the extension of patent protection to biotechnological material as well as to software became highly political. We cannot deny the importance of some of the arguments raised at that stage; however, they were of a mainly ethical nature (“patents on life”) and of socio-political importance (“open source” movement). The economic impacts of these extensions of patent protection were hardly ever in the focus of the public perception. Admittedly, economists have investigated in the field of patent law. However, the approach of that economic research has been rather general. A differentiation with regard to the different subject matters is usually missing or, at least, does not receive attention to a degree that permits conclusions on a diversification of approaches to protection.

This generalization may not be satisfactory since the justification for patent law basically is that it attempts to avoid a market failure. In fact, some legal protection may be appropriate if a potential inventor would otherwise refrain from making investments in the light of the possibility of a non-amortization. However, the question whether a market failure does occur or not depends on all the circumstances of an individual case. Consequently, it is not plausible that all kinds of innovations deserve an identical degree of protection. Rather, we should, at least, try to construct groups with similar framework conditions. If, instead, we stick to the “one-size-fits-all approach”, we risk the consequences of over- or underprotection in certain fields of technology. Actually, an inadequate extent of protection is to the disadvantage of the system as a whole since it causes either a lack of incentives for investments or quasi-monopolistic situations.

Admittedly, observing international law (in particular the TRIPS agreement), we are not entirely free to distinguish between different kinds of technology. Notably, the term of patent protection must endure for at least twenty years counted from the filing date (article 33), the conditions of protection are identical (novelty, inventive step and capability of industrial application), and – apart from certain specific subject matters (article 27 paragraph 3) – “patents shall be available and patent

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rights enjoyable without discrimination as to ... the field of technology ...” (article 27 paragraph 1). However, in truth, certain adverse effects of patent protection derive precisely from the fact that unjustified differentiations are made in practice (e.g. the requirement of disclosure, in article 29, which is hardly ever observed in connection with software patents). Further on, limitations to the exclusive right (article 31) must not necessarily be identical in all fields of technology since the economic or socio-political impacts of the different technologies may vary widely. In fact, the application of the “three step test” (article 30), requires that not only the interests of the patent owner must be taken into account, but also legitimate interests of third parties. Finally, even with regard to the enforcement of patent rights, distinctions regarding different fields of technology may be appropriate. This is in line with article 7 (“objectives”), according to which “the protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations”.

Even in view of this international legal framework we must conclude therefore that today’s reactions to the existing pressures on the unitary patent system are not appropriate at all. The existing freedom for differentiations is not utilised by far. The European patent system might be amended substantially in ways which do not conflict with obligations deriving from international law; therewith, much more beneficial economic impacts could be achieved from the legal protection of technical innovation.

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Hanns Ullrich

Prof. Dr.iur.,M.C.J.(NYU) European University Institute, Florence

For an integrated patent policy of the European Community

I. Existing options

1. A decision has to be taken on whether we are in need of policy options for the European patent system or for a patent system of the European Community. Even assuming that the objective of this workshop reaches beyond examining options for the European patent system, which is that of the European Patent Convention of 1973 only, there is a choice to be made between designing a patent system for Europe and designing a patent system for the European Community. The former option will tend to be politically neutral, and, at best, be customer friendly to industry. The reason is that it must be acceptable as uniform law for a large group of States with heterogeneous markets, interests and policies, and it must be so accepted in the form of an international convention to be negotiated at a diplomatic conference. It, therefore, requires the consensus by all, and thus will tend to be a minimum compromise. The latter option could and should express the public policy of the Community as regards its own industrial strategy, its competition and integration policy, and its social, ethical and environmental concerns.
2. If preference is given to the Community option, the present discussion on relying, be it by interim, on the EPC/EPLA- European patent system will lead into an impasse. It will do so, because
 - politically the EPC/EPLA is a joint EU/non-EU system wherein the Community cannot define any other policy than that which non-EU members are willing to accept and to put into practice;
 - economically the EPC/EPLA-system will hurt market integration, because, most likely, it will not extend to all EU Member States, and because it certainly will deepen rather than remedy existing technological divergences between Member State, in particular, but not only as regards Middle- and Eastern European Member States;
 - legally the EPC/EPLA-system does not allow the common definition and efficient enforcement of public policy rules, such as those on mandatory licensing, nor does it permit the development of a consistently uniform and unitary law of patents in general, e.g. as regards prior user rights or the principle of exhaustion;
 - even if politically conceived as an interim step to a Community patent system, the EPC/EPLA-system will block the future development of a “better” patent system, because the patents granted under the EPC as it stands (or as it may be revised) will last virtually non-modifiable for 20 years, and because, as a matter of manpower and costs, an EPLA- court system cannot practically be duplicated or replaced in part by a Community system of patent courts.

II. Search for better option

1. For the reasons mentioned sub I.2., the present crisis of the Community patent should be used for a “cease-fire” in the political and lobby arena with a view to altogether reconsider the approaches to a modernized patent system. The STOA- initiative, therefore , is most welcome, particularly so as, on the one hand, the EPC- and the proposed Community patent need a revision in profundis anyway – conceptually they date from the midst of the last century - , and as , on the other, postponing the present proposals for quick action for some limited time will at least not do any major harm.

