

Some Economic Aspects of the European Harmonization of Intellectual Property Rights in Software and its Impact to Eastern EU

Mr. Ville OKSANEN, Mr. Mikko VÄLIMÄKI

Helsinki Institute for Information Technology (HIIT)

P.O.Box 9800, FIN-02015 HUT, Finland

[ville.oksanen, mikko.valimaki,]@hiit.fi

European Union has been harmonizing intellectual property rights (IPRs) legislation for over a decade. Harmonized business regulation is thought to be necessary for well functioning internal markets. Regional legal barriers and uncertainty about regulation in general may increase transaction costs and cause market failures. Yet it is anything but certain that the new Eastern European member states would benefit from common market regulation. We argue that harmonization benefits status quo, i.e. merely protects the interests of incumbents, before offering equal opportunities for new entrants. This trend is most visible in the regulation of rapidly evolving information technology industry. Therefore, we use the intellectual property rights regulation of software as an example.

We first describe shortly the most relevant IPR regulation of software in Europe: directive 91/250/EEC on legal protection of computer programs (Software Copyright Directive), directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society (EUCD), and finally the proposal 2002/0047 for a directive on the patentability of computer-implemented inventions (Software Patents Directive). Special attention is given to sections having direct relevance to the competitiveness of the relevant fields, e.g. how these directives form entry barriers to new entrants.

Then we proceed to explain the background motives and legislative proceeding of the regulation. Here we use public choice theory as a theoretical framework. We will demonstrate how the current legislative process has favoured incumbents who have enough resources to lobby effectively in Brussels and also in the member states. We conclude that the current regulation regime is not likely helpful for the competitiveness of the industry and the biggest harm will be caused to the new member states, which can not delay the implementation of the Directives as the current member states have done to give more time for their industries to adapt.

Keywords: property rights, software, copyright, patents, rent-seeking.

1. Introduction

The laws regulating intellectual property rights (IPRs) form one of the regulative corner stones of the information society. Thus, it is not very surprising that also European Community has been lately very active trying to harmonize the rules in this area. At the same time, we should remember that IPRs are actually one of the earliest area of law, in

which harmonization has taken place at a global level.¹ The reason behind increasing harmonization processes at different regional levels is relatively simple: IPRs have to be mutually recognized to be effective. A relatively new trend is, however, that IPRs are part of trade policies and political agreements. Yet again the reason can be traced to the growing economic (and therefore political) significance of IPRs during the last two decades.²

1.1 Harmonization in European Union

1.1.1. Copyright

The 1988 Green Paper on “Copyright and the Challenge of Technology” was the starting point for copyright harmonization in Europe. The main goal of the Green Paper was to identify those areas, where the copyright laws of EU Member States should be harmonized so as to remove all unnecessary barriers from the European Union single markets. Six separate areas were identified in need of harmonization and European Commission subsequently considered five of these areas requiring prompt action.

A determined political process followed and as a result the directives for legal protection of computer programs (1991), rental rights, lending rights and the main neighbouring rights (1992), satellite broadcasting and cable retransmission (1993), the duration of protection of authors’ rights and neighbouring rights (1993), and the legal protection of databases (1996) were created. These directives have now been implemented into national laws in all EU member states. The sixth directive is the Directive on the Artists' Resale Right, which has been much more controversial than the other directives. After five years of lengthy heated discussions, it was finally adopted on 2001.

The work did not end here. A first draft of a more ambitious Directive on copyright and related rights in the Information Society (EUCD) was introduced by the Commission in

¹ The first patent treaty is the Paris Convention for the Protection of Industrial Property, which dates back to March 20th, 1883. The first international copyright treaty, which is still in force, is the Berne Convention for the Protection of Literary and Artistic Works, which was signed September 9th, 1886.

² For more detailed discussion about the background, see May 2000 and Maskus 2000.

December 1997. Unlike the earlier directives, which had been focused on relatively narrow areas, EUCD covered a wide range of issues. EUCD will be analyzed in more detail in 3.1

1.1.2 Patents

Interestingly, the process of patent harmonization has been less successful than copyright in spite of patents are traditionally considered to be a fundamental part of trade policy. One could argue that the need for EU-level harmonized regulation has been more limited because the harmonization has already taken place through the Convention on the Grant of European Patents (EPC), signed in 1973, which established the European Patent Office. (EPO 2001). As a result of EPC the patent system in Europe is already relatively uniform. Nevertheless certain questions were left open in EPC³ and as a result the legal status of software and biotechnical patents varies from one country to other, which may be considered harmful for the single market. To partly solve this problem, Commission issued first in October 1996 the Directive on the legal protection of biotechnological inventions. This directive has been very controversial and only a minority of member states have implemented it at the moment. -- The new member states are still required to implement the Directive.

