Stimulating competition and innovation in the information society

Patent or *sui generis* right: what protection should be considered for software and other intangible innovations?

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**Suggestions**

Please send your suggestions and comments to jean–paul.smets@mines.org. The current suggestions and comments will be included in future releases of this report:

- Include a history brief of software patent examination rules at the USPTO
- Develop the paragraph about "secret"
- Include in the knowledge base recent press publications
- Add a chapter on the defensive strategies for SMEs against software patent abuses
- Include a summary of economic research articles on software patents published by "Elsevier"
## Table of Content

Notice to readers ..................................................................................................................... 1

Recommendations ................................................................................................................... 3

Summary ................................................................................................................................. 5

Questions and Answers ......................................................................................................... 11

Introduction ........................................................................................................................... 21

1 The protection of digital works and services: A brief reminder of the basic principles ..... 23
   1.1 Copyright ........................................................................................................................... 23
       1.1.1 Automatic granting of an exclusive monopoly on an original work ...................... 23
       1.1.2 Non–pecuniary and economic rights ................................................................. 24
       1.1.3 Copyright and software: backup copy, decompiling and interoperability .......... 25
       1.1.4 Towards an abolition of the right to personal copying? ..................................... 27
       1.1.5 Free contents: a self−regulatory tool in the publishing market ......................... 29
       1.1.6 Technical protection devices ........................................................................... 30
   1.2 Registered Trademarks ..................................................................................................... 31
       1.2.1 Domain names on the Internet ........................................................................... 33
       1.2.2 The role of trademarks in increasing the value of intangible assets in the information society ........................................................................................................ 33
   1.3 Database law ......................................................................................................................... 34
       1.3.1 A sui generis right ........................................................................................... 34
       1.3.2 Databases and the economics of digital services ................................................ 36
   1.4 Trade secrecy ....................................................................................................................... 37
   1.5 Unfair competition ............................................................................................................. 37

2 The patent: sharing knowledge and stimulating innovation ................................................. 39
   2.1 The patent: granting of a privilege in the general interest ............................................... 40
       2.1.1 Fostering dissemination of technical knowledge ............................................... 40
       2.1.2 Creating an economic environment to foster innovation ..................................... 40
       2.1.3 Patenting entails associated costs for society ....................................................... 41
   2.2 Patent scope: subject, field, cover, term and privileges .................................................... 41
       2.2.1 Patented object, patented process, patented question ........................................ 42
       2.2.2 Scope of Patentability ....................................................................................... 45
       2.2.3 A twenty−year term harmonised at international level ........................................ 46
       2.2.4 Privileges laid down by national law and limited in scope .................................... 46
   2.3 Patents, instructions for use thereof ................................................................................... 48
       2.3.1 The application: a text comprising the description and claims of the invention .... 48
       2.3.2 Examination: is this really an invention? ............................................................... 49
       2.3.3 Defending patents: eliminating infringements and avoiding annulment ............ 50
3 Patent and software: an unnatural union?

| 3.1 Software patent = patent on an information processing method | 55 |
| 3.1.1 Digital services patent | 56 |
| 3.1.2 Examples of software patents | 56 |
| 3.2 The dissemination of technical knowledge | 64 |
| 3.2.1 Source code: the key to technical knowledge | 65 |
| 3.2.2 Software without patenting: source code secrecy but sharing abstract technical knowledge | 65 |
| 3.2.3 Patented software: strengthened source code secrecy | 66 |
| 3.2.4 A patent base of little use | 68 |
| 3.3 Software innovation | 69 |
| 3.3.1 The software patent: protection offering little profit, but a source of litigation | 72 |
| 3.3.2 Effects of patenting on software innovation | 72 |
| 3.3.3 No patenting system: freedom to exercise as a software publisher | 73 |
| 3.3.4 With a patenting system: too much ownership kills ownership | 74 |
| 3.3.5 Other economic analyses of innovation | 76 |
| 3.4 Software competition | 77 |
| 3.4.1 Interfaces: the Key to Competition | 79 |
| 3.4.2 Diversified dissemination methods | 80 |
| 3.4.3 Increasing concentration, legal vulnerability of small publishers | 81 |
| 3.5 Other difficulties | 82 |
| 3.5.1 Hasty examination procedures | 82 |
| 3.5.2 The law does not work | 83 |
| 3.5.3 Patents on e-commerce are not in compliance with WTO rules | 83 |
| 3.5.4 Conformity with some provisions of EU law | 84 |

