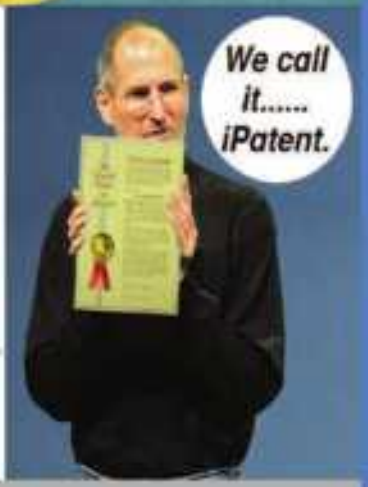

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SOFTWARE PATENTS

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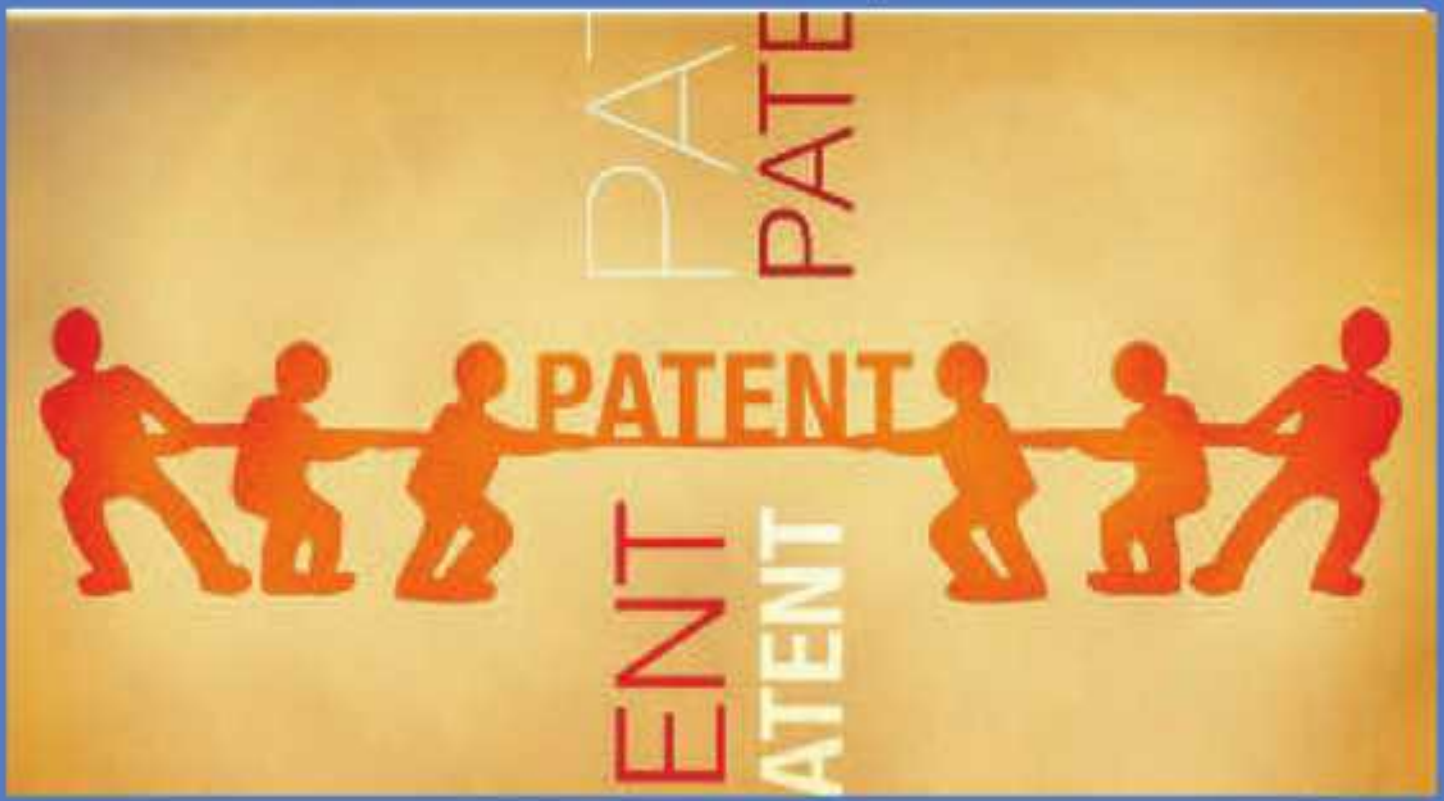
Author: **Valentin Erich Sylvester Langmaier**

ID-nr: 551710

Tutor: ao. Univ.-Prof. Dr. Rony G. Flatscher



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Abstract

This paper has been compiled to deal with the subject of patents for software and related subject-matters. It provides an insight in the patent system of the EPO in general and in the question of patentability of software in Europe in particular.Patentability of software has been in the center of attention in recent years and has been discussed controversially. While software patents are common in the US and Japan, the situation in Europe is different. Software is excluded from patentability as such but still, there is the term of computer implemented innovation, that opens the door for patents on software.The historical development of patents in Europe and the attempts made by the EU to harmonize the patent system led to the establishment of the unitary patent. These decisions and the different types of intellectual property are described in this paper. Furthermore a comparison of the pros and cons of software patents is made in this paper and finally a conclusion including some recommendations for future reforms in this area is drawn.

After reading this paper the reader should should have basic knowledge on the field of Software Patents and be aware of the pros and cons of this topic. He should be familiar with the risks and opportunities arising from software patents and be able to build his own opinion about it.

1. Introduction

Due to recent developments in the policies regarding software patents worldwide it is necessary to have an overview about this topic. Several far-ranging decisions were made in the last decades which may have the potential to influence the whole business sector, especially the e-commerce and software industry.

This development is not uncontroversial because software patents could influence a very large group of businesses and the society as whole. Hence there is large movement against the official legalization of software patents. This movement includes groups and organizations like the Free Software Foundation and many other famous people of the IT industry and works mainly on the net. While there is a movement against software patents on the one hand there are other interest groups who are in favor of software patents on the other hand. These interest groups include software giants like Microsoft, IBM or Apple and patent brokers.

First of all this article intends to provide information about intellectual property and the different forms of its protection. To understand the system of patents and copyrights it is important to know the basics of the historical development. The author tries coming up with an overview of the pros and cons of software patents and the impacts they could have on business and society. This article has its focus on the developments in Europe although sometimes comparisons to the US are drawn.

2. Intellectual Property

The term intellectual property refers to creations of the mind, what includes inventions, literary, artistic work, symbols, names and designs used in commerce. Basically two categories of intellectual property can be distinguished.

1. Industrial property: inventions (patents), trademarks, industrial design, geographic indications of source
2. Copyright: literary and artistic works like novels, poems and plays, musical works, films, drawings, paintings, photographs, sculptures, architectonic design. [Vgl. WIPO12a]

Intellectual property is a far reaching concept that covers various types of legally recognized rights arising from some type of intellectual creativity, or that are otherwise related to ideas. Intellectual Property rights are rights to intangible things - to ideas, as expressed (copyrights), or as embodied in a practical implementation (patents). [Vgl. Kins01 S.9f]

Even the term intellectual property itself is disputed because some critics like Richard Stallmann argues that this term tosses copyright, patents and trademarks together although there are three separate sets of law plus a dozen other laws. In his eyes the term is a seductive mirage. According to Professor Mark Lemley the widespread use of the term “intellectual Property” is a fashion that came up with the founding of the World Intellectual property Organization WIPO in 1967 and became common in the recent years. Stallmann states the this term “comes with an obvious bias: it suggests thinking about copyright, patents and trademarks by analogy with property rights for physical objects, what is in fact at odds with the legal concepts behind.” [Stal12]

2.1 Trademarks

Actually a trademark is a protected brand name. A trademark or service mark can be used to protect any word, name, symbol, device, or any combination of it that is used or intended to be used to identify and distinguish the goods/services of one seller or provider from those of others. There is no legal requirement for a federal registration of a mark but it has several advantages like notice to the public of the registrant's claim of ownership of the mark, legal presumption of ownership nationwide, and exclusive right to use the mark on or in connection with the goods/services listed in the registration. [Vgl. USPT12a] Regarding computer programs a trademark can be used to protect the brand name and the symbol of the program but not the content itself.

2.2 Copyright

Copyright serves as a legal protection of an author's work. It is a kind of intellectual property that provides exclusive rights to the author like publication, distribution, and usage rights. This means whatever content the author created cannot legally be used or published by anyone else without the consent of the author. The duration of copyright protection may vary from country to country, but it usually lasts for the life of the author plus 50 to 100 years.

Many different types of content can be protected by copyright, like books, poems, plays, songs, films, and artwork. Over the last decades copyright protection has been extended to websites and other online content. Therefore, any original content published on the Web is protected by copyright law. This is important in the digital age we live in, since large amounts of content can be easily copied and pasted.

In most countries, copyright protection is automatic. Whenever original content is published, it is automatically protected by copyright law. Many countries additionally provide copyright registration, which allows authors to register copyrighted content with a central agency. This makes it easier to prove ownership of content if it is ever disputed. [Vgl. TeTe12]

2.3 Patent

A patent is an exclusive right granted for an invention. This can be a product or a process that provides, a new way of doing something, or offers a new technical solution to a problem. The patentability of an invention depends on certain requirements that differ from country to country. Furthermore a patent provides protection for the invention to the owner of the patent. The protection is granted for a country specific limited period of time. The exclusive rights which come along with a patent are the following: It is forbidden to anybody to commercially make, use, distribute or sell the invention without the patent owner's consent. The patent rights are normally enforced in a court. This court holds the authority to stop patent infringement inn most countries. As a quid pro quo the same court can also declare a patent invalid if a third party successfully challenges it.