Commission has recently published the Directive on the patentability of computer-implemented inventions (February 2002), which is aimed to remove national differences in patent application concerning software patents. Also this Directive has been debated, which we explain in detail in 3.2.

In any case, the most ambitious legislative project so far in the field of patents has been the community patent. The idea here is not to replace (at least in the first stage) EPO but instead to create a new system, in which the patent applicant can get a European Union wide patent with one application without multiple filings and language translations.⁴ Community patent has received rather strong opposition from most member countries. Giving up native languages in patent applications might create formal as well as practical problems to smaller member countries. How can one assume that companies and

³ Another problem is that there is no unifying structure with binding effect on national courts and there is therefore the potential for differences to appear over the interpretation of particular aspects of patent law

⁴ The translation costs are often the biggest cost of the EPO patent application. This makes patenting much more expensive in EU than in the USA, which enjoys the benefits of one single official language.

individuals in a particular language region have identical possibilities to get knowledge of patents only available in one or two major Western European languages? Are the courts in that language region capable and legally allowed to judge cases based on only foreign language materials?

1.3. TRIPS

It is important to remember, that at the same time EU was working with the Directives, it was also putting the same agenda forward in international forums. Starting as a loose initiative the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) finally resulted in 1994 as substantive requirements to strengthen both the copyright and patent protection of software.⁵ TRIPS is part of World Trade Organisation's (WTO) complex treaty-package and used as the main tool used in harmonize especially the enforcement of IPRs at a global level. Unlike the other IPR-treaties, TRIPS has also very effective sanctions against countries, which do not fulfil their obligations. In practice, these sanctions are typically different trade restrictions like punitive tariffs. (Las Das 1998 pp. 129-137)

TRIPS regulates seven areas of IPRs, namely copyright, trademarks, geographical indicator, industrial design, patents, layer-designs of integrated circuits, and trade secrets. The agreement sets minimum levels of protection in the covered areas. For example, all fields of technology have to be patentable with only two possible exceptions: 1) human and animal treatment methods (diagnostic, surgical) and 2) plants and animals and essentially biological processes for the production of plants and animals.⁶ (WTO, 2003) This almost unlimited patenting was under intense but futile opposition from the developing countries. They saw clearly that it would mean the end of their production of cheap general drugs in their countries, but the resistance could not overcome the aggressive lobbying from the United States.⁷ (Drahos, Braithwaite 2002, p.146)

⁵ The original idea of adding a treaty about IPRs under WTO umbrella came from the United States, but EU was backing the process very strongly after it managed to secure its goal (Drahos, Braithwaite 2002, p 137-146.)

⁶ In other words, patent protection is not required for copulating animals but different methods for artificial insemination should already be patentable.

⁷ What they did not realize at that point, is would possibly also cause the same effect in information products.

In the field of software, the most relevant TRIPS articles require that software should be treated as literary work under copyright law and that software should be patentable as well (Lea 200, p. 152). There are essentially no requirements for exemptions to less developed countries. This suggests that the acquisition costs of software in less developed countries as well as barriers to entry to international markets have risen significantly. In order to compete on global markets, any would-be market participant must in the first place license a substantial amount of copyrights and prepare a patent portfolio to defend its position.

2. The Economic Rationale of IPRs

Most societies accept, for the time being, that economic growth is a key element for societal development. Similarly innovativeness has been seen as the main driving force for economic growth. Schumpeter was among the first economists to link economic progress to the contribution of creative entrepreneurs (Schumpeter 1942). A “logical” conclusion from this basis is quite often that stronger IPRs result in more innovativeness and increased social development in the society.

The conclusion, however, is not universally accepted; it is mostly used in the rhetoric of trade organisations like Business Software Alliance (BSA) and other interest groups close to the IPR owners industries. The academic research has constantly voiced scepticism over one-eyed view of IPRs and numerous efforts have been conducted to get some verifiable conclusions. Some economists stress the general economic problems of state intervention (IPRs are regulative monopolies), others admit that IPRs may be needed to create markets but criticize the ill functioning and non-efficient property rights distribution (the current rights distribution favours IPR industry).