4 What industrial protection for the information society?

| 4.1 Model 0: guaranteeing freedom of application via a non-restrictive course | 87 |
| 4.2 Model 1: using limited-privilege patenting | 88 |
| 4.2.1 Automatic, uniform and non-discriminatory licensing | 90 |
| 4.2.2 Defining patent infringement as the unauthorised execution of a patented computer-implemented process | 92 |
| 4.2.3 Extending the right to decompile, or registering the source code | 94 |
| 4.2.4 Likely disappearance of inconsistencies observed in the United States | 95 |
| 4.2.5 Natural disappearance of obvious patents | 95 |
| 4.2.6 Avoiding trade conflict with the United States at the cost of an innovative legal approach | 96 |
| 4.2.7 Strengthening competition | 97 |
| 4.2.8 Strengthening control mechanisms for the granting of patents | 97 |
| 4.3 Model 2: the creation of a sui generis right for the protection of intellectual methods | 99 |
| 4.3.1 "Registration": short-term patent-type protection | 101 |
| 4.3.2 Free "registration" with no examination and immediate effect | 102 |
| 4.3.3 An a posteriori evaluation guaranteed by a "user pays" principle | 103 |
| 4.3.4 Developing an e-market for intellectual property | 104 |
| 4.3.5 Protection which respects secrecy and transparency | 105 |
| 4.3.6 Safeguarding Europe’s export capacity | 106 |
| 4.4 Developing the French capacity for economic analysis | 106 |

5 How can limits to patenting be set?

| 5.1 In Europe, software is not patentable, but there are software patents | 109 |
| 5.1.1 In French positive law, programme are not patentable | 110 |
| 5.1.2 The European Patent Office nevertheless deems programmes and digital services to be patentable | 112 |
| 5.1.3 Tacit agreement from the States party to the European Patent Convention | 117 |
| 5.1.4 The proposal of the European Commission: to transpose EPO case law into positive law | 118 |
5.1.5 Using the TRIPs Agreement to justify the software patent........................................119
5.2 From software to intellectual methods and then ideas.....................................................120
  5.2.1 Examples of patents on intellectual methods.................................................................121
5.3 The new trilateral practices................................................................................................126
  5.3.1 The ambiguities of European law..............................................................................127
  5.3.2 Towards privatisation of ideas...............................................................................128
  5.3.3 Can patents on intellectual methods be avoided ?...................................................128
5.4 Clear rules for drawing the limits to the boundaries of the patenting system....................130
  5.4.1 Definition of patentable inventions............................................................................130
  5.4.2 Exceptions to patentability.......................................................................................131
  5.4.3 The claim in the patentable invention: the solution....................................................131
  5.4.4 Borderline cases: technical processes controlled by a computer programme.........131
  5.4.5 Use of a a known multimedia interface is not technical...........................................132
  5.4.6 Analysing the invention as a model, problem and solution......................................132
  5.4.7 What is to be done with the 10 000 to 20 000 EPO patents? ?.................................134

Conclusions................................................................................................................................137

6 Appendix................................................................................................................................141
  6.1 Economics.......................................................................................................................141
  6.2 Law......................................................................................................................................142
  6.3 Public policy.....................................................................................................................143
  6.4 Press articles.....................................................................................................................143
  6.5 Conferences.....................................................................................................................144
  6.6 Petition for a Europe without software patents..............................................................144
  6.7 Examples of software patents..........................................................................................145
This working document was written in the framework of a study requested by an official French organisation in July and August 2000. The purpose was to determine how to ensure that intellectual property rights could continue, in the new climate of the information society, to meet their twofold objective: encouraging innovation, and guaranteeing the sharing of knowledge. Today, we are witnessing gradual distortions of property law which are of some considerable concern, since they are producing harmful effects. One of these is that innovation is being stifled by quantities of patents with no real innovative value. Another is that the protection afforded by these patents is too long-lasting, disproportionately so in relation to the rate of development in information technology. Moreover, the development of the Internet has brought new problems. These concerns are particularly crucial as regards the question of extending patentability to software and intellectual methods (business, consultancy, management, and educational methods etc.), as currently practised by the European Patent Office or the European Commission.

Today, this document is being published in the form of a "working document", so that comments and suggestions may be made. More particularly, we would like readers to consider the following questions:

a) Is it necessary to grant patent protection to inventions on production of tangible goods, based on the use of computer programmes?

b) Does the European Patent Convention in its present form afford protection to inventions on production of tangible goods, based on the use of computer programmes?

c) Has the software patenting system developed in the United States had a beneficial effect on innovation, sharing of knowledge, and competition?

d) Does the TRIPs agreement oblige Europe to extend the patenting system to software? To intellectual methods?

e) Can a clear boundary be marked between software processes and intellectual methods in the information society?

f) Would extension of the patenting system to intellectual methods be good for development of small and medium-sized enterprises?

As regards the scenarii described in Chapters 4 and 5:
1. Of the three scenarii envisaged (copyright alone, copyright plus patent, and copyright plus *sui generis* right), which seems the most conducive to innovation, sharing of knowledge, and competition?

2. Supposing that intangible inventions were protected by a *sui generis* right, what types of procedure could be envisaged for application, then examination and assessment of the application, and for litigation connected thereto?