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2. In addition to the options for reform of the substantive rules of patent protection, in particular for a differentiation of the scope of protection and for its reorientation toward competition and the dynamics of innovation (so for systems efficiency rather than for individual technology protectionism, i.e. for informative disclosure, adequate experimental use, unlocking dependencies), options for improving the granting process need to be developed. The present ratio of 130.000 “Euro-patent” applications to 50.000 European patent grants per year as well as the processing time of 3and 1/2 years do operate as a deterrent rather than as an incentive to competitive innovation. The practice of early search reports combined with a preliminary assessment point to that the EPO-examination system is about to degenerate into a qualified registration system. The Strategic (decentralisation) Debate and the discontent of the examining staff about the organisation of the work, which has become public as of recent, are symptoms of a structural crisis.
3. Notwithstanding the plea for suspending action until better options have been found (supra sub 1.), a revision of the patent system cannot be postponed for too long. The many problem areas the Working Group has defined promise a wealth of options, which will be difficult to transform into law within a predictable time frame. The necessary prioritisation might become easier, and the achievement of an “effet utile” of the reforms more likely notwithstanding the long gestation period of a reform of the system of property rights (supra I. 3. in fine), if an aspect is taken into consideration, which has not yet been mentioned by the Working Group, namely regional diversity of innovation and protection. The EPC-system heavily centers around the patenting needs and practices of a few Member States, and , at the same time, it threatens to displace , if not to ruin the existing national patent systems of the other Member States. There is, therefore, a need for an integrated Community patent policy, which preserves the advantages of national patent systems by allowing for some (controlled) regional diversity, e.g. in the form of pioneering approaches to protection. The price for this is a reform also of the national systems and of national patent administrations. They must become innovation support providers, inter alia by helping to solve the Community patent’s linguistic information problem.

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Governance of the European Patent System: A Separation of Powers Approach⁵¹

Summary

- The current governance of the European patent system is characterized by an increasing centralization of power strongly influenced by insider governance.
- In order to deal with the dangers of insider governance a separation of powers approach is outlined along with four policy options that illustrate the approach.
 1. A transparency measure to turn patent policy committees into a mix of insider/outsider governance.
 2. An independent external audit process that checks patent quality.
 3. Transparency registers that help to reduce the uncertainty generated by patent owners in areas where society cannot afford the social costs of that uncertainty.
 4. Target concentrations of power that compromise patent quality.

*

Modern Networked Governance

Re-thinking and reforming the governance of the European patent system has to be based on an understanding of the fundamental global shifts that have taken place in governance generally. In a nutshell, states no longer have a monopoly on governance. Instead they are a part of networks in which actors (public and private) seek to influence the course of events. A state may or may not be the most influential actor within a given network. Information technology has meant that networks can be organized quickly and can operate globally. States that fail to understand the nature of modern networked governance will lose capacity as governing agents and are more likely to be the object of governance.

Examples of Networked Governance and Patent Systems

The WTO's Agreement on Trade-Related Aspects of Intellectual Property Rights was the product of a network consisting of the US, EU, Japan and those US and EU multinationals with large intellectual property portfolios.

⁵¹ My thanks go to my colleagues, Dr Luigi Palombi and Ms Carolina Roa at RegNet and to Mr Gary Lea at the University of New South Wales for their comments and suggestions.

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The Doha Declaration on TRIPS and Public Health was the product of a complex network of international NGOs (eg MSF, Oxfam), public health advocates, civil society activists, developing country governments with support from some developed countries.

Patents linked to biological materials from developing countries such as the Neem plant have attracted high levels of networked activism leading to patent proceedings of various kinds in the USPTO and EPO.

Some Important Features of the current European Patent System from the point of view governance.

At the level of substantive patent law, European states have moved to a high degree of convergence. This is largely due to the operation of the European Patent Convention. In contrast, although moves are being made towards a European Patent Litigation Agreement, at the level of procedure and enforcement European states currently have a comparatively low level of convergence.

Historically speaking, the principal players that have most influenced the evolution of the current system of governance have been the big business owners of patents, the patent attorney profession and lead states in terms of patenting. To that extent, the current system might even be said to be the product of insider governance; as an illustration, it is noteworthy that although the revisions to the European Patent Convention agreed at Munich in 2000 (likely to come into effect in 2007) were signed off by a number of EPC signatory states, they were principally developed by the “user community” and the EPO itself (see <http://patlaw-reform.european-patent-office.org/epc2000/index.en.php>).

The insiders, especially big business, are continuing their push for convergence. Put simply, subject to overriding wishes for broad coverage of subject matter and correspondingly amenable examination processes, they would like to see one European patent, one granting authority and one court developing the case law. If all of these requirements were to be met it would mean that insider governance would then be combined with a centralized power structure. The dangers of this are well known. They include regulatory capture, rent-seeking, lack of accountability and lack of responsiveness. In the case of the patent system it is far from clear that there would be compensating efficiency gains.

It must be emphasised, however, that it is not a simple question of centralisation at any cost: under the seemingly innocuous banner of a “cheaper and more reliable patent system” (per Commissioner Charlie McCreevy, “Closing remarks at public hearing on future patent policy”, Brussels, 12 July 2006), it is clear that where any proposed changes to the European patent system challenge what one might term the insider view, then, even where these are highly or fully convergent in nature, they are to be discarded or shelved; examples include:-

- the entry into force of the Community Patent Convention (this is currently held up until such time as language and jurisdiction issues are resolved in favour of a more cost effective solution for big business); and
- harmonisation of EU Member State law on patentability of computer implemented inventions (the relevant draft EU Directive was recently shelved by the Commission because European Parliament amendments might have resulted in more restrictive coverage of CIIs than that available under the EPC as currently interpreted by the EPO).