In a landmark article, Kenneth J. Arrow gave the reasons why perfect competition might fail to allocate resources optimally in the case of invention and IPRs might be needed:

"We expect a free enterprise economy to under invest in invention and research (as compared with an ideal), because it is risky, because the product can be appropriated only to a limited extent, and because of increasing returns in use. This underinvestment will be greater for the more basic research." (Arrow 1962, p. 15)

Douglas Clements belongs to the first category of critics. He summarises the recent critical economic discussion in his article “Creation Myths” (Clements 2003). His conclusion is that the scholars criticising the current scope of IPRs may have a case, the public good

nature of innovations possibly does not justify the current system because “attendant damages of inefficiently high prices, low quantities, and stifled future innovation” may outweigh the benefits.

Scalise analyses the question from different angle in his book “Intellectual Property Protection Reform” (1999). He essentially accepts Arrows basis and goes on to argue that the level of optimal IPRs depends heavily on the level of economic development of the country. Obviously, in less developed countries the rules should be more flexible and not globally uniform in contrast to the main ideals behind the IPR harmonization efforts. The USA is actually a good example of this; the country has been very selective while choosing, which IPRs its protecting at a certain point of its development into an information society. (See for example: Nowell-Smith 1968, pp. 64-85) .

2.1 Copyright

Watt (2000) has recently surveyed the economic theory of copyright written during the last couple of decades. Research has been able to show that unauthorized copies of copyrighted works do not cause direct financial costs to the copyright holder. The economic harm materialises mainly in opportunity costs and negative externalities. Accordingly, the basic idea of an efficient copyright law is to ensure that these costs do not prevent the author to receive adequate compensation for the invested time and resources. At the same time, copyright increases the costs of new works because most of creations are bases on existing works. Copyright protection also raises, often significantly, the cost of the users of the copyrighted works. (Watt 2000, pp. 11-15).

As Landes and Posner (1989) formulate in their classic article:

“For copyright law to promote economic efficiency, its principal legal doctrines must, at least approximately, maximize the benefits from creating additional works minus both the losses from limiting access and the cots of administrating copyright protection”

The recent literature takes also some other questions into account. For example, Liebowitz (2002) argues that those cases, where the “indirect appropriability”⁸ is possible, the

⁸ The term means basically situation, in which the price of the work can higher for those copies, which will be used for unauthorised copying.

copyright harms can be ameliorated. He also raises three other situations, in which the unauthorised copying may not be harmful for the owner of the copyright. First obvious one is a person, who would not have purchased the product even if the copying had been impossible. Another one is “exposure effect”. The copyright holder gets actually more sales because the unauthorised copies work as free advertisement for his other works or services. The third case is strong network externalities. A typical example of this could be office software, which value rises for all users if more people are locked into its file formats. (Liebowitz 2002, p. 149).

2.2. Patents

The economic theory on patents is more ambiguous. Some authors build theories on investment in innovative activity where results are assumed to be measurable in the volume of patenting activity. In short, investment results in a patent(s), which equals innovation. If the return from innovation is greater than the costs of investment and patenting, investment naturally pays off.

More sceptical authors point out that in practise, especially in the software sector, innovative activity has little if nothing to do with patents. Instead, patents are mainly an additional administrative cost to company R&D and therefore an unfortunate example of an inefficient state intervention. For example, Bessen and Maskin (2002) found practically no evidence that the software patenting would have had increased the R&D spending in United States during the time the software patents were gradually allowed.

Another line of argumentation has been focusing on the information revelation that occurs during the patenting process and the benefits what the society gets from this. However, Boldrin and Levin (2003) take an opposing view. They argue that revenge engineering can be socially valuable and that there is actually much more narrow area, in which patenting is beneficial than generally it is thought. Yet another thing is that in the field of software, the patents do not necessary reveal anything, which is useful for actual programming and thus the argument for spreading the useful knowledge is possibly moot.⁹

⁹ EPO does not require source code in the patent applications. For example Linus Torvalds has rather strong views on this: “I do not look up any patents on _principle_, because (a) it's a horrible waste of time and (b) I don't want to know. The fact is, technical people are better off not looking at patents. If you don't know what they cover and where they are, you won't be knowingly infringing on them.”

3. The Directives

We are next going to go through the most relevant directives from the perspective of software industry. In each of the cases we explicate first the process and secondly the outcome. In the end we use public choice theory or more exactly the rent-seeking to explain the outcomes.