3. Supposing that intangible inventions were protected by a *sui generis* right, how could limits be set to the current patenting system, and how could the European Patent Office be made to stop granting patents on intangible inventions (e.g. distribution of cookery recipes in a supermarket to encourage customers to consume products), "dressed up" as tangible devices (such as computer printers)? What should be done with patents like these, given that they probably fall into the category of exceptions to patentability?
Having been asked to examine means of protecting intellectual property, with a view to stimulating innovation and sharing knowledge in the information society, our conclusions are:

a) it is essential to be able to offer patent protection to inventions for the production of tangible goods which involve the use of computer programmes (e.g. ABS braking system);

b) the European Patent Convention in its present form provides for the protection of inventions for the production of tangible goods which involve the use of computer programmes;

c) the software patenting system was developed in the US and has had unexpected adverse effects on the desired general objectives of stimulating innovation, sharing knowledge, and enhancing competition;

d) the TRIPs Agreement does not require the extension of the patenting system to software or intellectual methods;

e) the protection of software by patent in the US and Japan has rapidly spread to intellectual methods;

f) an extension of the patenting system to intellectual methods is contrary to European values, and would greatly undermine the development of small and medium businesses.

We recommend:

1. the creation of a *sui generis* right for intangible inventions pursuant to the objectives of stimulating innovation and sharing knowledge;

2. the retention, when the European Patent Convention is revised, of the exclusion of computer programmes from patent protection, in order to avoid an unlimited extension of the patenting system to intellectual methods;

3. that the present patenting system in Europe be clarified by asking the European Patent Office (EPO) to refrain from granting patents for intangible inventions which are clearly excluded (e.g. the distribution of recipes in supermarkets to encourage consumption);

4. that current holders of patents on intangible inventions be advised to convert these patents into *sui generis* rights once they have been created.
Europe is about to create a European patent to harmonise and simplify its system of protection of innovation. In the framework of this reform, the European Commission recommends that the law should be "clarified" so that the case law built up by the European Patent Office (EPO) over the past ten years in the area of computer software may be codified as positive law. Past decisions have thus allowed that "software having technical effects" can be patented, while at the same time asserting that a "programme as such" cannot. In practice, case law allows any computer programme to be patented, since, as the representatives on the "software" commission of the Union of European Intellectual Property Attorneys pointed out in 1997, "all programmes are technical".

The Commission’s recommendation that EPO case law should be transposed into law is based neither on scientific and economic studies, nor on consensus between software professionals and the public authorities. EPO case law is in contradiction with the Munich Agreement and the intentions of the French legislator. The distinction European judges have made, without prior debate, between a "programme having technical effects" and a "programme as such" appears to be a deliberate subterfuge designed to get around the fact that the Munich Agreement and French law both provide an exception for computer software in their patent provisions. Indeed, there is no exception to the principle of non-patentability of software in France. This was underlined in a decision handed down by the Paris Court of Appeal, upheld by the French Cour de Cassation:

"During the parliamentary debates, it was stated that some programmes or series of instructions could order the development of industrial processes and also have industrial effects; nevertheless, when the law was passed as it stands at present, the Parliament clearly expressed its intention to provide that no computer programme, whether producing industrial effects or not, was an industrial invention".

Nor is software patentability covered by the TRIPS Agreement set up under the aegis of the WTO, as points out Paul Hartnack, the Comptroller General of the British Patent Office. The issue of software patentability in Europe therefore remains to be resolved as regards the law.

It would be hazardous to follow the European Commission in its recommendation on software patents without first making a thorough analysis of the impact of software patents on the information society. This analysis is all the more necessary as today, national parliaments attempting to
transpose a Directive on patentability of living organisms drawn up by the Directorate General for the Internal Market and adopted by the Council of Ministers in Brussels, are experiencing difficulty because the Directive is ambiguous and poses ethical problems.

Contrary to the above example of living organisms, patentability of which is opposed on ethical grounds, the issue of whether software is patentable or not is an economic one, with serious repercussions given the swift development of the information society. The question is whether a patent, in addition to copyright, trademark rights and data base rights, will contribute to stimulating innovation and competition in the information society or if, on the contrary, it will ultimately weaken the proven system of protection and injure the economic interests of the States concerned. The software patent would not replace copyright but add to it. This is what Catherine Tasca, the French Minister of Culture and Communication, indicated in a speech during the international conference on "Management and Legitimate use of Intellectual Property", on July 10th, 2000.

(…) The proof of this is the issue of non-patentability of software falling within the scope of intellectual property rights. In Europe, these rights (copyright) and the protection they afford have shown that they are legitimate and effective. Intellectual works, ideas, mathematical formulae, software codes, or new formal expressions cannot be patented without first ensuring that creation will not be stifled. If they change categories this might lead to effects contrary to those we seek to obtain for our culture. We seek cultural diversity, exchanges of cultures, and creation. A detailed analysis of the economic and intellectual impacts of this change in intellectual property rights would be most precious in this regard.