The owner of a patent has the right to decide who is - or is not – allowed to use the patented invention for the period in which it is protected. The patent owner can decide to give permission to use his invention or to license it to other parties on consensually agreed terms. The owner has also the right to sell the invention to someone else. The buyer receives the full ownership of the patent, including all its exclusive rights. After expiration of a patent the protection ends, and an invention enters the public domain. [Vgl. WIPO12b]

3. Historical Development

Even if the first computers and software programs originated in the 20th century the history of patents goes back to the ancient Greeks. To understand the current debate about intellectual property and software patents it is essential to have a basic understanding about the actual intentions behind the patent system and the historical development. This chapter gives a general overview about the history of patents and copyright by explaining the milestones in the development.

3.1 Patents

The first mentioning of patents or time limited exclusive rights goes back to the 3rd century BC. According to Athenaeus of Naucratis, a Greek Rhetorician, his compatriot Phylarchus delivered to posterity that exclusive rights for one year were granted to those who created unique culinary dishes in the ancient Greek city of Sybaris. This early form of a patent was a kind of a monopoly. The word monopoly derives from the Greek words “monos” and “polei” what means “alone” and “to sell”. [Vgl.Yong54 S.835]

The industrial usage of patents started in the middle ages. Venice, what was kind of an economic superpower in the Middle Ages was the first country that granted privileges to citizens as early as the 12th Century. For example the Republic of Venice granted ten-year monopolies to the inventors of a silk weaving process. Later on Patents were systematically granted in Venice as of 1450. Most of them were granted in the field of glass making what was a specialty of Venetians. When more and more Venetians emigrated, they sought for some kind of similar patent protection in their new homes. This fact led to the dissemination of patent systems to other countries

In England a system was adopted in the 14th Century whereby the Crown granted special privileges to entrepreneurs so that they alone could use their imported invention until it became a viable industry. In fact the earliest known patent was granted to John Utyman in 1449. He imported a glass-making process used by Venetian glass makers that was unknown in England at that time. At this time the Crown didn’t make a difference between an imported product or technique and a new invention, because the only intention behind

granting privileges to inventors or importers was to secure new technologies for the domestic use and to limit the dependency from imports. As a compensation for the royalties granted, Mr. Utyman had to teach his process to Native Englishmen. The contract between the Crown and the entrepreneur was concluded thus the new technologies when introduced domestically could create jobs and stimulate the economy.

The first patent statutes were issued in the Republic of Venice in 1474. From that time on new and inventive devices had to be communicated to the Republic, as soon as they had been put into practice. This procedure was necessary to obtain legal protection against potential infringers. The general principals of Patent Law have been laid down the first time in these statutes. Firstly, the invention had to be new and useful (to the State), secondly the rights conferred to the inventor were to be exclusive, thirdly the Patent was for a limited time and finally, that infringers could be brought to account and their copied devices could be seized and destroyed.

The English Crown continued to offer exclusive rights to those it thought worthy, because this system turned out to be a very useful way to raise funds. As it was very profitable for the Crown as well as for the owner of the patent the practice of granting Letter Patents was widely abused and led to general dissatisfaction among the common folk. Indeed this system led to corruption because the Crown granted monopolies to any favored persons usually for a sum of money regardless if the goods were new or old. This practice led to a big public outcry and James the First was forced to cancel all existing patent privileges. The result of all this was that the Statute of Monopolies was adopted in 1623 which ensured the grant of monopolies only to new inventions and for a limited period of time. The Statute stated that:

“any letters patent and grants of privilege for the term of fourteen years or under, hereafter to be made, of the sole working or making of any manner of new manufactures within this realm, to the true and first inventor of such manufactures which others at the time of making such letters patents and grants shall not use”. [StoM23]

The next big milestone in the development of patents came with the Industrial Revolution when the use of patents rose dramatically and was adopted by other countries. The United

States introduced its first Patent laws in 1790; France in 1791 and in 1883, the patent systems was internationalized via the signing of the Paris Convention.[Vgl. PiPa12]

3.2 Copyrights

In 1710 the world's first copyright law was established in England, the so called Statute of Anne. It was stated the first time that the author of a work was also the owner of its copyright and fixed terms of protection were. On the strength of this act copyrighted works had to be deposited at specific copyright libraries and registered at Stationer's Hall. Unlike nowadays there was no automatic copyright protection for unregistered works. The Statute of Anne acted as a role model for Legislation in other countries, such as the Copyright Act of 1790 in the United States. At an international level the copyright legislation remained uncoordinated until the 19th century. Finally in 1886 the Berne Convention was inured to provide mutual recognition of copyright between nation states, and to promote the development of international standards for copyright protection. Due to the Berne Convention the need to register works separately in each individual country could be dropped. In the 2012 it has been adopted by almost all the nations of the world (165 of the approximately 193 nation states of the world). Since the United States' adoption of the treaty in 1988 the Convention now covers almost all major countries. After more than 100 years the Berne Convention remains in force to this day, and continues to provide the basis for international copyright law.

The extension of copyright protection to unpublished works and the removal of the requirement of for registration were two of the biggest changes implemented by the adoption of the Berne. In participating countries this means that an individual (or the organization they are working for) owns the copyright of any work they produce as soon as it is recorded in some way, be it by writing it down, drawing, filming, etc.

The adoption of the Berne Convention implicated many benefits for the creators of original works, however the systems for protecting unpublished works remains fragmented internationally. Some states offer optional registration services within their own jurisdiction, while others offer no kind of registration at all. Registration allows a faster and more reliable who is the rightful owner of a copyrighted work. The national registration systems may not be willing to offer support in a dispute in another country. Consequentially the Intellectual

Property Rights Office IPRO was created in an effort to create a central international point of deposit for unpublished works from around the world, via its Copyright Registration Service. The intention behind that was that this can provide a standard point of registration for all citizens of Berne Convention nations. [Vgl. StUn12]

3.3 International IP Agreements

While no creative work is automatically protected worldwide, there are international treaties which provide protection automatically for all creative works as soon as they are fixed in a medium.

3.3.1 The Berne Convention

The Berne Convention for the Protection of Literary & Artistic Works of 1886 built the basis for ensuing international copyright agreements. The Berne Convention implies the requirement of its signatories to recognize the copyright of works of authors from other signatory countries in the same way as it recognizes the copyright of its own nationals. The treaty followed in the footsteps of the Paris Convention for the Protection of Industrial Property of 1883, which had already created a framework for international integration of the other types of intellectual property like patents, trademarks and industrial designs. Historically and sociologically important is the fact that the Berne Convention was developed at the instigation of Victor Hugo of the Association Littéraire et Artistique Internationale. Consequently it was influenced by the French "right of the author" (droit d'auteur), which was opposed to the Anglo-Saxon concept of "copyright" which only dealt with economic concerns.

The Berne convention has been modified in order to keep up with technological changes and new standards several times since its adoption. Therefore additional agreements, extending the Berne Convention of 1886, have been amended like:

- Paris 1896 Revision
- Berlin 1908 Revision
- Berne 1914 Finalization
- Rom 1928 Revision
- Brussels 1948 Revision
- Stockholm 1967 Revision
- Paris 1971 Revision [EnBr12]

3.3.2 Universal Copyright Convention

Many countries were not satisfied with the Berne Convention, what led to the development of an alternative that was called the Universal Copyright Convention (or UCC). The UCC was adopted at Geneva in 1952 and came into force in 1955.

Developed by the United Nations Educational, Scientific and Cultural Organization (UNESCO), as an alternative to the Berne Convention, the UCC supplied a framework for those states which disagreed with aspects of the Berne Convention, but still wished to participate in some form of multilateral copyright protection. Developing countries like the Soviet Union were skeptical about the strong copyright protection granted by the Berne Convention because they were apprehensive that this strong protection overly benefited the Western copyright-exporting countries. Other countries like the USA and Latin America had already their own Pan-American copyright convention, which was weaker than the Berne Convention. Nevertheless the states that ratified the Berne Convention also became party to the UCC in order to ensure that their copyrights would exist in non-Berne convention states.

The main features of the UCC are:

1. no signatory nation should accord its domestic authors more favorable copyright treatment than the authors of other signatory nations
2. a formal copyright notice must appear in all copies of a work and consist of the symbol ©, the name of the copyright owner, and the year of first publication
3. the minimum term of copyright in member nations must be the life of the author plus 25 years (exceptions for photographic works and works of applied art 10 years
4. all adhering nations are required to grant an exclusive right of translation for a seven-year period, subject to a compulsory license under certain circumstances for the balance of the term of copyright.