3.1 EUCD

3.1.1. Legislative Process

The Parliament has been subjected to unprecedented lobbying onslaught on this Directive, and I regret that some of the parties concerned strived to obtain nothing less than total victory, using sometimes highly emotive arguments, rather than seeking a balanced compromise between the various legitimate interests involved. That is not the European way - to move forward we all have to be prepared to accept compromise and I congratulate the Parliament for having done so. (Bolkestein 2001)

As can be seen from the quote above, the fight on copyright directive was very ugly. To simplify the matters a bit, the parties were content industry on the one side and the telecommunication industry and library associations on the other. At the time, consumer organisations did not play any major role and there were no EU-level cyber-rights organisations in effect (Oksanen, Välimäki 2002).

3.1.3. The Content

At the first look EUCD should not have any effects on software. Directive's preamble states:

(50) Such a harmonised legal protection does not affect the specific provisions on protection provided for by Directive 91/250/EEC. In particular, it should not apply to the protection of technological measures used in connection with computer programs, which is exclusively addressed in that Directive.

In practise, the claim that EUCD would not affect software copyright is untrue. EUCD may not apply to “whole” computer programs as copyrighted works but instead it regulates the essential functionality of software. Arguably the most important part of EUCD, the legal protection of technical protection measures (TPMs), applies also to software as long as it is used as a tool for creating TPMs. This dual nature of software of being a work itself and a gatekeeper to other works gives content owners more to choose between different protection alternatives. It is rather trivial to add other protected works inside a software product and, moreover, practically all TPMs are implemented with software.

TPMs enjoy very strong protection. The circumvention is never allowed for individuals. The governments may take action against the works, which do not permit circumvention for the limited exemptions stated in article 5 – at least in theory. The so-called E-Commerce Safety Clause (Article 6.4.4) forbids even this limited governmental veto-right for the works, which are being sold in digital form. This will be most likely the predominant distribution method for digital works in the future and thus there won't be any exemptions.

3.2. Software Copyright Directive

3.2.1. Legislative Process

The software copyright directive raised also some waves during the legislative process. Different compared to EUCD was, that this time there were two more or less equally strong parties fighting against each other. A number of dominant American companies of that era (Microsoft, IBM, Apple, Lotus etc.) established Software Action Group for Europe (SAGE), which was aiming to get as stringent law as possible to curtail the European competition. They were lobbying to add uses interfaces under the scope of copyright and, perhaps more importantly, trying to ban reverse engineering altogether.

To counter this threat, the European software industry (Amstrad, Bull, Olivetti and Fujitsu from Japan) formed European Committee for Interoperable Systems (ECIS), which was aiming to secure an open competitive environment. The group received some mixed support from the academic community.

The Commission sided with SAGE and made a proposal, which would have made it nearly impossible to create interoperable software. The European Parliament choose to support

ECIS and adopted a substantial set of amendments to the proposed Directive, including three key amendments dealing with the interface and reverse engineering issues. Finally the Council of Ministers drafted a fine-balanced compromise.

3.2.2. Content

The most important part of the Directive is without a question Article 6, which defines the right of decompilation. The Article requires that in order to be legal, the following six requirements have to be met: 1) The acts are performed by the licensee or by another person having a right to use a copy of a program, or on their behalf by a person authorized to do so. 2) The information necessary to achieve interoperability has not previously been readily available. 3) The acts are confined to the parts of the original program, which are necessary to achieve interoperability. 4) The information may not be used for goals other than to achieve the interoperability of the independently created computer program. 5) The information may not be given to others, except when necessary for the interoperability of the independently created computer program. 6) The information may not be used for the development, production or marketing of a computer program substantially similar in its expression, or for any other act which infringes copyright.

The final version does not state anything about the user interfaces, which was a clear win for ECIS. This is also in line with the outcomes of a few high profile court cases (Lotus vs. Borland etc), which took place more or less at the same time in the USA.