The economists have supplied answers to this fundamental economic issue, and they are almost all the same. Contrary to the traditional industrial fields where the patent stimulates innovation and competition, and encourages sharing of technical knowledge, the patenting system in the software field tends to limit innovation, hinder competition and slow down dissemination of technical knowledge. According to Professors Bessen and Maskin of the MIT Department of Economics, Patents and Imitation and the Harvard Department of Economics, software is one of the economic sectors in which innovation is sequential, in other words, in which implementation of one invention needs to be grounded on previous ones and to imitate them. Although the patent stimulates innovation during an initial cycle (typically 3 years in the case of software) it then becomes a counter-inducement because it tends to limit innovation and R & D costs during the subsequent cycles. This is because at this stage an inventor needs to imitate what has already been invented, and the patent prevents this. Professors Bessen and Maskin conclude that it is better not to introduce patents into the software economy, so that the maximum degree of innovation can be attained. They add that only copyright offers optimum protection from an economic viewpoint, sufficiently strong to pro-

1 WORKING PAPER DEPARTMENT OF ECONOMICS SEQUENTIAL INNOVATION, PATENTS AND IMITATION. James Bessen Eric Maskin N; 00–01 January 2000. MASSACHUSETTS INSTITUTE OF TECHNOLOGY 50 MEMORIAL DRIVE CAMBRIDGE, MASS. 02142 http://www.researchoninnovation.org
tect the invention from piracy, and sufficiently flexible to avoid negative effects. These conclusions have been corroborated by an econometric study covering a period of over ten years in the United States and which shows that there is a correlation between development of patent protection in software and the fall in innovation in this same sector. According to Hal Varian, an economist from Berkley and the author of the best seller "Information Rules", introduction of the patent into the software economy does not lead to any additional inducement effect where that inducement effect is already very strong owing to the principle of "first mover takes all". In the view of the author of this report, the concentration effects in software publishing, induced by the system of software patenting, force technological software inventors to sell the licences on their patents too cheaply, so that investment in new software technology offers no attractions and there is an overall drop in software innovation. Moreover, if a patent were introduced it would hinder sharing of technical knowledge, since the discrepancy between copyright and patent rights would lead to increased claims of infringement by software authors choosing to share their technical knowledge, on the one hand, and protection of software authors choosing to keep it secret against this risk, on the other. To our knowledge, no serious study has been undertaken to prove these economic arguments wrong in the specific area of software.

The issue of patentability is also a legal one. As it exists in the United States today, the software patent places all authors of original software in the position of infringement, simply because it has become impossible to write any software whatsoever without involuntarily using one of the 100,000 software patents already granted in the United States. Here it should be recalled that a software patent may be obtained by someone not having written a single programme: all it requires is to make a relatively abstract description of an innovative method of processing information which can be implemented by software. An example of this is the hyperlink principle used on Internet, which is patented by British Telecom. The principle of publishing a data base on the Web is also patented. All Websites in the United States today are therefore infringements, but only a few are the subjects of lawsuits. In other words, patent law as it stands in the United States has resulted in every software author being placed in the position of infringement and creating de facto discrimination between small and large companies when there is a risk of litigation.

The issue of patentability is also political, since software patents do not concern merely the technical aspects of software. They concern what we do each day as players in the information society, when we use a computer to get us to a service or when we seek to automate a service using the computer. In the United States, software patents involve trade in goods and services (such as the software patent on sales of airline tickets on Internet), education (such as the software patent on the idea of only answering once when three pupils ask the same question on Internet), finance (such as the software patent on a method of evaluating the price of an option), corporate organisation (software patent on a method of ordering production) democratic life (software patent on processing a
petition on Internet) and consultancy services (software patent on a method of strategic consultancy). This is why to grant a software patent is tantamount to granting a de facto 20–year monopoly on the use of the intellectual methods that are partially or totally automatable by means of a computer programme. Therefore to include software in patent rights will lead to political and social consequences totally unconnected to the, a priori, technological nature of the software. As an analogy, a society in which the right to print, conduct mail order trading or organise a petition were all private monopolies would without doubt give its citizens far fewer freedoms than those they enjoy today. And indeed it may be observed in the United States that there are uses of the software patent in cultural fields that are causing detriment to the right to keep a public record and to universal access to culture.

Finally, there are commercial aspects to the question of patentability. In this area, as in many others, American policy is to have its trading partners adopt American law or similar under the international trade agreements. It must be ensured that the American proposals do not sacrifice European interests. Because there are many companies in the United States which dominate the market in the fields of software or electronic commerce, the Americans could be led to adopt a position which is streets away from what Europe seeks to achieve, that is, to foster innovation and economic development. Moreover, as things stand today, a sudden decision to approve patents on electronic commerce would give already-established American startup companies the power of life or death over European startups, which would be particularly vulnerable to lawsuits for infringement in the early stages of their development, even if such litigation were ungrounded. This also applies to Japanese patents since Japan is more advanced in the field of e-commerce via mobile telephone.