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A Separation of Powers Approach for Insider Governance and Centralized Power

An important idea in the Western political tradition, perhaps the most important, is the that of the separation of powers, of introducing checks and balances into any system that has power over citizens. Many principles of governance and regulation such as the principle of transparency, accountability and audit serve this most fundamental political value. If the European patent system is to continue to move down the path of a centralization of power then to counter the dangers mentioned above new checks and balances will have to be included. It is important to add a sufficient number so as to turn the system from one of insider governance to a mix of insider/outsider governance. No one check or balance will do this. Some examples of possible checks and balances follow.

A Transparency Balance

Patent offices typically have policy committees or advisory committees. These committees usually have a heavy representation from business and the patent attorney profession. If there is broader representation it is usually token. Insiders have little incentive to raise critical questions or issues. For example, biotech patents attorneys and patent offices have little incentive to ask whether as matter of legal principle the patenting of purified biological materials substantially identical to those that occur in nature actually do cross the threshold of 'invention' or patentable subject matter. Both parties have a financial incentive not to do so. Doctors working in public hospitals and scientists working in public universities may have different views of the invention threshold.

One obvious balance to the system would be to make the membership and appointment processes of these kinds of committees maximally transparent. In particular, one would be looking for membership profiles from these committees that included sophisticated public users of patented technologies and that was not token.

More generally, one would be looking through better structures of representation to connect insiders within the patent system to communities where innovation was taking place that did not necessarily depend on the patent system.

An External Audit Check

A system that ensures patent quality, like the Holy Grail, has proved hard to find. Well resourced patent offices will have internal procedures for checking the work of examiners (the EPO has a Quality Audit Directorate). Litigation is another test of patent quality, but only a tiny fraction of patents are litigated. Another separate strand of governance that could be employed is the external audit of granted patents. Each year a committee of independent experts would target some key areas of patenting (eg pharmaceuticals, software, biotechnology) and audit the quality of a sample of patents in that area. It would report its findings to a body independent of the patent office eg the European Parliament.

This audit mechanism could potentially be combined with other strands of governance to form a powerful tool of networked governance. Companies encountering patent thickets could feed information to the external patent audit committee so that it could focus its resources on problem areas. This committee would be, as it were, a guardian of the guardians and alert other independent actors within the system as to problems. It would also be an independent source of technical information for bodies like the European Parliament.

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Transparency Registers

In theory the patent system is meant to disclose information and create certainty for downstream innovators. In practice precisely the reverse happens. Modern large scale patenting creates large scale rule complexity and therefore uncertainty. The Swedish Patent and Registration Office in commenting on the reform of the International Patent Classification system observed in 1999 that the problems with the IPC had grown to a point “where even experts have trouble making accurate searches” (See IPC/R 1/99 Rev. 1 Annex 10, 1-2).

This uncertainty is especially dangerous from the point of view of the public management of risk, as the recent experience with Roche’s patents and licences over oseltamivir illustrated. Roche’s reluctance to disclose the patent situation in each country left public health officials confused as to what or what was not permissible.

In order to deal with the complexity and uncertainty that is deliberately generated by sophisticated players within the patent system, simple bright line rules are needed to remove this complexity. For example, regulatory agencies could establish patent transparency registers in areas of technology where there were serious risk management issues. Companies would be asked to use the registers to make a full disclosure of the patents surrounding the relevant technology. In addition, the registers would require the disclosure of information relating to ownership and licensing (eg have exclusive licences been granted). Ownership and licensing information is in practice difficult to track down. Private clearing house mechanisms have failed to provide this information in any systematic way. If the social contract that is said to exist between the patentee and society requires the disclosure of the invention it must presumably also require the disclosure of patent holdings around the invention.

The cost to a company of not disclosing on the register a patent that it should have might be some form estoppel that would prevent it from enforcing that patent. Patents that were put on the register that were of dubious validity or were later found to be invalid could attract severe financial penalties (an example of the use of financial penalties to deter the use of patents that do not have a reasonable prospect of success is to found in section 26C of the Therapeutic Goods Act 1989 (Australia)).

Transparency registers would only need to be created by regulatory agencies in areas where it was important to reduce the social costs of the uncertainty and complexity being orchestrated by patent owners. Society can live with the uncertainty generated by patents over tennis racquets. It should not have to live with uncertainty in vital areas like pharmaceuticals that compromises its ability to respond to serious threats like pandemics.

Transparency registers could be used widely to create islands of certainty in areas of technology where innovation was flourishing and the costs of patents potentially outweighed the social benefits eg open standards/formats. In theory, the patent system should provide innovators with certainty as to what is or is not permissible. In practice it does not. Transparency registers backed by the authority of government would be one way in which to counter the uncertainty that the present patent system is being used to generate.

Target concentrations of power that compromise patent quality

The volume of patent applications, the power of senior managers in a patent office and pressures from patent attorneys seeking a quick and positive outcome for their clients all combine to create structural pressures on examiners that militate against quality in the examination process. A

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separation of powers approach would look for ways to increase the independence of examiners that were consistent with the goal of increasing quality. As a preliminary step this would require a study of the real world incentives and costs facing examiners. One, for example, would want to know the actual costs to an examiner of rejecting an application. More broadly, one would want to have information about the kinds of imperatives and incentives that are created for patent offices by their current financing models and whether in fact these models are consistent with the social contract ideal that is invoked to legitimate the patent system.