3.3 Proposed Software Patent Directive

3.3.1 Legislative Process

The debate on software patenting has been going on for a while. It took place earlier around EPO's practices but lately the EU-activity on the field has drawn most of the attention. The first hearing on possible EU-directive started in October 2000. (DG Internal Market 2000). The Commission received most likely more responses than what they expected. The European Free / Libre and Open Source Software movement (FLOSS-movement) rallied behind the EuroLinux Alliance and as a result The Commission received a total of nearly 1450 responses before the closing date. Out of these responses, approximately 1200 were in line with EuroLinux Alliance's position. On the other hand

only 114 responses were clearly in favour of software patenting, but these included the biggest industry groups like EICTA and UNICE.¹⁰ (PbT Consultants 2001)

After the consultation the Commission came out with the proposal for the Directive, which was, at least in theory, more limiting than the current EPO practice. The commission argues that they have taken account the results from the consultation:

The objective is to achieve the right balance between making patents available where appropriate in order to reward and encourage innovation, while avoiding stifling competition and open source development. The Commission received some submissions arguing that patents tend to restrict innovation in fields like software development. We also received submissions from organisations representing many thousands of companies arguing that computer-implemented inventions should remain patentable or even that patentability should be extended. The Commission's proposal reflects the balanced interests of the EU's economy and society as a whole. (DG Internal Market 2002)

The proposal was considered to be not enough far-reaching in the Council of Ministers and they made amendments, which would make the Directive in line with the EPO practice. The directive is currently in the European Parliament. So far the Committee on Industry, External Trade, Research and Energy and Committee on Culture, Youth, Education, the Media and Sport have given their Opinions and both of these are more sceptical towards patenting than the Commissions proposal. JURI, which has the biggest influence to the outcome has not yet given its opinion and the lobbying is currently pinpointed to the MEPs, which are the members of that Committee.

3.3.2 Content

The content of the directive is currently still open. The main question here is whether computer programs should be patentable as a product or as a process or even not at all without a hardware component. Currently the European Patent Convention does not allow software patents “as such”, which means that the software innovation has to have a technical contribution in order to be patentable. In practise this does not limit software

¹⁰ Academic Institutions 4, Industry Associations 16, IPR Associations 19, Governmental organisations 13, Large Industry 15, IPR Professionals 18, SME 9, Individual Software Developer 1, Individuals of unknown type 19. One might argue that the group represents rather well the most likely beneficiaries.

patenting. Product patents (software on a CD-ROM etc.) are also allowed in EPO practise, but some of the national patent offices decline to accept them.

3.4. Rent Seeking

“Rent seeking consists of legitimate, non-voting actions that are intended to change laws or administration of laws such that one individual and/or group gains at the same or greater expense to another individual or group.” (Gunning 2003).

We can find in all of the presented cases elements that fit in the Gunning’s definition. In each of the cases several parties had conflicting interests and the parties were trying to use lobbying to get the most favourable outcome from their perspective.

There are also some interesting differences between the cases. In the case of EUCD, there was no real counter balancing force, which would prevent the rent seeking of content industry. The telecommunication companies were active, but their goals were limited to securing to the right to make temporary copies¹¹ and to the right not to be forced to implement any DRM systems. The library unions had also a narrow interest, which they managed to secure at least to a certain extent. Practically no-one was defending general public and to a lesser extent software SMEs, which both were arguable the biggest losers of the outcome.

Software Copyright Directive was a classical example of a case, in which two powerful parties with opposite interests were engaged in a lobbying competition. The result was more or less a compromise without no clear winner except the society, which was better off (essentially by accident) compared to the situation, in which no reverse engineering is allowed

The most interesting case is and will be Software Patent Directive. This time there are two coalitions, which have directly the opposite interests. The difference here is the nature of coalitions. The FLOSS-side is in much larger if we consider only the number of individual activists but the pro patent-side has much more economic power and also more experience on lobbying. The outcome is yet unclear but at the moment the pro-side has succeed better

¹¹ The content industry demanded that even the technical copies, which have to be created to transfer the information in the Internet, are part of the exclusive rights of the copyright holder. Needless to say that this would have meant the end of Internet as we know it.

in processes, which are effectively controlled by civil servants (Commission and Council of Ministers) and FLOSS-side in the Parliament.

The similar trend is interestingly visible in two other cases. For some reason the Parliament seem to be more resistant against the rent-seeking done by the supporters of the strong IPR-rights. This is an area, which requires further research.

The idealistic view to democracy is that the decision makers try to consider the public good while making the decision. At least in analysed cases there is little to no evidence about this¹² and the outcomes seem to be dictated mostly by the composition of interest groups. In case the IPRs, the potential benefits are very clear to small group of parties and they have therefore a reason to invest to lobbying. On the contrary the general public does not have a very easily demonstrated benefits from active participation and secondly the questions are often so complicated that even the experts cannot be sure what the different outcomes really means for the society at large.