We suggest that the issue of software patentability should be examined first by noting that it is impossible legally to distinguish a software invention from an invention of an intellectual method partly automatable by a computer programme. Proof of this can be found in recent decisions handed down by the EPO, which granted patents on corporate organisation methods on the grounds that they produced technical effects arising from the use of information technology. To improve the current position as regards protection of intellectual property, we suggest two approaches, both based on protection of software via copyright, combined with independent protection of intangible inventions. The first approach, which we prefer, would be creation of a sui generis right for intangible inventions, adoption of a short period of protection, and the principle of filing without examination. The period of protection would correspond to an innovation cycle, for instance, 3 years. A clear boundary would then need to be drawn between inventions requiring a patent (tangible inventions, possibly controlled by software) and those engendering a sui generis right (software and intellectual methods).

The second approach, which would be more complicated to implement, would be to adopt the EPO case law on patent granting, so that Europe would be aligned on the United States, while at the
same time adapting the rules of litigation to limit the perverse effects of the patent on software and intangible inventions. One particular suggestion we make is that software dissemination should not be considered as constituting infringement, and that the scope of software patents should be limited to the effective use of software. It would also avoid the entire software publishing industry being in infringement of patent while at the same time affording the inventor protection of his software invention when it is actually used. Another suggestion is to extend the notion of compulsory licensing for software, so that any computer user will be able automatically to obtain a license in respect of any patented software capable of being used on a computer, at a non-discriminatory price and without having to litigate. This second adaptation would limit the problem of competition being curbed by the introduction of patenting into the software economy.

Today, choosing a method of protection is tantamount to choosing an economic and political model for the information society of the future. Between the two extremes of refusing any type of protection of intangible inventions, and using exactly the same patenting system to protect tangible and intangible inventions alike, there are many scenarios and approaches for protection of the interests of consumers, software publishers, inventors and society, all in conformity with the general principles set forth in the Rome Treaty. Whatever the means of protection chosen, there must be a clear limit to protection of intangible inventions, and it must not be possible to find loopholes in the law such that the legislator’s intentions are distorted.

Before choosing a position for France, a detailed, impartial audit of the various possible scenarios will be needed, involving every player as well as the legal and economic experts of the information society. There is a high risk that the choice will not be impartial if patent attorneys, who have obvious interests, are given too great a role. There should be considerable corporate involvement, especially the many European small and medium-sized software companies, as well as that of innovation and competition specialists, if a position corresponding to the general interest, not that of individuals, is to be arrived at.

In order to have the time to carry out this audit, and avoid the EPO case law being transposed into positive law with the \textit{de facto} result of privatising ideas, we recommend that:

1. computer software be maintained outside the scope of patentability when the European Patent Convention is revised;
2. a list of exceptions to patentability be clearly set forth in the Directive on EC patents, not least including intellectual methods and computer software, and clearly providing that the publication or reproduction of software or intellectual methods does not constitute infringement.

In parallel, we recommend that an international group of lawyers, independent of the professional community of industrial property, study to what extent, in the course of appeals to the EPO, the provisions of the Munich Agreement have been implemented in conformity with the original
intentions of the Agreement, and to what extent interpretation has exaggerated on the side of stringency. If such stringency is identified, then a clear definition of the limits to the patenting system must be made, so that it will not be progressively extended to fields defined as exceptions to patentability. In this case, heightened control of States over the EPO should be envisaged, so that political decisions as important as patentability or otherwise of software will not be taken without their effective participation.
Questions and Answers

Europe is preparing a Community patent to harmonise and simplify its system of protecting innovation. In the framework of this reform, the European Commission recommends that the law governing software should be "clarified". Unfortunately, this recommendation is grounded neither on scientific and economic studies, nor on consensus between software professionals and public authorities. It would therefore be hazardous to follow this recommendation without undertaking a prior economic and legal study of the impact a software patent would have on the information society.

The purpose of this section is to allow the decision maker to find quick answers to the most commonly asked questions regarding software patentability:

1. How does software patenting concern me?
2. What are patents for? What are software patents for?
3. What is the difference between software and a computer programme?
4. What is the difference between protecting software by patents and protecting it by copyright?
5. Is software patentable in Europe?
6. Why would a patent apply to traditional industry but not to software?
7. Isn’t there any way for the Patent Offices to grant patents only to real inventions?
8. Aren’t European firms likely to be disadvantaged if software can be patented in the United States but not in Europe?
9. What are the perverse effects of software patenting?
10. What are your suggestions for software patenting?

How does software patenting concern me?