In 1971 in Paris the Berne Convention as well as the UCC was revised to take into consideration the special needs of developing countries. As a consequence liberalized regulations were applied to teaching, scholarship and research. [Vgl. EnBr12b]

3.3.3 TRIPS

The **Agreement on Trade Related Aspects of Intellectual Property Rights** (**TRIPS**) is an international agreement administered by the World Trade Organization (WTO). Its aim was to set down minimum standards for many forms of intellectual property (IP) regulation. It was negotiated at the end of the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) in 1994. Its inclusion was the result of intense lobbying by the United States, Japan, the EU and other developed nations or more specifically their pharmacy companies. Many developing countries like Korea and Brazil opposed this implementation but the United States and others defeated their resistance with a negotiation strategy where they linked IP protection with trade treaties. After the Uruguay round, the GATT became the basis for the establishment of the World Trade Organization. Because ratification of TRIPS is a compulsory requirement of World Trade Organization membership, any country seeking to obtain easy access to the numerous international markets opened by the World Trade Organization must enact the strict intellectual property laws mandated by TRIPS. Furthermore, unlike other agreements on intellectual property, TRIPS has a powerful enforcement mechanism. States can be disciplined through the WTO's dispute settlement mechanism. [Vgl. ATWW12, S.4-7]

3.3.4 WCT

The World Intellectual Property Organization Copyright Treaty is an additional agreement under the Berne Convention. It is not required for the signer of the WCT to be a party to the Berne convention but any Contracting Party must comply with the substantive provisions of the 1971 (Paris) Act of the Berne Convent. In addition to that the Treaty names two more subject matters to be protected by copyright,

(i) computer programs, whatever may be the mode or form of their expression, and

(ii) compilations of data or other material (“databases”), in any form, which by reason of the selection or arrangement of their contents constitute intellectual creations.

Regarding the rights of the author the treaty deals with three:

(i) the right of distribution,

(ii) the right of rental, and

(iii) the right of communication to the public. [Vgl. USLE12]

The treaty has been criticized due to its broad definition of IP and its non-differentiation of its member countries regarding their stage of development.

The treaty came into force on March, 6th 2002, when the condition of 30 ratifications was fulfilled. In January 2013 already 90 parties adopted the treaty. [Vgl. UnTo12]

3.3.5 ACTA

ACTA stands for Anti-Counterfeiting Trade Agreement and was a multinational treaty initiated to establish international standards for intellectual property rights enforcement. It was intended to establish an international legal framework for targeting counterfeit goods, generic medicines and copyright infringement on the Internet. Additionally a new governing body outside existing forums should be created, such as the WTO, the WIPO, or the UN.

The first signers of the agreement in October 2011 were Australia, Canada, Japan, Morocco, New Zealand, Singapore, South Korea, and the United States at a ceremony in Tokyo. One year later Mexico, the European Union and 22 of its member states signed as well, although there has been a lot of protest from different opposition groups. Until January 2013 Japan was the only country that has ratified the agreement, which would come into force in countries that ratified it after ratification by six countries. While supporters of ACTA consider the agreement a response to "the increase in global trade of counterfeit goods and pirated copyright protected works", opponents warn that the convention adversely affects fundamental rights including the right of freedom of expression and privacy. Supporters can be found in the area of Trade Unions representing workers in the music, film and TV industries and large IP-based organizations such as the Motion Picture Association of America and Pharmaceutical Research and Manufacturers of America which were active in the treaty's development. [Vgl. CMUp12] ACTA has also been criticized by Doctors Without Borders for endangering access to medicines in developing countries. [Vgl. MSFa12] Another point of criticism was the secret

nature of the negotiations and the exclusion of civil society groups, developing countries and the general public. The first time the public heard about ACTA was when Wikileaks released some internal negotiation papers. The signature of the EU and many of its member states led to wide spread protests across Europe and the resignation in protest the European Parliament's appointed chief investigator, rapporteur Kader Arif. As a consequence to the ongoing protests in 2012 the newly-appointed rapporteur, British MEP David Martin, recommended against the treaty, stating: "The intended benefits of this international agreement are far outweighed by the potential threats to civil liberties". Finally on 4 July 2012, the European Parliament rejected the agreement with 478 voting against the treaty, 39 in favor and 165 MEPs abstaining. [Vgl. Whit12]

3.3.6 WIPO

The World Intellectual Property Organization is one of the 17 specialized agencies of the United Nations and is dedicated to the use of intellectual property aimed to stimulate innovation and creativity. It was established in 1967 and had its headquarter in Geneva. In January 2013 it had 185 member countries and about 250 observers and administers 24 international treaties. [Vgl. WIPO12c]

The WIPO was the successor of the BIRPI which was installed in1893 to administer the Berne Convention. The formal creation of the WIPO took place in April 1970 by the Convention Establishing the World Intellectual Property Organization. Article 3 of this Convention implies that WIPO seeks to "*promote the protection of intellectual property throughout the world." [CEWI67]* In 1974 WIPO became a specialized agency of the UN. According to the agreement between the UN and the WIPO it is responsible "*for promoting creative intellectual activity and for facilitating the transfer of technology related to industrial property to the developing countries in order to accelerate economic, social and cultural development, subject to the competence and responsibilities of the United Nations and its organs, particularly the United Nations Conference on Trade and Development, the United Nations Development Programme and the United Nations Industrial Development Organization, as well as of the United Nations Educational, Scientific and Cultural Organization and of other agencies within the United Nations system."[AUNW74]*
After that the mandate of the WIPO, which it inherited in 1967 from BIRPI, to promote the protection of intellectual property, expanded to one that involved the more complex task of

promoting technology transfer and economic development. [Vgl. CIEL07 S.3ff]
In contrast to agencies of the United Nations, WIPO has significant financial resources due to collection of fees by the International Bureau under the IP application and registration systems which it administers. More than 90% of its income of about 596 million CHF in 2012/13 was generated that way. [Vgl. WIPO12d]
Although the WIPO is officially an independent organization under the roof of the UN, there are still interest groups that have doubts on that independence. Some of the observers, like the Free Software Foundation Europe FSFE, are not satisfied with way the WIPO works. This can be seen at the long list of statements and submissions on WIPOs decisions on their homepage. For the FSFE, WIPO is often at the root of current threats, such as software patents, the European Copyright Directive (EUCD) and others. [FSFE12a]

4. Present of Intellectual Property Laws

Although a UN Agency for the protection of intellectual property exists and administers 24 multinational treaties, there are still substantial differences on the field of software patents between some regions. These differences might be caused by cultural or sociological reasons on the one hand but also by economic reasons on the other.

4.1 European Legislature

As Europe is a very heterogeneous region with dozens of different cultural circles and a checkered history it used to have a mass of different legislations. Due to the unification process in the European Union and to efforts made to create a harmonized patent and copyright systems, several steps have been undertaken to improve IP protection. The intention was to reduce costs and to accelerate the processes of patenting and litigation. This should encourage development and research and finally also result in productivity improvements and economic growth.

4.1.1 The Copyright Directive

The Copyright Directive was dissolved in May 2001 by the European Union to implement the WIPO Copyright Treaty WCT and the WIPO Performances and Phonograms Treaty WPPT and to harmonize aspects like copyright exceptions of copyright law across Europe. The internal market provisions of the Treaty of Rome were the basis for the directive.

The directive was influenced by unprecedented lobbying [Vgl. Huho00] and has been hailed as success for copyright and content industries. [Vgl. Gins12] Although the directive gave EU Member States significant freedom in certain aspects of transposition and time until December 2002, only Greece and Denmark met the deadline. As a consequence the European Commission eventually initiated enforcement action against six Member States for non-implementation.

The EUCD makes no exceptions for anti-circumvention applications. Therefore the use of potentially relevant digital media is prohibited in European colleges and universities. While member states may apply for copyright permission, they are limited by EUCD regulations.

The implementation of the EUCD has been a challenge in many points. Namely problems occurred by technology's varying interpretations, implementations and provisions, such as digital watermarking and encryption. Proponents of the EUCD were mainly businesses - such as movie studios, record labels and software manufacturers, because they were generally looking forward to EUCD's stringent copyright stipulations. In 2012 EU members remain at odds over EUCD. Thus, the directive and related legislation are under constant review by the European courts. [Vgl. Jans12]

4.1.1.1 Scope of Protection

The Directive applies without prejudice to existing provisions relating to:

- the legal protection of computer programs;
- rental and lending rights and certain rights related to copyright in the field of intellectual property;
- copyright and related rights applicable to broadcasting of programs by satellite and cable retransmission;
- the term of protection of copyright and certain related rights;
- the legal protection of databases.

4.1.1.2 Main Areas of the EUCD

The Directive deals with three main areas:

1. reproduction rights,
2. the right of communication and
3. distribution rights.

The **reproduction right** comprises the exclusive right to authorize or prohibit direct or indirect, temporary or permanent reproduction by any means and in any form, in whole or in part:

- for performers, of fixations of their performances;
- for phonogram producers, of their phonograms;

- for the producers of the first fixation of films, in respect of the original and copies of their films;
- for broadcasting organizations, of fixations of their broadcasts - regardless of the method of transmission.

The **Right of communication** grants authors the exclusive right to authorize or prohibit any communication to the public of copies of their works, including the making available to the public of their works in such a way that members of the public may access them from a place and at a time individually chosen by them.

Distribution rights harmonize for authors the exclusive right of distribution to the public of their works or copies thereof. The distribution right is exhausted if the owner of a copyright transfers the ownership or sells his works.

However the EUCD doesn't grant only exclusive rights, adversely there are also several exceptions included.

The **mandatory exception** to the right of reproduction is introduced in respect of certain temporary acts of reproduction, technologically necessary to enable the lawful use or transmission in a network between third parties, which has no separate economic significance.
The **exceptions in the field of rights of reproduction and communication** are optional and especially concern the "public" domain. Three of this exceptions- reprography, private use and broadcasts made by social institutions – claim for a fair compensation to the right holders.
L**imitations to distribution rights** depend on the exceptions made to reproduction or communication.