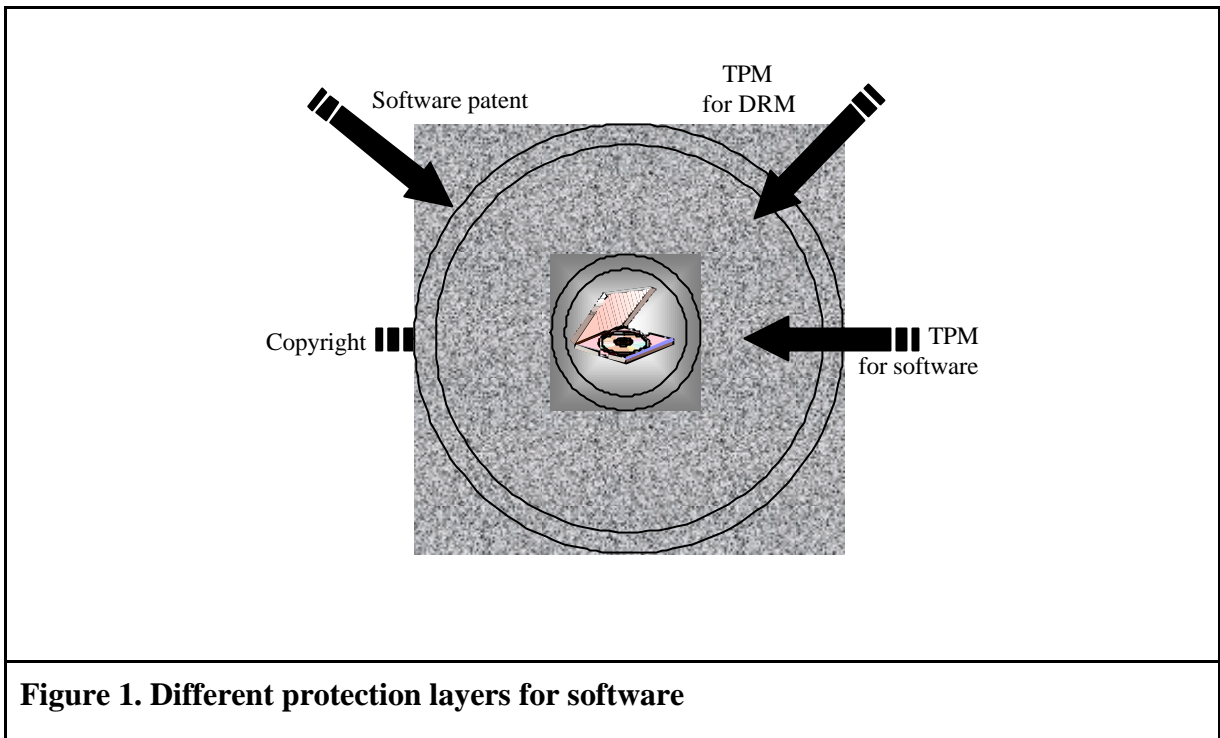
The experiences from the United States seem to support this view also. As Boldrin and Levine (2003) note:

That public rent-seeking plays an important role in the acquisition of intellectual property is clear. The recent Sony Bono copyright extension law is a good case in point: the U.S. Congress unanimously on a voice vote extended copyright retroactively by 20 years - yet there is no economic argument whatsoever in favour of retroactive extension of intellectual property.

4. Conclusion

Typically, as we have showed above, political processes of new IPR regulations in software have been prone to rent seeking. The outcome depends heavily on the involved parties. In case of the software the result is mixed.

¹² For example, most of the decisions are done without having any real independent economic research as background, which would be one of the basic starting points if the public good is the aim.