Software patenting concerns our everyday activities as players in the information society – when we use a computer to gain access to a service, or when we automate a service using a computer. In the United States, patents are granted for the following activities more particularly:

a) trade in goods and services (software patent on sale of airline tickets by Internet, auctions on the Internet, putting customers and suppliers in contact etc.);
b) education (software patent on the idea of only answering once when three pupils ask the same question on the Internet);

c) finance (software patent on a method of evaluating the price of an option);

d) corporate management (software patent on a method of planning production);

e) civic life (software patent on processing of an electronic petition on the Internet);

f) consultancy services (software patent on a method of searching out software in infringement).

To grant patents means that, de facto, a 20–year monopoly has been given on use of intellectual methods which can be formulated as a series of stages in information processing, part of which needs software; which is tantamount to giving it, potentially, on the use of any rationalisable intellectual method whatsoever. This is why the debate on patentability of software is above all a debate on a choice of society: do we wish to grant monopolies on the intellectual methods of the information society, or not? For what purpose? In what form? With what likely consequences? Which national or foreign companies would hold these monopolies? What are the risks of abusing a dominating position?

An analogy of this might be a society in which the rights to print, to conduct mail order trading, or to organise a petition, were all owned by private or public monopolies. Such a society offers no resemblance with the free society we know in Europe today.

What are patents for? What are software patents for?

The purpose of a patent is to stimulate innovation, promote the sharing of technical knowledge, and create an economic framework that will encourage companies and competition. A patent is not a natural property right but a privilege granted in the general interest. If we extend patenting to cover inventions linked to software, we must examine the system in the light of the general interest.

Patents are sometimes used as tools for appraising research, for they encourage researchers to imagine commercial applications for their discoveries. They are also an advertising tool used by companies to demonstrate their technological advances to their customers, or by State research institutions to show their productivity to their tutelary authorities. These uses of the patent, while of benefit to private interests, nonetheless do not serve the general interest purpose of the patenting system.

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2 In this report, we have deliberately chosen the general term "intellectual method" rather than more precise ones such as "commercial method", because in our view, this term covers "intellectual methods in the exercise of sales activity, "intellectual methods in the exercise of educational activity", "intellectual methods in the exercise of consultancy activities, or "intellectual methods in corporate management", all together, and they are all being increasingly patented in the United States (see Chap. 5) under the heading of "business method patents", including in fields such as education which do not exactly fall under commerce in France.
What is the difference between software and a programme?

A programme is a series of instructions. Software is a programme to which texts, images, sound, video etc. have been added. Software and programmes both belong to the wider category of digital works, that is to say, human creations that can be represented as a series of noughts and ones.

What is the difference between protecting software by a patent and protecting it by copyright?

Copyright and patent rights give complementary, and not mutually exclusive, methods of protection.

Copyright (see Chapter 1) more especially allows an author to forbid the total or partial reproduction of original software (e.g. copying a diskette). However, copyright does not allow authors to forbid anyone from using functions or procedures used in their software as inspiration for other software.

In the United States, the software patent (see Chapter 3) more especially allows an abstract procedure for processing information to be protected, independently of the software which runs it. The inventor of this kind of procedure for information processing therefore has no need to be the author of the software to obtain protection by means of a patent. All he needs to do is describe the series of stages in information processing that he has invented, and their application, in fairly general terms. The owners of patented procedures for information processing can forbid their procedures to be used by anyone else.

As regards protection of computer programmes, the object is not to replace copyright by patent rights, but to replace it by a combination of copyright and patent rights. The problem that arises out of this combination is that software may be at one and the same time original, as regards copyright, and yet be in infringement as regards patent law. All that needs to be done is to write an original programme capable of running a patented procedure. For example, any original programme which allowed its user to gain access to a data base and read it in a Web navigator would be infringing a patent in the United States. This means that nearly all today’s original Web sites in the United States are, in fact, currently infringing patents.

Is software patentable in Europe?

Under positive law, computer programmes and software are not patentable in Europe. In France, in the late sixties, the parliament expressed the wish to exclude computer programmes from inventions capable of being patented, including when the list of instructions in the programme resulted in the controlling of a machine and an industrial effect.

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3 We will not, in this report, use the traditional formula "programmes as such are not patentable", since in our view this is a syntactical and semantic deformation which does not conform to the spirit of the law. It in fact gives the impression that there are, a contrario, programmes which are not "as such", and that ultimately all programmes are patentable, which is manifestly not what the legislator intended (see Chapter 5).
French case law clearly established that computer programmes were not patentable. The Schlumberger case confirmed that processes could be patented, including when the stages in the process involved a programme. It did not lay down the patentability of the computer programmes.

According to the European Patent Office, programmes are patentable when they produce technical effects. According to industrial property experts, in practice the European Patent Office is virtually identical to the American Patent Office in that it treats all computer programmes as having technical effects. The EPO also grants patents on management methods, business methods, and e-commerce methods, insofar as these intellectual methods are based on a computer programme.

There is therefore a clear contradiction between positive law and the decisions handed down by the European Patent Office (Chapter 4). This contradiction needs urgent clarification: either we must patent computer programmes, or we must consider them to be non-patentable, or, better still perhaps, adopt a *sui generis* right for intangible inventions.