Another Obligation to the Member States is the legal protection against the circumvention of any effective technological measures covering works or any other subject matter. This legal protection is very broad and comprises also "preparatory acts" such as the manufacture, import, distribution, sale or provision of services for works with limited uses. Nevertheless, Member States can ensure the implementation of some exceptions and limitations for those who may benefit from it. Furthermore Member States may also take such mea-

sures with regard to the exception for private use. If any person knowingly performs without authority any of the following acts, Member States are to provide for legal protection:

- the removal or alteration of any electronic rights-management information;
- the distribution, broadcasting, communication or making available to the public of works or other protected subject matter from which electronic rights-management information has been removed.

In these cases Member States are required to provide for appropriate penalties and remedies in respect of infringement of the Directive.[Vgl. Keeg03]

4.1.1.3 Critical analysis of the EUCD

The EUCD has created a lot of public resistance from many different interest groups. The uniting force of these groups is the concern about the freedom on the Net in general and impacts on the future development of open source or free software in particular as well as the domination of a hand full of big IT companies. The risks of this kind of legislation are:

- **Monopolies on file formats**: Libraries are worried about this issue because the ability to effectively control a file format involves that each e-book format will have its own reader and a reader can only read books in the company's own format. This is a serious threat to libraries because they don't have the funds and the personnel to compete with companies like Amazon. [Vgl. Neve12]
- **Interoperability**: It could be possible that you are not allowed to use and share tools to analyze protocols, because these tools can be used to circumvent ineffective technological measures. In that case it's not possible to put together two systems working unless both vendors publish information on the protocols they use. Due to the recent trends of vendors to trap clients in their proprietary systems this is not realistic.
- **Insecurity**: The full disclosure movement has improved the whole security of computer systems considerably. To achieve this, vulnerabilities were published even if they weren't corrected already, what forced vendors to correct them as soon as possible to avoid an image problem. According to the EUCD a vulnerability that allows the circumvention of rights-management in-

formation cannot be even communicated. As a result full disclosure is no longer an option and the public loses this advantage.

- **Freedom of Speech**: A very critical impact of the EUCD is that it can be used to limit basic human rights like the freedom of speech. Since copyright owner are able to define terms of use and all their measures are protected and can be enforced, rights like the freedom of speech can be limited. A very illustrative example is the Microsoft FrontPage 2002 End User License Agreement EULA that prohibits the usage of the software to create sites that criticize Microsoft or any of its subsidiaries. [Vgl. FSFE12b]

4.1.2 Patents

Two main problems arose when somebody sought to obtain patent protection in Europe before 1978. Firstly in a number of countries it was required to file a separate patent application in each country, what subsequently resulted in a distinct grant procedure in each country. The second challenge was the need to translate the text of the application into a number of different languages, what raised the costs for the filing substantially. Although there have been some attempts to improve the situation shortly after the second world war like the Longchambon Plan in 1949, which led to two conventions regarding the formalities for a patent application and to international classification of a patent, the comprehensive developments started decades later.

4.1.2.1 European Patent Convention

In 1973 more than 20 states met in Munich at a diplomatic conference to discuss about the introduction of a mutual European patent licensing procedure. The conference resulted in the signing of the European Patent Convention EPC by 16 participants which came into force in October 1977. [Vgl. NAIP12] Following these decisions and having the legal framework finally in place, the European Patent Office EPO in Munich started its work as a granting authority in June 1978.

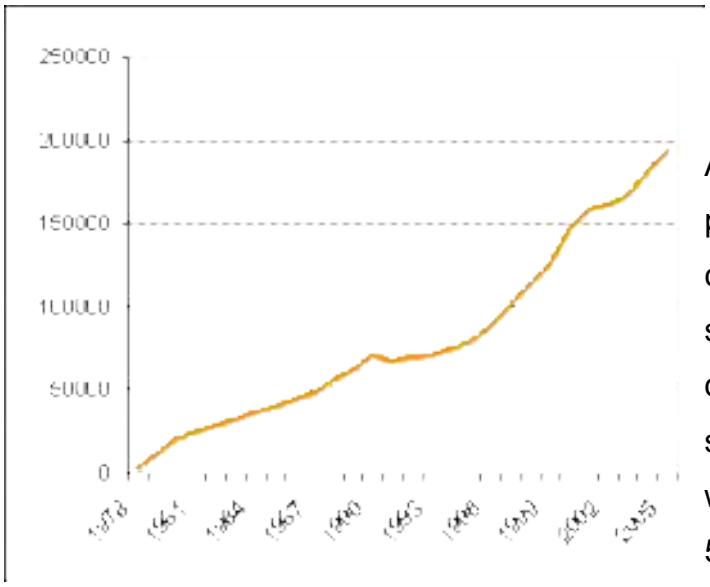

Figure 1: Development of application filings [NOSP12a]

Already in the same year the office expanded and set up a site in Berlin and included the former International Patent Institute in The Hague. As a result to this development the filing figures for patents soared and the 100.000th application was filed in 1983, eight years later 500.000 were reached and in 1997 the filing mark reached the million mark. In the 1990s the Vienna site was established, incorporating the former International Patent Documentation Center. Additionally a small office in Brussels was opened to build up relations to the European Commission.

In 2012 all 27 EU Member states and 11 third party states are members of the EPC. Furthermore there are two extension states namely Bosnia and Herzegovina and Montenegro, which are recognizing European patents upon request. [Vgl. EUPO12a]

Figure 3: Member States of the EPC 2012 [EUPO12b]

4.1.2.2 European Unitary Patent

Almost forty years after the creation of the EPC, the EU has taken a big stride towards a unified system. In December 2012 the European Parliament voted for proposals to create a “unitary” patent, which is recognized automatically in 25 EU countries (all member countries except Spain and Italy) and overseen by a new court, and to eliminate the requirement of translation of patents into lots of languages.

Before that historical event the European Commission estimated that the cost of patent recognition all over the EU might be about €36,000, where €23,000 of it are caused by translation. In comparison American patents cost a mere €1,850. [Vgl. ECON12a]

This tariff could be an explanation why the percentage of patent applications in national patent offices is still very low as can be seen in the chart below.

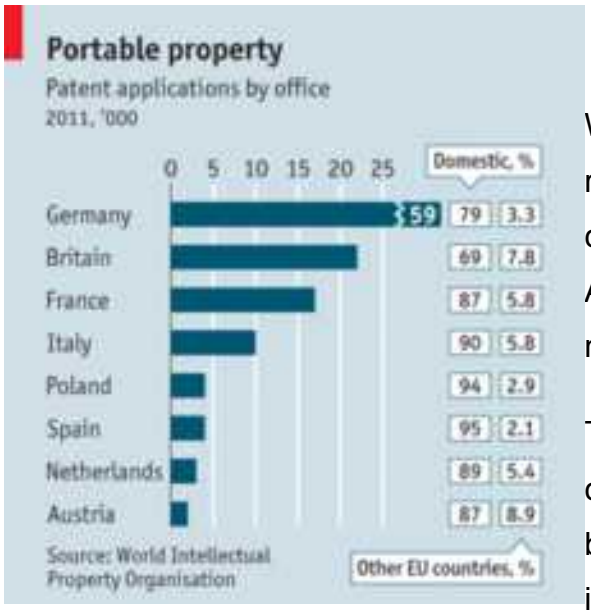

Figure 4: Patent applications per office [ECON12b]

While the filings for European patents in the period from 2008 to 2011 fell by 2.5%, probably caused by the economic decrease, filings rose in America by 10% and in China, what is now in number one position worldwide, by 66%.

The new system for unitary patents is expected to come into force in 2014. The applications must be in English, French or German, or translated into one of the three. As a result of the largely elimination of the translation requirement, the commission expects the cost of a unitary patent to be less than €5,000. The still high price is partly caused by the division of the “Unified Court” into the court in Paris and the two specialized branches in London and Munich. Italy and Spain did not join the unitary patent yet because their tongues were not on the privileged list. Furthermore they are also disputing the right of the other 25 to press ahead without them.

Three big European companies that own of fistfuls of patents, namely BAE Systems (UK Defense Industry), Ericsson (SWE Telecom Equipment) and Nokia (FIN Mobile Phones), tried to urge the Parliament to reject the plan. Their concern was that the new court must apply a patent-owner's domestic law when ruling on infringements. They feared that different standards will apply in different cases and thus "patent trolls"[1] may choose friendly territory and hold more innovative companies to ransom. [Vgl. ECON12c]

Although the European Unitary Patent is a big achievement, there is still room for improvement. Europe is the only region with three layers in patent legislation: national, European and unitary. National offices could cease granting patents and focus on advising and servicing the applicants. [Vgl. POBE11]

Many people think that the European Parliament's approving of the unitary patent is a threat for the economy and another step towards the general legalization of software patents. Below some of their arguments are enlisted.

1. The costs for patents are plummeting, what leads to more applications and finally more restrictions and litigation. One patent application is now covering 25 countries (the EU minus Spain and Italy), whereas 25 separate applications involving many translations had to be filed before

2. Litigation becomes more profitable, especially for big firms and patent trolls. A single European court is now responsible for infringement restitution claims instead of one court per country before. Absurdly the inefficiency of the old system was what saved Europe from masses of litigation like they are happening in the USA.