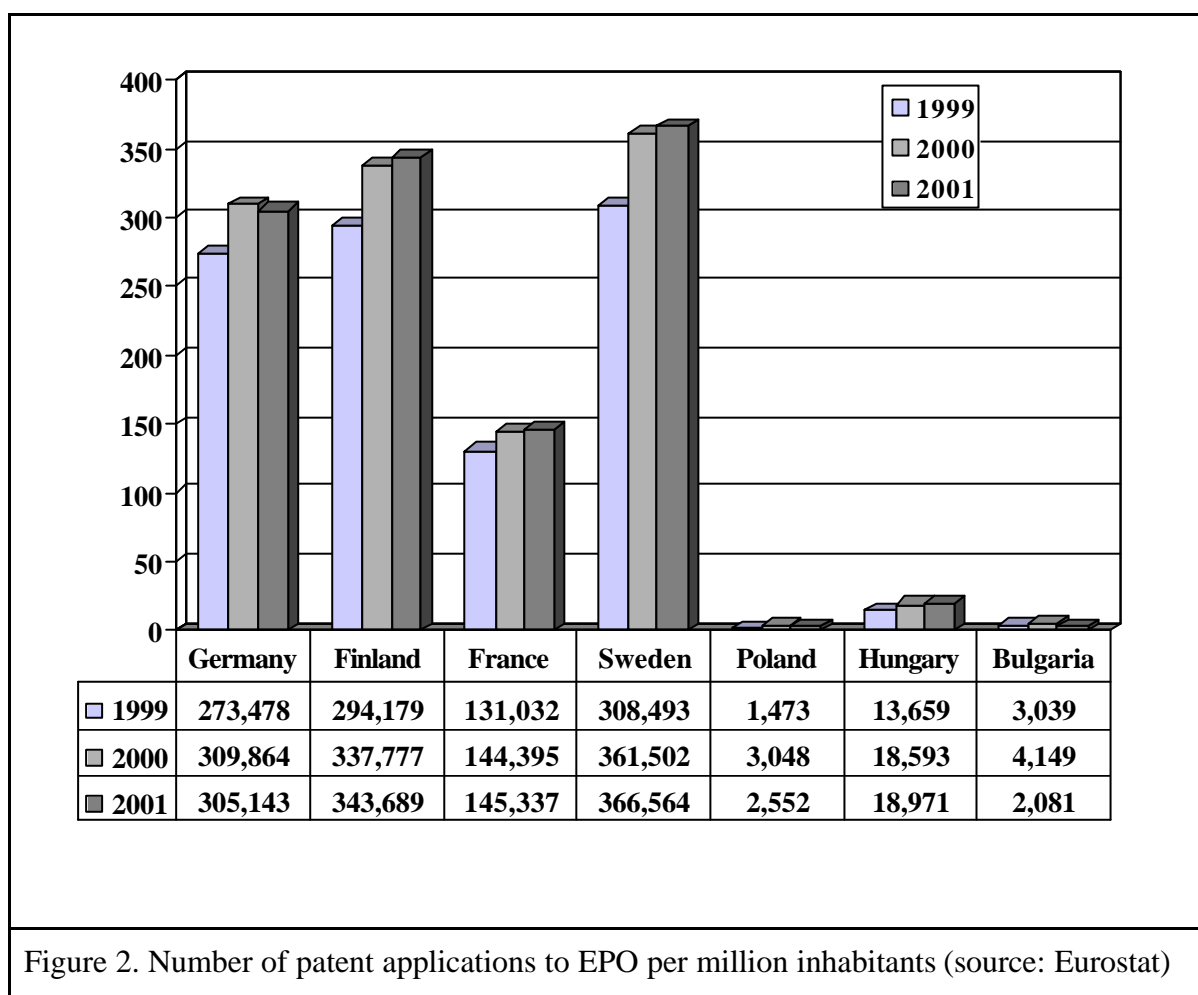


As can be seen from the figure 1., software enjoys currently a rather strong protection, but it could be still even stronger without right to reverse engineering and right to mimic the user interfaces. An incumbent has to be still able to breach legally all the different layers of the protection if he wants to make a compatible product. If the IPR-protection is made correctly, this is practically impossible. This opens existing firms way to benefit from monopoly profits and thus get rid of low margins of truly open markets.

This is exceptionally bad news for the “Eastern EU”, because the IT-sector is there currently comparatively weak. Now it has to face not only competition on creating useful and innovative products but also a very high legal risks related to IPRs. For example, if the EPO standard for software patenting prevails, it will mean that the costs for newcomers will be much higher because they cannot use existing patent portfolios for cross licensing. Of course, it is also possible that they cannot even obtain the required licenses for creating legal software. The figure 2 gives a glimpse on current situation, which clearly shows that the new member states are really going to have an uphill battle on this front. Especially, considering that the patents, which have been granted during the last few years, are going to be enforceable for next 15-20 years, which is a very long time in IT-sector.