**Why would patents apply to traditional industry and not to software?**

There are two answers to this, the first involving software patents on tangible inventions, and the second, software patents on computer techniques alone.

In the first case, software patents concern the traditional industries which are gradually replacing physical solutions by computer programmes providing control and command of industrial machinery. They are not, properly speaking, patents on intangible inventions, but patents on physical inventions which contain software, mathematics, intellectual methods etc., inventions which are clearly patentable under present positive law, and for which possible non-patentability of software is not an issue.

In the second case, the question is whether patenting should be extended to the new economy (software publishing, online services etc.) or not. Legally speaking, there is nothing to stop it in theory. It is what happens in the United States and Japan. But on the other hand, there is nothing to stop us from firmly asserting that computer programmes should not be patentable, as French legislation provides. The TRIPs Agreement made by the World Trade Organisation, which some people use to justify the need to make software patentable, does not apply to software and intangible services.

It is not a question of whether patentability can be extended to intangible inventions, but whether it is useful to society to do so, or not. Insofar as the purpose of patenting is to stimulate the sharing of knowledge and innovation, indeed to stimulate competition and company creation, the decision (to make intangible inventions associated with software patentable or not) should be dictated by economic or social needs.

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4 More precisely, these technical effects must be secondary ones distinct from the first technical effects, which are the flow of electrons produced by the running of a computer programme.
Studies conducted in the United States (see Chapter 3) show that software patents in their present American form have resulted in curtailed sharing of knowledge, sluggish innovation, blocked competition and a climate of legal uncertainty which, in the medium term, discourage the creation of new companies in the software publishing sector. These negative effects could, in theory, be corrected under patent law but would require highly complex provisions. We therefore recommend a *sui generis* right tailored for intangible inventions, rather than adaptation of rights originally tailored to the tangible inventions of the nineteenth century (see Chapter 4).

 Isn’t there any way for Patent Offices to grant patents only to real inventions?

It may be observed that too many software patents concern inventions which reasonably should never have been patented. There are therefore regular recurrences of the notion that real inventions in software should be separated from the others, to avoid perverse effects and abuses.

Thus, in the United States, some 90% of software is considered without value, either because it is not new, or because there is no inventiveness. Moreover, many patents on software concern intellectual methods which have apparently no technical character at all, such as auctions, financial analysis, educational methods etc. If real inventions were separated from the others, it would mean that patents would not be granted to inventions which have no technical character except in their formulation, or which do not have a real value.

Unfortunately, the procedure of patent examination is very largely formal, and the notion of technical character is particularly vague: it is enough to specify that a business method is based on use of a data base for the technical criterion to be met and for the subject of the invention to become potentially patentable. In an information society where intellectual methods are automated by programmes, it is therefore vain to try to exclude software patents on business or educational methods, among others, without at the same time excluding software patents on IT techniques.

Furthermore, there is no incentive in the patenting system to encourage players to fight against the rising tide of patents. The Patent Offices have productivity and financial targets which encourage the growth of patenting. Corporate intangible assets are evaluated on the basis of the number of patents applied for, regardless of their content or quality. Indeed, creators of companies often find themselves being asked to file patent applications because future shareholders wish them to obtain funding. When the tutelary authorities, which in some cases are responsible for innovation as well as for Patent Offices, choose the number of patents filed as a criterion for evaluating new companies, there is no interest in limiting the inflationary trend.

Finally, there are far more publications in the software and intellectual methods fields than in traditional industry, a situation which makes searches for prior rights particularly arduous. It must
therefore be recognised that, even with the best will in the world, examinations of software–associated patents cannot be made in depth without becoming extortionately expensive. Over–high examination costs are obstacles to entry into the market. This can seem unfair where the average cost of R & D is low and therefore innovation can occur with no need for capital investment, among scattered populations, as is often the case with software or intellectual methods.

That is why we recommend (see Chapter 4) that protection of software inventions be based on a system of registration rather than on one of examination. This recommendation is in fact a recognition of the de facto evolution of American software patenting from an examination system to a registration system. Transposition of this recommendation into European positive law could even precede the likely evolution in the United States.

Are European companies likely to be disadvantaged if software can be patented in the United States but not in Europe?

No, European firms will not be disadvantaged if Europe adopts a law different from that in the United States. On the contrary, by preceding the evolution of American law, Europe can create an economic environment that is more favourable to the information society than that of the United States, and gain considerable benefits (on the principle that the first mover takes all).