3. Another risk is that this new court will be made up of judges who are "experts" in patents, what means that they have a background in the patent industry and will bring a strong pro-patent bias. This development looks similar to the way it was done in 1982 in the USA when they created the pro-patent appeals court, the CAFC. [Vgl. ESWP12b]

[1] "**Patent troll**" is a term for companies that acquires patents for the purpose of extracting money from product developers. A narrower term is **non-practising entity** (**NPE**), which denotes a sub-category of patent trolls whose only activity in a domain is patent trolling. One definition of NPE is "an entity that does not have the capabilities to design, manufacture, or distribute products that have features covered by the patent". [ESWP12a]

4.1.3 Software Patents

The EPO is committed to the European Patent law determined in the EPC. Article 52, paragraph 2 EPC, excludes from patentability, in particular

- *“discoveries, scientific theories and mathematical methods;*
- *aesthetic creations;*
- *schemes, rules and methods for performing mental acts, playing games or doing business, and* ***programs for computers****;*
- *presentations of information;”* [EUPC07a]

The following Paragraph 3 says:

“*The provisions of paragraph 2 shall exclude patentability of the subject-matter or activities referred to in that provision only to the extent to which a European patent application or European patent relates to such subject-matter or activities* ***as such****.*" [EUPC07b]

The phrasing "as such" opened a broad playing field for applicants, attorneys, examiners, and judges. Although the EPC should be construed under a purposive approach like other international conventions [Vgl. VCLT69], the purpose behind this phrase is far from clear. [Vgl. PILA05]

While some countries grant patents for all types of software, the patent practice in Europe is different. The EPO distinguishes between software and computer implemented innovations CII. The term CII means an invention that works by using a computer, a computer network or other programmable apparatus. The invention is required to have at least one or more features which are realized wholly or partly by means of a computer program.

4.1.3.1 Patentability Criteria

To be recognized as patentable, CIIs must fulfill the same patentability criteria as inventions in all other fields. Consequently, CIIs can be patented if:

- They have **technical character** and **solve a technical problem**.
- They are **new**.
- They involve an **inventive technical contribution** to the prior art.

A panel of three highly trained members of the EPO need to conduct a thorough search for prior art and examine a rigorous examination process before a European Patent can be granted. This procedure ensures that a patent is only granted if the application fulfills the strict requirements of the EPC and the invention is really a novelty. Furthermore various possibilities for third parties to intervene in the procedure are given what ensures that European patents are of a high quality and are legally sound. [Vgl. EUPO12c]

The EPO patenting process is very restrictive due to this definition and puts emphasis on new technical solutions. Patents are not granted for computer programs or computer-implemented business methods unless they make a technical contribution. As already written above programs for computers are excluded from patentability in general. An exception can be made if it has the potential to cause a "further technical effect" which must go beyond the inherent technical interactions between hardware and software. A CII (even in the form of a computer program) alternatively can be patentable if it can provide this further technical effect and if it fulfills the other criteria.

4.1.3.2 Examples for Patenting Practice

To demonstrate the practice of the EPO some examples will be shown for a better understanding.

- The EPO did not grant a patent for an internet auction system that used conventional computer technology and computer networks, because it made no inventive technical contribution to the level of existing technology. Simply business advancement is not enough for a patent by the EPO.
- In contrast to the former situation, the problem of improving signal strengths between mobile phones is a technical problem. In this case it doesn’t matter if the problem was solved by an improved hardware or by modifications to the phone software. As long as the solution was novel and inventive, such an invention would obtain a patent

The requirement for the solution to a technical problem is the main difference in the granting practice of the EPO and the USPTO. Patent protection for software can be granted in America even if it does not solve a technical problem but is just a pure business solution.

Since the EPC came into force in 1978, at least 30.000 patents for computer-implemented inventions have been granted by the EPO [Vg. MEMO02]. The USPTO has in comparison granted more than 200.000 software patents and has a backlog of more than 1 million applications, many of them regarding software patents [Vgl. PABS12].

4.1.3.3 Debate and legislation

The debate about the patentability of Software in Europe started back in the 1990s and is still ongoing. Opponents of the CII Practice argue that patent protection should not be available for any computer program, while others complain that there is no protection for software at all in Europe. Computer programs can gain patent status if the make a proven technical contribution but there is one exception. Patent applications for computer programs are not eligible in the UK.

Thanks to the ongoing discussion a number of official conferences have been initiated. In June 1999 the member states of the EPO discussed the patent status of computer programs in Paris. The aim was to eliminate any ambiguity regarding the patentability of innovations involving software. Some members requested the removal of computer programs from the list of non-patentable innovations in Article 52. After some months of evaluation it was decided to leave the article unchanged. In 2002 the EU proposed a Directive on the Patentability of Computer-Implemented Inventions which aimed to establish common practice for the national courts and in doubts of its interpretation the requirement to seek a ruling from the European Court of Justice. Even if Switzerland was not a member of the EU but of the EPO it signaled that it would adjust its practice according to the EU legislative procedure.

However, the directive became highly controversial. Proponents of the Directive on the one hand claimed its purpose was to clarify the meaning of Article 52, whereas opponents claimed the Directive would abolish perceived more stringent restrictions against software patenting. The opponents were worried about the sacrifice of employed or employable more stringent restrictions on the patentability of software perceived by national courts and that this would lead to an increased assertion of patents on software. There was a lot of lobbying escorting the whole process and massive publicity efforts from both sides to influence the decision about the Directive [Vgl. OULA12]. Finally it was largely supported by the European Commission and most member state governments in contrast to their na-

tional parliaments [Vgl. TINQ12]. In July 2005 the Directive was overwhelmingly rejected by the European Parliament what terminated the legislate procedure.

Subsequently the final interpretation of the law in this area continues to be the responsibility of national courts, following national case-law. Only if a European patent application is refused or when a European patent is revoked in opposition proceedings before the EPO, the EPO has the final say regarding the interpretation of the EPC. [Vgl. WiPe12]

4.1.3.4 Arguments for and against patentability of software

As already mentioned above there is still a discussion going on about software patents. This chapter will enumerate list of pros and cons to provide an overview about chances and risks software patents involve. Many pages on the web provide a large variety of reasons why they are against software patents like the following points:

- **Software patents are too slow**. Examination takes several years and patents limit competition for up to 20 years. The software life cycle and amortization of investments are much shorter.
- **Software patents ruin investment**. A typical computer program can violate hundreds of patents. Established players hold off emerging competitors with a single patent and delay creative destruction of their markets. Entrepreneurs refrain from the risk of entering a mined market. Legal ambushes deter investment in the next generation by the market leaders of tomorrow.
- **Software patents are overly broad rights.** Inventors may deliberately phrase their applications very broadly and negotiate with the patent office over breadth of the grant.
- **Software patents deprive authors of the fruits of their work.** Patent regimes dilute ownership over copyrighted works because they overlap with the realm of copyright. Software patenting closes an alleged copyright protection gap, which was preserved by the legislator for reasons.
- **Software patents are not economically justified.** Insufficient economic evidence supports an application of the patent system on software. On the contrary, most studies hint that software patent regimes restrain innovation.
- **Software patents reward hot air**. Ideas are not scarce but cheap. Their disclosure barely justifies granting rights to prevent them happening. Developers

who read software patents consider them an offence: they disclose nothing useful.

- **Software patents are difficult to research**. Patent databases, software and patents are complex. Patent attorneys can do unreliable but only courts can decide if a patent infringed or not. The inventor takes all risks and bills. Patent Offices admit it is impossible to find prior art in source or binary code.
- **Software patents are useless for defensive purposes**. Patents are useless against patent trolls, since they do not have any product which could infringe a patent at all. If a business declares bankruptcy a troll can buy it and use these 'defensive' patents to terrorize competitors.
- **Software patents discriminate small players**. They are forced to bow into cease-and-desist letters about questionable patents or settle out of court as litigation is too expensive and takes a long time. Small player often can either pull or cut their software or take a license if available. They are excluded from fair cross-licensing deals, since they do not have enough patents to cross-license.
- **Software patents are like 'cold war' for large companies.** Large companies view positively the potential to nuke competitors from the market. With cross-licensing deals they recreate a level playing field that resembles the situation without a patent system for members of the club. But weight in trolls, litigation costs, damages, royalties, product removal risks, and a shift of resources from the R&D (Research & Development) to the P&L (Patents & Litigation) department.
- **Software patents do not fit for service-oriented markets.** The software market is about providing services. Patenting suits service markets badly. Patents were designed for the classic industrial sector.
- **Software patents are not written by (and for) developers.** Investors can write patent applications without skills in software development and sue software developers who independently recreate their inventions. [Vgl. SSWP12]
- **Software patents originate high costs**. For the U.S. the economic benefit is dubious. A study in 2008 found that American public companies' total profits from patents (excluding pharmaceuticals) in 1999 were about $4 billion, but that the associated litigation costs were $14 billion [Vgl. ECON12d]. More re-

cent figures come from the Smartphone industry. $20 billion were spent on patent litigation and patent purchases in the years 2011 and 2012, an amount equal to eight Mars rover missions. 2012 was the first year when spending on lawsuits and patents purchases by Apple and Google exceeded spending on research and development of new products. [Vgl.DuLo12a]

- **Software is math**. A program is the transcription of an algorithm in a programming language. By virtue of the Church-Turing thesis, a program is thus the transcription of a mathematical function. Since math is not patentable, neither is software [Vgl. SSWP12]

This list has no intention of being complete, but to offer a variety of solid reasons why software patents harm development and have the potential to cause serious threats to the economy.

On the other hand there are also some qualified reasons in favor of software patents which are presented in the list below.