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Governance of the European Patent System

1. The **European Patent system** is characterized by a “unique, multipolar constellation”⁵² which has its merits and drawbacks. Due to the “birth failure” of the EU Community Patent, a double structure between the **European Patent Organization (EPO) and the EU** has come into existence. The lack of a European Patent Court means that the enforcement and validation of European bundle patents is still left to the national courts.
2. The **EPO** is a supranational organization at the public/private divide. By employing more than 6.500 public servants it has become the third biggest international organization worldwide (after the UN, and the European Commission). The European Patent Office enjoys a high degree of autonomy, control by the EPO’s Administrative Council is weak. Substantive patent law for new technological fields evolves in the interplay between the granting departments and the Boards of Appeal which are quasi-judiciary bodies. Patent examination, grant, and decisions made in opposition procedures and by the Boards of Appeal are tacit *policy-making practices* masked as mere administrative execution of law. EPO is self-funded by the fees of the patentees. Only applicants’ interests are systematically represented within its system. Therefore the EPO is at risk of treating applicants as customers to be served, and may thus be susceptible to be captured by its clients. Over time, this has arguably resulted in an expansion of patent eligibility, and in patents granted with a broad scope. EPO’s „technocratic self-determination“⁵³ thus raises questions about division of power, transparency, accountability, and democratic control.
3. It was exactly the “incompleteness” of the European patent system – particularly the lack of a European Patent Court – which prompted the **European Commission (EUC)** to propose **legislative directives** for patents in biotechnology and later software to provide for legal clarity in these new technological areas. They intended to harmonize national patent law of EU member states, and pre-empt diverging national court judgements which would have fragmented the European patent system. In addition, EPO’s granting practice should be secured by clear statutory norms at the EU level. This indirect (co-)regulation of the EPO system is also related to institutional problems of the EPO itself, whose constitutional treaty EPC has been considered as “non-revisable”⁵⁴ for contentious issues.
4. This **legislative regulation** of substantive patent law must be seen as of paramount importance for **democratizing the governance of patents**. The contentions and protraction having arisen in the EU’s legislative processes should not be seen as barriers to effective policy-making, but as enabling new, discursively negotiated regulatory mechanisms. Both directives failed in their first round of law making and were rejected by the Parliament (biotech in 1995, software in 2005), but the biopatent directive (98/44/EC) finally was passed in 1998. The European Parliament (EP) resonated with concerns about

⁵² Artelsmair, G. 2005: A Comprehensive Patent System Needed for Europe, in: A. Kur et al. E. (Ed.): „...und sie bewegt sich doch!“ Patent Law on the Move. Cologne, pp. 5-30: 19

⁵³ Ullrich, H. 2004: Harmony and unity of European intellectual property protection, in: D. Vaver, L. Bently (Ed.), Intellectual Property in the New Millennium. Cambridge, pp. 20-46: 77

⁵⁴ Bossung, O. 2003: A Union Patent Instead of the Community Patent – Developing the European Patent Into a EU Patent, in: International Review of Intellectual Property and Competition Law (IIC), Vol. 34, No. 1, pp. 1-30

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- ethical limits to patent eligibility;
- the erosion of the public domain of open science;
- Public Health concerns such as access to and high costs for patented products (diagnostic tests, drugs) which put pressure on health budgets;
- the efficiency of patents which may stifle innovation if granted excessively.

These legislative procedures gave impetus for a better balance of the patent system. They allowed for innovation to be qualified in terms of efficiency, sustainability and social desirability. Alternative models for effective and useful innovation (open source) were acknowledged. The failure of the software directive should be seen as just an intermediate step, and the EUC be convinced to propose a new directive, taking up the EP's concerns.

5. **Interface EU – EPO:** Although formally fully independent, there is some synchronization between the EPO and the EU. EU candidates for the enlargement process were required to become EPO contract states as part of the *acquis communautaire*. The EPO's Administrative Council "implemented" the EU Biotech directive in 1999 as rules 23 d-e of the Implementation Regulation for the European Patent Convention (EPC). The EPLA may be a future linkage.
6. **Proposals for reform of the European patent system** must strive for a **coherent co-evolution** of the multiple poles of the system. Due to the absence of direct policy-making powers of the EU upon the EPO, and the constraints of the European Parliament due to the Commission's monopoly for introducing proposals for EU directives, the EP must primarily rely on its moral voice as democratically elected representatives of the European citizens. We can distinguish three models of governance: a) the technocratic model represented by the EPO, b) the representative model incorporated by the EU, and c) the deliberative model. As policy option, the deliberative model currently seems to be the most adequate. This means that the EP should take up a *direct dialogue* with the EPO, both to discuss matters of substantive patent law, and options for institutional reforms of the European patent system. EPO's current search for orientation provides for a fortunate opportunity structure.⁵⁵
7. **Strengthening the interface between the EU and the European legislator(s):** As a voluntary self-obligation, the EPO should be required to provide annual **qualitative reports** on its practice of granting and on (pending) decisions of its Boards of Appeal. This would allow the European legislator to intervene concerning patent policy, either by legislative regulation or by filing opposition to patents recently granted. The EPO should also acknowledge the *limits* of its own competences as an *executive* body. In sensitive cases or concerning decisions about patent eligibility and scope of patents in new technological fields, it should request advisory support by the national and EU legislators, or the ECJ. Furthermore, the EPO should support the European legislator by scanning applications for sensitive issues, and thus to use patent information as an early warning system. This would enable regulatory activities *outside* of patent law to be addressed by EU regulatory mechanisms such as research funding, health, environmental or anti-trust regulation. In result, checks and balances between both the EU and the EPO should be established, buttressed by monitoring and control systems.
8. **Patent assessment and impact analysis:** Both the EU and the EPO should strengthen their analytical capacities in scrutinizing the empirical impact of patents. This requires expertise from different disciplines, also from economics and the social sciences.
9. Decisions about **patent eligibility and scope in new technological fields** are **genuine political decisions** which must not solely be left to legal and technical experts. This requires