Likewise, digital rights management has a potential to become a major obstacle for market entry. Current DRM-standards are heavily protected by patents but even if this isn't the case, the copyright law makes it anyway very hard to create interoperable systems.¹³

Taking all this into account, finally one question has to be asked. Why the new member states have not been more active in lobbying, because it should be clear that the current rules are definitely not optimal for incumbents. At least one partial answer might be that the persons who recognize the situation are also the persons who can gain personal benefit from the expanding IPR-rights. Still, this does not sound feasible enough to explain the total invisibility of the new members in lobbying arenas.



¹³ This problem is even bigger with open source products, which by definition cannot have effective DRM systems, which means that this otherwise very potential way to create competitive software is outlawed in some cases.

References

Arrow, K. (1962), Economic welfare and the allocation of resources for invention, in: *The rate and direction of inventive activity*, Princeton University Press, Princeton.

Bessen, J., Maskin E. (2000), Sequential innovations, patents, imitation, workpaper, 00-01, Department of Economics, MIT.

Boldrin, M., Levine, D. (2003), Rent-seeking and innovation, working paper, available online: <http://levine.sscnet.ucla.edu/papers/cr35.pdf>, last visited 22.4.2003

Bolkestein, F. (2002), *Commissioner Bolkestein welcomes European Parliament vote on copyright Directive, IP/01/210*, available online:

http://europa.eu.int/rapid/start/cgi/guesten.ksh?p_action.gettxt=gt&doc=IP/01/210/0/AGE D&lg=EN&display= , last visited 17.4.2003

Clement, D. (2003). *Creation Myths : Does innovation require intellectual property rights?*, Reason Online, available:

<http://www.reason.com/0303/fe.dc.creation.shtml>, last visited 17.4.2003

DG Internal Market (2000), The patentability of computer-implemented inventions : consultation paper by the services of the Directorate General for the Internal Market, available online: http://europa.eu.int/comm/internal_market/en/indprop/comp/soften.pdf , last visited 17.4.2003

DG Internal Market (2002) Proposal for a Directive on the patentability of computer-implemented inventions - frequently asked questions. Available online: http://europa.eu.int/comm/internal_market/en/indprop/comp/02-32.htm , last visited 17.4.2003

Drahos, P., Braithwaite, J. (2002), *Information feudalism : who owns the knowledge economy*, Earthscan, London.

Gunning, J. (2003) Understanding democracy : an introduction to public choice, available online: <http://www.gunning.cafeprogressive.com/votehtm/vm-16.htm>, last visited 17.4.2003.

Von Hippel, E., (1988), *The sources of innovation*, Oxford University Press, New York.

Landes, W., Posner, R. (1989), *An economic analysis of copyright law*, Journal of Legal Studies, XVIII, pp 325-363.

- Las Das, B. (1998), *An introduction to WTO agreements*, Zen Books, New York.
- Liebowitz, S. (2002), *Re-thinking the network economy: the true forces that drive the digital marketplace*, Amacon, New York.
- Lea, Gary (2002), *Digital Millennium or Digital Dominion? The Effects of IPRs in Software on Developing Countries*, in Drahos, Peter. Mayne, Ruth (2002), *Global Intellectual Property Rights*, Oxfam, New York p. 144-158.
- Maskus, K. (2000), *Intellectual Property Rights in the Global Economy*, Institute for International Economics, Washington.
- May, C. (2000), *A global political economy of intellectual property rights: the new enclosures?*, Routledge, London.
- Oksanen, V. Välimäki M. (2002) *Transnational Advocacy Network Opposing DRM - Technical and Legal Challenge to Media Companies*, *Journal of Media Management* 4/2002.
- PbT Consultants. (2001), The results of the European Commission consultation exercise on the patentability of computer implemented inventions, available online: http://europa.eu.int/comm/internal_market/en/indprop/comp/softanalyse.pdf
- Scalise, C. (1999) *Intellectual property protection review : theory, evidence and policy*, Singapore University Press, Singapore.
- Schumpeter, Joseph (1942) *Capitalism, Socialism, and Democracy*. Harper Perennial.
- Towse, R. (2001), *Creativity, incentive and reward : An economic analysis of copyright and culture in the information age*, Edward Elgar Publishing, Cheltenham.
- Watt, R. (2000) *Copyright and economic theory : friends or foes*, Edward Elgar Publishing, Northampton.
- WTO (2003), *Intellectual property: protection and enforcement*, available online: http://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm6_e.htm, last visited 17.4.2003.