- **Promotes research and development.** The basic principles of patent law were developed before computers were invented and have served societies for centuries. In the United States, the U.S. Constitution mandates that patent law promote "*the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."* [CUSA87]
    - **Public disclosure.**
        - Patents must disclose how to make and use an invention in sufficient detail so that other persons of ordinary skill in the art of the invention can make and use the invention without undue experimentation. [Vgl. USPTO12a] Furthermore, patents are only valid if the inventions they disclose were not known by the public prior to the filing of the patent application, or if the inventions were not obvious to those of ordinary skill in the art at the time the patent application was filed. [USPTO12b]
        - Patents can be invalidated if they lack sufficient detail.
        - The time delay between the filing of a software patent application and its publication is 18 months [USPTO12c]. This period serves as a

compromise allowing U.S. innovators to develop their software before revealing details about it and giving competitors an unfair look at their R & D but still providing the public notice within a fair amount of time to allow others to develop their own technology. The format in which software inventions are disclosed in patents (plain language text, flow charts, line drawings, etc.) allows a person with reasonable programming skills to recreate software capable of performing the ideas patented, as required by law.

- **Protection:**
  - The Congress of the U.S. has stated that "anything under the sun made by man"[SeRp52] deserves patent protection to promote innovation.
  - Some aspects of software are also covered by copyright law, but those are largely different from the protection of ideas and innovation in the useful arts provided by patent law. [Vgl. KuLa95]
  - Inventions can only be patented if they are non-obvious. This reduces the granting of "trivial" patents with no inventive step [Vgl. EUPO12d].
- **Economic benefit:** Software patents resulting from the production of patentable ideas can increase the valuation of small companies.
- **International law:** International law opens the possibility of patent protection for an invention in any field of technology. Following this interpretation of TRIPs software should be subject to patent law [Vgl. AGuG06]
- **Patent challenges:**
  - Granted patents can be revoked if found to be invalid.
  - If a third party thinks that an overly general patent was granted, they may file an interpartes examination in the U.S., an opposition in Europe, or a lawsuit in Court to challenge its legitimacy.
- **Copyright limitations:** Patents protect functionality. Copyright on the other hand only protects expression. Substantial modification to an original work, even if it performs exactly the same function, would not be prevented by copyright. To prove copyright infringement also requires the additional hurdle of proving copying which is not necessary for patent infringement. [Vgl. WiPe12b]

4.1.3.5 The Patented Web Shop

Figure 5: Patented Web shop [FFII12a]

1. **Web shop**: Selling things over a network using a server, client and payment processor, or using a client and a server EP803105,EP738446 and EP1016014
2. **Order by cell phone**: Selling over a mobile phone network EP1090494
3. **Shopping cart**: Electronic shopping cart EP807891
4. **[CDs] [Films] [Books]**: Tabbed palettes and restrict search EP689133 and EP1131752
5. **Picture link**: Preview window EP537100
6. **Get key via sms**: Sending key to decrypt bought data via mobile phone network EP1374189
7. **View film**: Video streaming ("segmented video on-demand") EP633694

8. **Copy protection**: Encrypt file so it can only be played on authorized devices EP1072143
9. **Credit card**: Pay with credit card on the Internet EP779587
10. **Adapt pages**: Generate different web page depending on detected device EP1320972
11. **Request loan**: Automated loan application EP715740
12. **Secure card payment**: Secure online credit/debit card payment with PIN code EP1218865
13. **Send oers**: Send oers in response to request EP986016
14. **Delivery**: Ship items to the correct pick-up point of the used delivery service EP1181655
15. **Support system**: Support system based on answers to questions -EP915422
16. **Preview chapters**: Use of TV as metaphor for selecting different video fragments EP670652
17. **Image**: Reduce page loading time by automatically reducing image quality EP992922
18. **Related results**: Show related results if customer likes the current ones EP628919
19. **Rebate code**: Allow rebate codes to be entered by customers EP929874
20. **Web-to-Print**: Generation of prepress formats or printouts from low resolution templates via the Internet EP852359 and EP1169848

This example of a typical web shop demonstrates what elements and processes would be covered by granted (not just requested) European Patents. All of these 20 patents would have been rendered legally enforceable by the soft patent directive that was finally rejected by the European Parliament in 2005. The rejection can be seen as a result of the awareness rising from Eurolinux, the FFII and concerned software professionals from all over Europe [Vgl. FFII12b]

4.1.3.6 Patents as Weapons

Patents are often compared with guns because there are some obvious similarities in the usage. The seller and the buyer of a gun usually say that it is for protection only, but in re-

ality guns are often used to rob or plunder, or even to wage wars and so are patents recently as well.

Each patent prohibits others from applying certain knowledge for a specific period of time and so they are not really an incentive to promote innovation but to block competitors from a market segment. For instance there are so many patents on any aspects of internet telephony that it is almost impossible to create an internet telephony program without violating any patents.

Patents can be pointed on somebody like a gun and the patent holder can shoot at a software company or at the users of the company. The patent holder can shoot or just force the opponent to pay protection money (license fees) to keep him out of the market or to gain profit. Even if it is not sure that the patent is valid, it is highly dangerous to find out. Metaphorically spoken it is like challenging whether the gun that points on you is loaded or not.

A patent holder has practically no legal obligation to society and so he can insist on his exclusive rights and there is no legal requirement to act reasonable. Even a property owner has more obligations to society than a patent holder because the former cannot buy property that would block a vital traffic artery in a big city, while with patents that sort of things happens all the time and it takes several years and a vast amount of money to get them annulled, if that is possible at all. It is a hard and long journey because a patent law suit causes insecurity for someone's clients and may disrupt the revenue stream. So even if the law suit is won, the company can go bankrupt because of lost clients or because the technology is outdated in the meantime.

The worst thing is that only a single patent can put an entire company out of business, overnight. A very illustrating example is the case Verizon against Vonage, a company that developed one of the first Internet telephone services and has attracted more than two million customers. In 2006, Verizon — one of Vonage's biggest competitors — sued for patent infringement and won a verdict in its favor. Two of the infringed patents cover the concept of translating phone numbers into Internet addresses. Basic technology without it the creation of a consumer-friendly Internet telephone product is virtually impossible. So if Verizon prevails on appeal, it will probably be able to drive Vonage out of business. Consumers will suffer from fewer choices and higher prices, and future competitors will be re-

luctant to enter markets dominated by patents. A patent is an absolute right against everyone that runs up to 20 years. The injustice is that the one who was first to register some idea at a patent office gets the patent and no one else can implement the same idea without his permission. Giving permission is up to the patent holder and he can choose if he wants to license to some but not to others. It doesn't matter if the idea is vital for anybody else even if it is something as trivial as a progress bar or a shopping trolley [Vgl. NOSP12b].

4.1.3.7 Two Bosses and their Relation to Patents

- Bill Gates and Microsoft:

What a difference 16 years makes. In 2007 an interview of Microsoft's general counsel agitated the technology world because he accused users and developers of various free software products of patent infringement and demanded royalties. Admittedly in the last years before the interview he argued that patents are essential for technological breakthrough.

On the contrary Microsoft had a diametrically different line of argumentation in 1991. At that time Bill Gates wrote in a memo to his senior executives "If people had understood how patents would be granted when most of today's ideas were invented, and had taken out patents, the industry would be at a complete standstill today." Ironically Mr. Gates worried that "some large company will patent some obvious thing" and use the patent to "take as much of our profits as they want."

The memo was shortly after the courts began allowing patents on software in the 1980s. Back in these days Microsoft was a growing company challenging well-established giants like I.B.M. and Novell. The fact that Microsoft had only eight patents in their portfolio prompted Mr. Gates to initiate an aggressive patenting program. The result of this program was that Microsoft's patent portfolio reached 31.000 patents in 2012 [Vgl. Reed12]. Taking this into account it is no surprise that Microsoft changed its point of view on software patents radically, but Mr. Gates was right in 1991: patents are bad for the software industry [Vgl. LEET12].

- Steve Jobs and Apple:

In 2006 Apple reluctantly agreed to pay $100 million to Creative Technology, a Singapore-based company for patent infringement. Creative applied for a broad software patent in

2001 for a “portable music playback device” that covered minor functions that Apple used for the iPod, a new product that had gone on sale the same year. Immediately after the grant of the patent, Creative asked for a license fee and Apple settled three months after Creative went to court. “Creative is very fortunate to have been granted this early patent,” Mr. Jobs said in a statement announcing the settlement in 2006. This experience induced Mr. Jobs to gather his senior managers privately to inform them that when it comes to the new iPhone they are going to patent it all. A former executive reported that his attitude was that if someone at Apple can dream it up, then they should apply for a patent, because even if they never built it, it is a defensive tool. Shortly after that meeting Apple’s engineers were asked to participate in monthly “invention disclosure sessions.” Once a group of software engineers met with patent lawyers, to talk about possible inventions and their protection. When the first engineer presented his vision of a software that studied users’ preferences as they browsed the Web, a lawyer said that that was a patent and noted it. Then another engineer talked about a slight modification of popular application and the patent lawyers said again that that was a patent and this procedure went on. A former Apple lawyer confirmed in an interview they filed applications even if they knew it would not get patented, just to prevent others from trying to patent the idea. After more than a dozen patent applications yielded from the session an engineer left the meeting, explaining that he did not think that companies should be allowed to own basic software concepts [Vgl. DuLo12b].

4.1.3.8 Some Interesting Facts and Figures about Patents and R & D Investments

Figure 6 shows the expenditures for R&D as a percentage of sales. These numbers are relative and do not express the total amount spent by a particular company. Apple increased its funding for R&D in 2012 by $1bn but the percentage of R&D spending still decreased. Some companies do not spend so much on research because they let their suppliers do that and rely on their efforts.