⁵⁵ EPO's "scenarios for the future project" which will be presenting its results on April, 26th, 2006 may be an institutional platform for this dialogue. For first results see: European Patent Office 2006: Interviews for the Future. Munich.

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participatory fora and the institutionalization of periodical public deliberation between patent experts, politicians, stakeholders, and civil society.

10. Judgements about the patentability of new subject matter are unavoidable for patent offices. Up to a certain point, EPO must certainly have discretion to decide. On the other hand, decisions about patent eligibility are political acts which should be reserved to the legislator. The dilemma can be framed as follows: Specific legislation would provide greater guidance to the EPO and the courts in making patentability determinations. Such legislation, however, might quickly be rendered obsolete by unanticipated technological advances, changes in societal moral judgements or socio-economic considerations. Therefore, general clauses allowing for more interpretative flexibility are inevitable. To bridge this dilemma, a more **reflexive self-regulation of the EPO must be combined with venues for legislative decision-making and feed-back-loops with society**. What is crucial is *kairos* – because legislation ‘after the fact’ may be bound to ratify what has already become practice.
11. For determining criteria for patent eligibility and the adequate scope of patents it would be to appropriate to organize **public seminars for deliberation on new technological areas**. Participants would be both stakeholders and experts from several disciplines, but also civil society organizations. Among the issues to be discussed should be the current state of the art of the technology in question, what is trivial or obvious for persons having ordinary skills in the art, what is prior art and how it can be accessed, and where to put the inventive step threshold. Also, it would be important to debate what should rest in the public domain, in terms of being so essential to advance knowledge that it must be freely accessible to all. Furthermore, the structure of the emerging industry and its networks, the type and duration for delivery of marketable products should be discussed. Another point would be, whether there should be a role for ethical or public policy exceptions to patentability. The goal of these deliberations to be initiated and documented by the EPO is not immediate decision-making, but the extension of cognitive frames. Participation and argumentation should support the *responsiveness* of the EPO and the legislators. It would also enhance trust and public legitimacy.
12. Another important topic is **patents and geopolitics**. The EU is not bound to imitate the US patent policy which reportedly suffers from flaws and distortions.⁵⁶ Patent law remains territorial law. International harmonization must take differences into account. Europe may and should self-confidently design a *regulatory* concept of IPRs. Sustainability of technological innovation in increasingly knowledge based societies, and the Precautionary Principle call for being translated to the area of patent law. Patent policy must be brought back to **the legislative arena** to assert transparency and broader participation which would increase both the effectiveness and the legitimacy of patent governance, and secure accountability in political decision-making. The EPO and the EU should be regarded as elements within a broader European governance framework, encompassing the national level, but also other regional supranational organizations, such as the Council of Europe and the European Court for Human Rights. The challenge is how to achieve adequate communication and policy-coordination between the multi-level structure, as opposed to dominance or hegemony. Any reform must also take into account that the EPO contracting states comprise seven non-EU members, whose governments and parliaments must have a fair chance to participate in the political will formation. To sum up, what is needed is a democratization and re-regulation of patent law. This requires a more **reflexive and responsive governance** of the European patent system.

⁵⁶ Cf. Jaffe, A./ Lerner, J. 2005: Innovation and Its Discontents: How Our Broken Patent System is Endangering Innovation and Progress, and What to Do About It. Cambridge

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Paper not available at time of printing

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Michelle Childs

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Cptech's Intervention at the STOA workshop on policy options for the European Patent system

Introduction

The Consumer Project on Technology⁵⁷ (Cptech) thanks the STOA team for giving us the opportunity to intervene in these proceedings. Our comments draw on our fuller written response to the recent European Commission questionnaire on the Patent System in Europe.⁵⁸

The debate on the EU patent system is dominated by discussions about the Community Patent and /or the European Patent Litigation Agreement. Important as these discussions are, they are about methods of implementing policy rather than the policy itself. It is this issue which I will focus on in my remarks.

For example the primary aim of the Community patent is broadly to make patents cheaper to obtain and easier to enforce. This is fine if, and only if, the current patent system functions well. We do not believe that it does.

The recent discussions in the EU Parliament about the EPLA also highlighted that there are a number of key questions about the mechanisms, institutions and accountability,. Before any further progress is made on either of these approaches we believe that policy makers must deal with 4 prior issues:

- 1) **Opening up discussions and decisions on patent policy to more stakeholders and acknowledging other interests than rights holders.** Many of the initiatives taken by the Commission in this field, and by Patent Offices, are undertaken in close cooperation with major rights holders, making the proposals one sided. It is often forgotten that citizens and consumers are key stakeholders in discussions about the future of the patent system. It is no longer sustainable to see it as a 'club' for lawyers and rights holders. A poorly functioning patent system impedes not just innovation but also access.