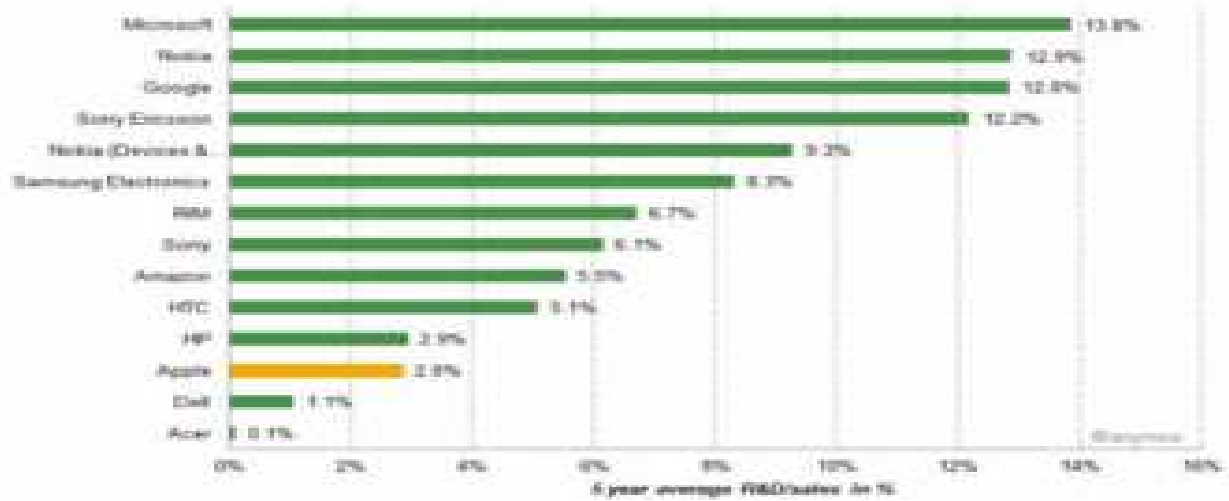

Figure 6: R&D in % of sales [ASYM12]

In comparison to the relative values, figure 7 comes up with the absolute values. They show a different picture with high investments made by classical industries like auto manufacturers or pharmaceutical industry heavyweights on top. Apple is generally known as a top inventor coming up with several breakthrough innovations like iPad, iPod or iPhone but is neither in the top group of the relative values nor in absolute

Rank		Company	R&D Spending			Headquarters Location	Industry
2011	2010		2011, $US billions	Change from 2010	As a % of Sales		
1	4	Toyota	$9.9	16.5%	4.2%	Japan	Auto
2	3	Novartis	$9.6	5.5%	16.4%	Europe	Healthcare
3	1	Roche Holding	$9.4	-2.1%	19.6%	Europe	Healthcare
4	2	Pfizer	$9.1	-3.2%	13.5%	North America	Healthcare
5	4	Microsoft	$9.0	3.6%	12.9%	North America	Software and Internet
6	7	Samsung	$9.0	13.9%	4.0%	Asia	Computing and Electronics
7	5	Merck	$8.5	-1.2%	17.6%	North America	Healthcare
8	11	Intel	$8.4	27.3%	15.5%	North America	Computing and Electronics
9	9	General Motors	$8.1	16.7%	5.4%	North America	Auto
10	8	Nokia	$7.8	0%	14.5%	Europe	Computing and Electronics
11	14	Volkswagen	$7.7	26.2%	3.6%	Europe	Auto
12	10	Johnson & Johnson	$7.5	10.3%	11.6%	North America	Healthcare
13	16	Sanofi	$6.7	15.5%	14.4%	Europe	Healthcare
14	12	Panasonic	$6.6	6.5%	6.6%	Japan	Computing and Electronics
15	17	Honda	$6.6	15.8%	4.5%	Japan	Auto
16	13	GlaxoSmithKline	$6.3	3.3%	14.2%	Europe	Healthcare
17	15	IBM	$6.3	5.9%	5.9%	North America	Computing and Electronics
18	19	Cisco Systems	$5.8	9.4%	13.5%	North America	Computing and Electronics
19	26	Daimler	$5.8	24.1%	3.9%	Europe	Auto
20	18	AstraZeneca	$5.5	3.8%	16.4%	Europe	Healthcare
		TOP 20 TOTAL	$152.6	9.9% Avg.	8.2% Avg.		

Source: Bloomberg data, Booz & Company

Figure 7: Absolute R&D spending top list [BOOZ12]

Figure 8 demonstrates which companies filed in the most application for patents to the EPO in 2011. Five of the top 10 companies are located in member states but there are also two American and two Korean companies as well as one Japanese in the top 10.

Figure 8: Patent applications at the EPO 2011 [EUPO12e]

The situation at the USPTO is different. Only three out of the top 10 have their headquarter in the United States but 6 are located in Japan and one in Korea. Apple is listed as 37th.

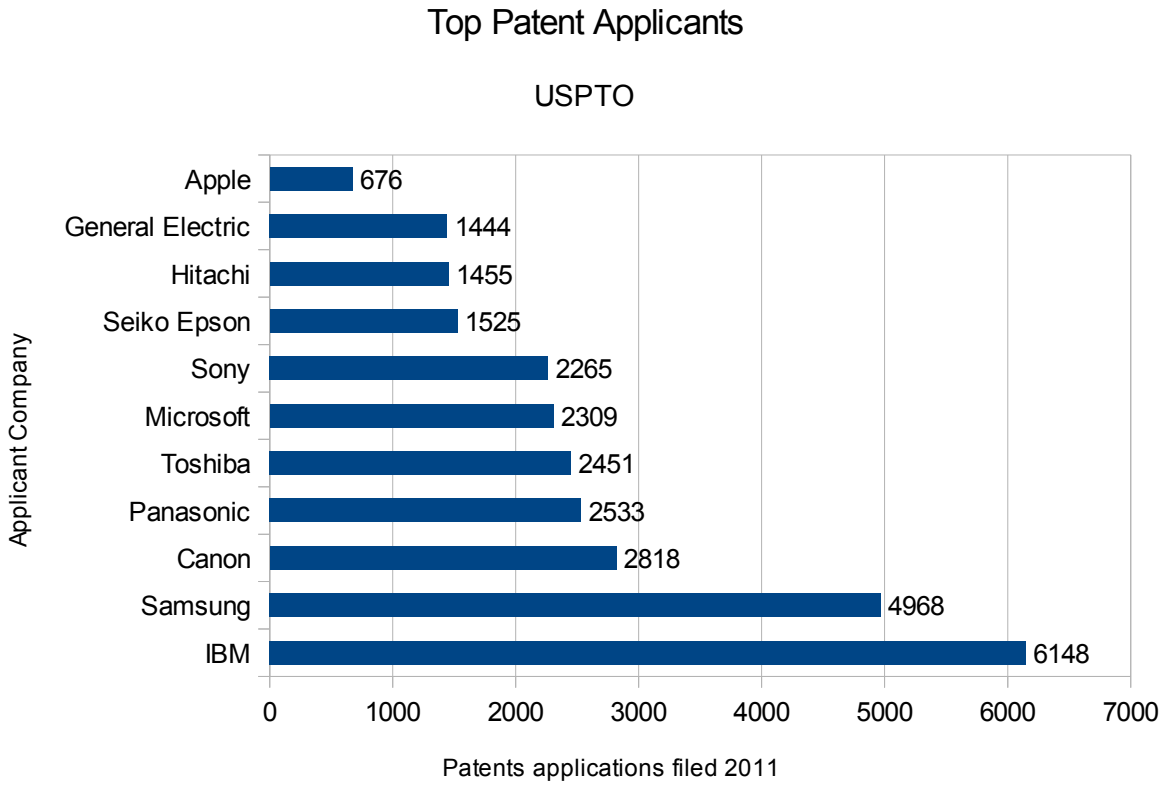

Figure 9: Patent Applications at the USPTO [built on Data from http://www.uspto.gov/web/offices/ac/ido/oeip/taf/topo_11.htm]

4.1.3.9 Interesting quotes regarding patents

"Patents are intelligent bombs."

Harvard Business Review

"I have sworn upon the altar of God eternal hostility against every form of tyranny over the mind of man."

Thomas Jefferson, 3rd President of the USA

"Patents are being used as an offensive measure. [...] If you don't have any patents, you don't have any weapons in your armory."

John MacPhail, Partner, Baker & McKenzie

5. Expert Interview

1. Q: Dear Mr. “Examiner” (Name is known to the author. EPO policy does not allow unauthorized interviews) could you please briefly describe your position at the EPO and name some of your daily routines at the office?

   A: I am working as patent examiner. The main task is examining new patent applications in the light of novelty and inventiveness. This task includes the careful study of an application and then looking up similar patents or patent applications in a huge database. Based on the closest prior art at hand I write an opinion about the patentability (to be sent the applicants attorney) which is the basis for further discussions. A lesser fraction of my time is spent on following up the responses from the applicants (this task is called patent examination, the aforementioned task is the patent search) and oral proceedings (These are official hearings with the attorneys on one side and a division of three patent examiners on the other side. The goal of these oral proceedings is – in simple words - to conclude the process of deciding whether an application is worth being granted a patent or not).

2. Q: Due to the recent decision of the European Parliament to adopt the unitary patent I would like you to explain what this means for the EPO in particular and the European Economy in general?

   A: The most important impact is for the European Economy due to the fact, that the – up to now – very costly process of applying for a patent will become considerably cheaper. This will also make it for smaller companies affordable to apply for patents and therefore enter areas of business which have been blocked off by big enterprises by means of patents.
   Nevertheless, it will still be expensive and not so easy for small companies to endure the financial hardship of litigating patent disputes with bigger enterprises (if a small company e.g. is not allowed to sell and market its product over an unknown period of time due to some preliminary court decision this might be ruinous to a small company, while a big enterprise is better suited to endure such processes). In this respect Goliath will still be in a better situation than David.
   For the European Patent Office the new unitary patent will result in an increase of applications and hence increase business (since the EPO is a non-profit organization an increase in business means mainly the hiring of new examiners).

From an overall point of view, the unitary patent will stimulate innovation in Europe and therefore also boost the economy.

3. Q: What's your opinion regarding the prices for filing a patent in Europe in comparison to other major players like the US, China, Korea or Japan?

   A: The filing costs in Europe have been considerably higher than in the other big economic units mainly because of the cost of filing it in every country separately which imposed very high costs of translation. This problem will be tackled to some extend by the unitary patent.
   Nevertheless, the higher cost for examining a patent application by the EPO as compared to the USPTO is compensated by the higher quality of examination that can be done by the EPO. The reasons for the higher quality is that examiners at the EPO are capable of reading prior art documents in at least three languages (GE, FR and EN) and that we have machine translation of prior art in most of the other languages at our disposal. The means of machine translation are constantly expanded by the EPO including languages like Chinese and Korean at the present time. In other words, the EPO can do a more complete search, which is acknowledged by the applicants (they often prefer a more expensive first filing with the EPO over a less complete search obtainable from other IP offices).

4. Q: Are there still negotiations going on to convince Spain and Italy to join the unitary patent scheme later on under some conditions?

   A: I did not follow this topic that close recently, but I would be surprised if these two countries would not join in the long run.

5. Q: What do you personally think about software patents, especially regarding to the Free Software and Open Source Movements?

   A: It is inherent to the EPC (Article 52 (2) c), that the EPO does not grant patents on software per se. Since I am not working in this field and I didn't pay too much attention to this problem I am afraid there is nothing I can say about this topic.

6. Q: Do you think that the rejected European Software Directive from 2005 was the last attempt to abolish Art. 52 Exceptions from patentability, or are

there new attempts to legalize software patents to come with the creation of the unitary patent?

A: I do not think that with the unitary patent there is any attempt to overthrow the EPC, so frankly I don't think there will be any changes concerning Art. 52 EPC because of the unitary patent. Certainly with the development of new technologies (biology, computers, etc.) there is a constant need for questioning end rethinking the EPC, but as mentioned in my previous answer I am not aware of any attempts for changing the rules for granting patents for software.

7. Q: Do you think that the fact that the funding of the EPO depends on the number of applications for patents and their servicing makes it impressionable by big companies that are important “customers”? Or is there anything that could be done to guarantee the independence of the EPO, like public funding?

   A: Although it is important for the EPO to have a high number of applications, I cannot see that the EPO would please certain costumers by granting their applications. This is due to the fact that a patent is a public document and can be opposed by anyone. This means, that if we would be very generous in granting patents with some applicants, their competitors would oppose the patent and we would have to withdraw the patent. This would not be good for the EPO as an organization but also not for the individual examiners if it would happen to them too frequently (this serves as kind of control mechanism against any kind of bribery as well as a quality check). Since the EPO can finance its operations out of the fees it is collecting, there is no need for supporting the EPO by public funding.

8. Q: As I read in some media the USPTO is chronically underfunded and overloaded with applications so that some companies file the same application several times with small adaptions until the patent is granted, like Apple did with SIRI. How is the situation at the EPO regarding manpower and time for examination of applications?

   A: As far as I know, many people working at the USPTO consider their job just as a transitional career step on their way to becoming a patent attorney. Therefore the turnover is pretty high (as compared to the EPO) and the average examiner is less experienced. They also got a smaller time budget for

performing searches and examinations and do not have the tools (special software) for performing their task in an efficient way as we do at the EPO. Therefore it could be possible that one might go away with filing the same application many times until some examiner is in favor of granting it. This doesn't seem to be possible at the EPO since we have electronic tools to bring to our attention all the applications filed in the past by the same applicant, the same inventor, and so on. So if an application is filed several times, the applicant has to pay several times and can be almost certain to get exactly the same answer all the time. Even if it would have not been detected that the same application is filed multiple times and hence gets treated by different examiners, it is very likely that these examiners will come to the same conclusions (about patentability) due to the highly standardized and traceable way we are performing our task.
Currently at the EPO the examiners have ample time to do their job at a high quality without being under constant pressure. Nevertheless, there are certainly time constraints and the amount of work each examiner performs is closely monitored by management.
Will the number of applications continue to increase in the future (which is most likely the case due to the unitary patent) then - I think - the EPO has to hire more examiners in order to be able to deal with the work load.

9. Q: Do you think the patent system should be reformed or more restrictive to prohibit the grant of very broad and abstract patents, which are often used as weapons to nuke out competitors? What can be done against patent trolls and so called “non-performing-entities”?

   A: There can be nothing done against the granting of very broad patents except a careful search and hence citing some prior art against its novelty. The praxis as examiner shows, that if an applicant is going for very broad claims it is easy to find prior art taking away the novelty of the application. If no prior art can be found it is a clear indication that the very broad application contains new subject matter and might be considered for being granted (it has to be inventive for this purpose). In this case, the applicant found something that has not been covered by any other applicant and shall have the advantage of it.
   I do not see any reasonable approach to reform the European Patent Convention in order to avoid the problems posed by patent trolls or non-performing-entities, unfortunately this seems to be a problem inherent in the concept of patents.

10. Q: What would be your wish for the future of the European Patent System?

    A: I hope that the patent system (not only the European) will continue to stimulate innovation by only granting high quality patents. I am on the other hand also very confident that this will be the case.

6. Conclusion

Considering the variety of threats and possible consequences for the economy as a whole, national governments and the EU and its institutions are well advised to reconsider every decision on the terrain of software patents twice. Even if the current system is far from perfect, it prevented the European economy from patent wars like they are currently going on in the US.

If companies are constrained to spend more on Professional and Legal Fees, to protect each other from complaints regarding patent violation, than on R&D, something is wrong with the concept of patenting. Centuries ago the patent system was invented to honor extraordinary inventions and to promote the development but nowadays some companies misuse the honorable institution of a patent to get rid of competitors and to maximize their profits on the back of society and competition. The use of patents as weapons is an obstacle to any form of development. Large companies pay astronomical amounts for the acquisition of patent portfolios to use them as deterrence, comparable with the nuclear deterrence during the Cold War. The acquisition of Motorola Mobility, a struggling mobile phone pioneer with a portfolio of about 17.000 patents, for $12.5bn is just one example for the armament in the patent war. [Vgl.HaBl12].

The more patents one company owns, the easier it is for them to negotiate cross-licensing deals with competitors. This is a substantial disadvantage for small companies that lack in resources to pay hordes of patent attorneys and neither do they have enough patents to offer cross-licensing agreements to giants like IBM, Microsoft or Google. These cross-licensing deals can be seen as a ceasefire and sometimes obscure alliances accrue from them. Archrivals like Microsoft, Apple and Google together with many other tech companies assembled a syndicate to buy the 1100 patents Kodak needed to sell to repay a loan [Vgl. Bema12].

The only “industry” profiting without any doubts from the current situation is the lawyers. Legions of patent attorneys are hired by the big players and take about $1.200 per hour and more. The legal fees of the Apple vs. Samsung lawsuit ,which ended with a victory for Apple and an obligation for Samsung to pay $1.05bn, amounted for about $500 millions [Vgl. LuAn12]

In the light of the above the patent system needs to be reformed. In the EU the price for filing an application is too high on the one hand and the three layer system is not the answer to anything on the other hand. One central Patent Court in Europe could be part of a reform and a complete harmonization of the national patent systems could be another one. The national patent courts and patent offices are obsolete for their actual purpose but could be reformed to service stations, to help inventors at the filing process, the translation or at the search for prior art.

Another point is the system of the EPO that could be reformed. Independency and the equipment with sufficient resources are important guarantors for high quality patents. One way of ensuring that could be the inclusion of the EPO in the EU institutions and public funding that is independent from the number of granted patents. Third party members could participate with an aliquot part on the costs regarding to the number of applications filed from that country.

Considering all the arguments for and against software patents it would be better to exclude software programs and other intellectual property generally from patentability. Already Cicero, a roman philosopher, politician, lawyer and writer in the first century BC stated that the thoughts were free. ("**Liberae sunt** […]**nostrae cogitationes**" Thoughts, that is exactly what intellectual property is, nothing more than an idea, sometimes even an abstract one. Basic concepts, business models and small modifications to existing things are not technical inventions in the historical meaning and therefore they shall be excluded from patentability.

Software patents are beneficial for a handful of multinational companies but are a threat for the majority of innovative entrepreneurial startups and therefor harming economic and technological development.

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Interview:

Information regarding the Interview: […."Das EPO hat eine sehr strikte Regel bezüglich Interviews für Medien, etc. bezüglich unserer Arbeit. Ich bitte dich daher, meinen Namen in deiner Arbeit nicht zu erwähnen. Ich könnte meine Antworten auch von der Pressestelle absegnen lassen, aber das würde sicherlich 2 Wochen in Anspruch nehmen."]

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