The European Patent Office appears to be seeking to learn from past mistakes in its Future Scenarios project by interviewing an array of stakeholders and offering to involve them in policy making. However, an inclusive approach from a patent office is a necessary but not a sufficient condition for ensuring a patent system that serves the needs of all stakeholders. Policymakers must clearly set the parameters within which patent offices can act, the interests which must be taken into account, and ensure appropriate oversight and appeals mechanisms.

⁵⁷ Cptech is an NGO, with offices in London, Geneva and Washington DC. Currently much of our work concerns intellectual property policy and practices, focusing on access to knowledge, but some of it concerns different approaches to the production of knowledge goods, including for example new business models that support creative individuals and communities. Full details can be found on our website www.cptech.org. We are also a member of the Transatlantic Consumer Dialogue (www.tacd.org) which regularly meets with US and EU officials to discuss IP policy.

⁵⁸ <http://www.cptech.org/a2k/cptechECPatconsultation-12april06.pdf>

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- 2) **There must be a clear agreed statement of the purpose and objectives of policy in this area.** Many policy documents within Europe almost exclusively equate more protection with economic growth and innovation, in the face of growing evidence that sometimes the opposite is true. Patents are only one tool available to policymakers, and should only be used if the benefits outweigh the costs and are superior to alternative mechanisms.
- 3) **Policymakers should acknowledge the limited role for patents in the economy, and develop a better understanding of how to set appropriate limits.** There is a need for a more econometric approach to patent policy. We would like the policy to be developed on the basis of independent studies on the real problems of the patent system.

Specifically the costs patents represent to society should be taken into account. If patents were costless, they would not be controversial. But they do present costs to society, and in some cases, unacceptable costs. These include excessive prices for certain patentable inventions (such as Herceptin, the high priced and often rationed cancer drug, and second line AIDS drugs in newer EC Member States and patent thickets that make it difficult to adopt standards for new technologies in the areas of computing and telecommunication devices impeding innovation, and many other areas.

A good patent system recognizes and addresses the issues of costs and benefits, by limiting the use of the patent system only to those areas where the benefits outweigh the costs, and secondly, by limiting the rights associated with a patent, in order to address well known problems.

CPTech believes there are several areas where the evidence suggests patents should not be used. These include: (1) business practices, (2) software, (3) certain areas in medicines where the patent system is an unneeded and unwelcome barrier to the use of innovations, such as recommended doses of medicines or surgical procedures on humans, to mention only a few areas.

Policymakers should also look at developing new approaches to ensure greater public benefits, whilst rewarding inventors. For example: Remunerative versus exclusive rights. Increasingly, experts are considering more formally the benefits in certain areas of treating patents as a right to remuneration, rather than a right to exclude. This recognises the right of the inventor to reward by also encourages innovation by allowing others to access the patent .

- 4) **When the patent system is used, there must be a robust and effective mechanism to address abuses, and the public interest in more liberal use of the inventions.** This does not just involve competition powers. The limitations and exceptions to rights must include public authority to authorize both remunerative and non-remuneration non-voluntary uses of inventions, and to place constructive obligations on patent owners.

Only if policymakers deal with these issues, via legislation where necessary, can they then turn to implementing the policy objectives via the Community Patent, EPLA or other means.

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Hans-Werner Müller

Secretary General of the UEAPME

Key points of the speech

- UEAPME is the employer's organisation representing the interests of European crafts, trades and SMEs at EU level. UEAPME is a recognised European Social Partner. It is a non-profit seeking and non-partisan organisation.
As the European SME umbrella organisation, UEAPME incorporates 81 member organisations consisting of national cross-sectorial SME federations, European branch federations and other associate members, which support the SME family.
UEAPME represents more than 11 million enterprises, which employ around 50 million people across Europe
- For small and medium sized companies (SMEs), the protection of intellectual and industrial property rights is a very important issue.
Patents are an essential instrument for this protection and a guarantee for the opportunity of stimulating investment in the research and technology sector.
Favourable conditions for achieving patent protection are vital in order to get the necessary means to SMEs to develop and expand their businesses;
- This is not true for every matter. In ICT patents can also act as an obstacle to innovation.
- The European Patent system does not really suit SMEs. Patents can be granted for different countries but after granted, they are subject to the laws of each Country where the invention is protected. Therefore the same inventions can be subject to up to 31 different legislations. This implies high costs and a very complicated system.
- SMEs encounter several problems that hamper their capability to request patents:
 - lack of information and know-how of the patent system. Therefore, an information campaign should be launched to reinforce enterprises' knowledge and make them aware of the economic advantages which can arise from appropriate use of the patent system (the transformation of research results in commercial success, the penetration of foreign markets and the possibility of obtaining licences). A pro-active policy needs to be launched to maintain and strengthen the innovation capacity of SMEs, micro-businesses and craft enterprises.
 - Very high costs: To introduce a request for a patent it is necessary to address to experts (lawyers, technical experts); also the need of translations makes the costs higher.
 - High risk of litigation: SMEs do not have the financial and technical means to face it.
- It is necessary to solve the SMEs' problems and give them the opportunity to make the most out of patents' use.
 - UEAPME believes that it would be useful to foresee help to SMEs in the national patent offices;
 - To solve the translation question that raise the costs the number of languages should be reduced to a minimum. The creation of a Community Patent would solve those problems of SMEs;
 - A litigation system should be adopted: Advantages of the EPLA agreement. Courts of First Instance in every Member State with the relevant specific and technical, knowledge (article 7 of the European Patent Litigation Agreement) a centralised court for the appeal to insure an harmonised interpretation. Before hand a solution has to be found to avoid that software patents become patentable.

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- SMEs needs for patents are quite peculiar. Therefore we suggest that SMEs, policy experts and entrepreneurs with patent experience are involved in the discussions at EU level. UEAPME is ready to constitute a working group to assist the institutions in their work.

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Thomas Schweiger

Greenpeace

Key points

The workshop looks into the following questions:

- Is the current patent system blocking rather than stimulating innovation in some areas?
- Does the increased practice of using a multiplicity of patents complicate access to markets (and genetic resources)?
- Does the patent system strike the right balance between the needs of industry and the values of society at large?

Greenpeace believes that these concerns are indeed justified and that the patent system (in the area of biological resources and biotechnology) blocks innovation, creates unjustified monopoly rights on the market and restricts access to natural biological resources.

Here are some examples:

Microorganisms:

“The Malaria Vaccine Initiative (MVI) has identified a particular protein antigen (MSP-1) which may be crucial to the development of an effective vaccine for malaria. (...) There are up to 39 patent families that are potentially relevant in developing the vaccine from MSP. (...) Faced with such a situation, a commercial research organisation might decide to shift to another area of research. “

(Integrating Intellectual Property Rights and Development Policy, CIPR Commission on Intellectual Property Rights, <http://www.iprcommission.org>)

Human genes:

25% of US laboratories questioned have stopped testing procedures due to claims by patent holders, 53% did not develop their own, improved diagnostic methods because relevant patents had already been granted.

Conclusion: “Laboratory directors in the US believe that patents and licenses have had a negative impact on access, cost, and quality of testing, and on information sharing between researchers.”

(Mildred Cho, Stanford University Center for Biomedical Ethics, Effects of gene patents and licenses on clinical genetic testing, Presentation at OECD Workshop in Berlin, 25 Jan 2002)

(Merz, J.F. et al, Nature, 7 February 2002, Diagnostic testing fails the test.)

Example: Patent on breast cancer gene BRCA 1 (Myriad)

“The Europeans are challenging Myriad's patents that give it an unofficial monopoly. The Europeans also say that because the firm refuses to grant manufacturing licences, all DNA samples will have to be sent to the Myriad Genetics headquarters in Salt Lake City for processing, providing the company with a unique databank about people at high risk.”

(Ethical Guidelines Urgently Needed For Collecting, Processing, Using And Storing Human Genetic Data, Source: UNESCO, Press Release No.2002-93, <http://www.unesco.org/bpi/eng/unescopress/2002/02-97e.shtml>, Date: Nov 25, 2002)

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Plants and seeds:

Patents on plants, especially seeds, have an enormous negative impact on the plant breeding sector and the seeds market in Europe and worldwide. Patent holders easily dominate over holders of a “plant variety protection” (PVP) thus causing the PVP-system to lose its key function for breeding. In the seeds market patents are used to control and restrict the activities of farmers and hand monopolies in the food chain to a few multinational companies.

Example: **Patent on herbicide resistant plants (Monsanto)**

Claim 28: A glyphosate tolerant plant .. Selected from the group consisting of corn, wheat, rice, soybean, cotton, sugarbeet, oilseed rape, canola, flax, sunflower, potato, tobacco, tomato, alfalfa, poplar, pine, apple and grape.

Claim 29: A method ..planting said crop seeds....and applying to said crop and weeds in said field a sufficient amount of ... herbicide

On the basis of this patent Monsanto files court cases in Europe against Argentinean soy farmers which import their harvest by shipments, to force them to pay royalties.

However, the practice of patenting plants has moved on from genetically engineered plants to plants derived from normal, biological breeding methods:

Example: **Patent applications on rice genome (Syngenta)**

More than a dozen patents were filed worldwide, more or less claiming property on the whole genome of the rice plants. Several thousands of gene sequences are claimed as invention of Syngenta. The genomic data are no longer only relevant for (highly controversial) genetic engineering in plants, but for optimizing conventional breeding. (MAB; marker assisted breeding)

All uses of the listed gene sequences are claimed, no matter if the usage applies in biotechnological or conventional breeding. Claims are aiming to all gene sequences with similar structures and similar functions. All other plant species with similar genes are also covered by the patent applications.

Example: **Patent on (naturally occurring) high oil level corn grains (DuPont)**

Claims include:

Claim 1: Corn grain having a total oil content of at least

Claim 8: Animal feed comprising the corn grain

Claim 14: The use of the oil ... in food, animal feed, cooking..

Claim 15: The use of the oil ...to make margarine, salad dressings, cooking oils ..

Because of the generally negative effects of patents in plant breeding, the UK Commission on Intellectual Property Rights explicitly advises developing countries to completely ban patents on plants and seeds. (<http://www.iprcommission.org>)

“If this trend isn't halted, some experts claim, tomorrow's super-crops may end up like many of today's medicines: priced out of the reach of much of the developing world's growing population. “We are headed down the same path that public-sector vaccine and drug research went down a couple of decades ago”, says Gary Toenniessen, director of food security at the Rockefeller Foundation in New York.

(Crop improvement: A dying breed, Nature 421: 568-570, by Jonathan Knight, Feb 6, 2003)

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For reasons such as these Greenpeace strongly believes that European patent law should be reformed to exclude patents on gene-sequences and living beings such as plants, seeds and animals. Genetic resources must be kept in the public domain.

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Roger Burt

Intellectual Property Law Counsel, IBM Europe

Presentation

My presentation will make the proposal that the patent system as it currently stands is capable of working perfectly well. That is not to say that improvements are impossible but the main requirement is for a change of behaviour and an improvement in quality at all stages in the process.

We firstly need to understand the difference between the quality of patents and the quality of inventions; we then need to understand the difference between the value of patents and the value of inventions. Once we have this understanding, concerns about "sleeping patents", demands for utility model systems, trivial patents, and patent trolls go away.

A high quality invention is one that is considered a major advance - it is new, clearly not obvious and is capable of being implemented and used to the benefit of society. Most inventions do not achieve this high standard, but nevertheless, they are "clever" and are new and not obvious. A low quality invention is barely novel, if novel at all, and would have inevitably been made by any person working in the field - often referred to as the obvious next step. In some cases it may not be an invention at all - it may be no more than identification of the problem to be solved rather than the solution.

A high value invention is one that is actually used to the benefit of society; it may not be seen as a major advance but it is extensively used. A low value invention may have been a major advance but for one reason or other it is not used - some reasons include: quickly superseded by newer ideas, incumbent technology too well established to be replaced, many viable alternatives.

A high quality patent is one that is well written, clearly describes the invention such that it may be readily carried out, is novel over the prior art and clearly demonstrates non-obviousness of the invention. A low quality patent is one that covers an invention that is not new or is obvious and/or is badly written such that it fails to describe the invention correctly.

A high value patent is one that keeps people out of a market using the invention or forces people to pay to use the invention. The high value is due to its ability to exclude people from using the invention when they clearly want to or need to use the invention. A high value patent is not necessarily a high quality patent and does not necessarily cover a high quality invention. A patent covering a small incremental invention used by an industry but which is impossible to invalidate despite there being prior art or despite the invention being no more than an obvious variant (existence of the prior art often known but impossible to prove) will be incredibly valuable.

Solutions:

Establish a system that encourages applicants and their patent attorneys to search their inventions before filing and to prepare high quality patent applications. Encourage patent offices to improve their standards and only grant inventions where a technologically patentable advance is demonstrated.

Ensure that all patent applications describe in detail how to implement the invention including requiring pseudo code where the invention relies on a computer program as part of the implementation.

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Eliminate trivial patents; ensure that all utility model systems are eliminated and that only true patent systems are permitted.

Ensure that patent offices are encouraged to grant patents quickly when requested to do so by the applicant or a third party.

Institute systems to enable third parties aware of prior art can readily bring this to the attention of the patent examiner (patent peer review).

Ensure the patent renewal fee system encourages patent owners to keep patents in force no longer than strictly necessary (perhaps include a use requirement or similar)

Encourage patent owners to endorse their patents to the effect that licenses are available as of right subject to the provision that defensive revocation of the license is possible.

Introduce a system which restricts court injunctions stopping use of the patented invention to only those cases where remuneration would not be an acceptable remedy for the patent owner (pharmaceuticals, chip manufacture, high complexity manufacturing)

Encourage more use of publication of inventions rather than patenting.

Forget about "sleeping patents" - if the invention is not being used and no-one is desiring to use it then any patent for it is of no interest.

My conclusion is that your report is very good but includes proposals, such as the suggestion of a utility model system, which suggest a failure by the authors to understand the dangers of low quality intellectual property rights which have high value and can be used to the detriment of society. Patent trolls are seen as the scourge of the patent system - a utility model system will lead to a new breed of super-troll!

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Lars Kellberg

Vice President, Corporate Patents, Novo Nordisk A/S

Policy options for the European Patent System

The patent system is a long-established and accepted means for stimulating research and development, ensuring that many new life-improving and life-saving medicines come onto the market. It facilitates early publication of new inventions and in return gives the inventor an exclusive right to exploit the invention commercially for a limited period of time.

The process of bringing new medicines to the market is long, complicated, and very expensive. On average it takes more than 10 years to develop a new drug. The costs can amount to several hundred million dollars, and it is essential to be able to recoup these investments. Being a research-based pharmaceutical company that aspires to make a difference to the benefit of public health, patent protection is of vital importance to Novo Nordisk.

Because of the reliance on efficient patent protection for the development of new and better therapies, it is important to ensure a European patent system which is characterised by **stability, predictability and simplicity**.

We strongly urge that no changes be made to the basic principles of the patent system, which has proved effective for many decades. Rather our industry needs assurance that no fundamental changes be made because uncertainty in terms of exclusivity available in the future will discourage the high-risk, long-term investments necessary for conducting medical research and development.

Our wishes for the European Patent System can be summarised as follows:

- The lack of a single, common language in the European patent system makes protection of rights cumbersome and expensive. We thus propose working towards a system, where the English is accepted as the single language.
- A specialist Patent Court of first instance and appeal should be established which would decide issues relating to infringement and validity in a single action on a pan-EU basis. This would prevent inconsistent results between national courts, and minimise legal uncertainty.

List of participants

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