First of all, the software patents granted in the United States do not apply in Europe, since the patent is only valid within a certain national territory (Chapter 2). There is no world patent, only patents that can be extended from one country to another to cover all those that recognise the patenting system. A software patent granted in the United States will not, therefore, be extended to Europe if the latter does not recognise software patentability. On this subject, it should be noted that, in the European Patent Office, some 100 American patents on basic e-commerce methods are at present awaiting a change in the law so that they can be used to sue most of the European start-ups of the new economy for infringement.6

Secondly, if Europe creates a right on intangible inventions for its internal market that is better designed than the patent law as now developed in the United States, European firms will benefit from more advantageous conditions on their internal market, which would give them a distinct competitive edge. Contrary to what is sometimes believed, the information society maintains strong links with geographical entities, if only because of logistical constraints or cultural needs. There is, therefore, a real internal market, including in the information society.

Finally, the capacity of European firms in the United States and Japan is in no wise affected

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6 The Amazon “one-click” patent, for example, was filed in Europe under the reference EP0902381. This patent is on the known procedures for an e-commerce site to remember the address of a customer so that it does not need to be entered for each order. If patents on computer programmes are made legal in Europe, this type of patent would have every chance of being granted by the EPO. See for example “In favour of e-patents”, Le Monde Informatique, 18/05/00, in which Patrice Vidon, an intellectual property consultant, explains why this patent is in his view on a true invention.
when they adopt different laws. This is perfectly clear in the case of the large European companies, which are used to juggling with legal disparities, and will continue to file patent applications for software in the United States as they already do today. A fund constituted of software patents filed in the United States, owned by the subscribers to the fund, should be provided for small and medium-sized software firms, which in any case do not have the resources to acquire a patent portfolio which could serve as a means of exchange to protect themselves against infringement lawsuits. This fund for coverage of legal risk could be constituted on the lines of the systems for coverage of economic export risk that exist in various countries (e.g. Hermes, COFACE etc.)

What are the perverse effects of software patents?

Professors Bessen & Maskin, two economists at the Massachusetts Institute of Technology (MIT), have demonstrated that the introduction of patenting into the software economy only had economic usefulness if the monopoly were the most useful form of software production. They also demonstrated a statistical correlation between the spread of patentability in the United States and a decline in innovation.

Introduction of patenting into the software economy tends to reinforce industrial secrecy, contrary to the historic purpose of spreading technical knowledge by means of patents. This is the result of inconsistency between patent rights and the right to decompile included in copyright. In this case, authors who publish their source code contribute to the dissemination of knowledge and to IT security, but at the same time they make themselves more vulnerable to lawsuits because access to the source code makes it easy for competitors to pinpoint patent infringements. If the source code is kept secret, such searches cannot be undertaken since it is against the law to decompile binary codes. This effect is all the more regrettable as, since the YK2 bug and the cases of industrial and diplomatic espionage which arose over Echelon, it has become common knowledge that only access to the source code can guarantee a high level of IT security, as indeed is demonstrated by the development of open source encrypting software by the German government, or again, the case of suppliers who were obliged to supply the source codes of their compilers following the failed launch of the French rocket Ariane V.

The likely result of introducing patenting into the software economy is that all authors of original software will be accused of patent infringement. This is because software constitutes a complex system composed of thousands of sub-sets, and it is statistically impossible for an author to avoid several sub-sets in his software being protected by another’s patent without his knowledge, especially as there are already over 100 000 software patents in the world and as that number continues to grow. There is every likelihood that small and medium-sized businesses will face the maximum legal risk of patent infringement lawsuits from large publishers and powerful patent funds. Such lawsuits are often fatal to these businesses, which cannot afford long court cases, the costs of which
often easily exceed 500,000 in Europe and several million dollars in the United States. Thus it is often the case in the United States that the threat of an infringement lawsuit, even if unproved, is used to buy businesses up cheaply and eliminate competitors that have become too dangerous, because they do not have the financial wherewithal to defend themselves.

The introduction of patenting into the software economy is likely to block interoperability between software since a patent on a communication standard could forbid a publisher to produce software compatible with another. Less interoperability would therefore lead to reinforced concentration and market domination, not only in the field of software but also in every service activity in the information society.

Introduction of patenting into the software economy might also lead to disquieting changes in copyright law such as abolition of the right to private copying, concentration of the canals for dissemination of artistic works, etc.

**What do you suggest as regards software patenting?**

We recommend that the principle of non-patentability of computer programmes, which was laid down by the French Parliament, should be enshrined. We also recommend that creation of a *sui generis* right for intangible inventions connected to software should be envisaged. The conception of this right should be the subject of wide-ranging, democratic debate so that inventors could be offered protection which would be in the general interest and compatible with the protection of software creations by copyright. If the *sui generis* right scenario were adopted, clearly defined limits to the patenting system would have to be drawn, so that it would cover only tangible inventions, while the *sui generis* right would cover intangible inventions. To clear up the uncertainties arising from the granting, by the European Patent Office, of many patents to manifestly intangible inventions, the holders of such European patents would be encouraged to change them into *sui generis* rights, in their own interest.

If it proved impossible to create a *sui generis* right, we recommend that the perverse effects of the software patent be attenuated, first by excluding software reproduction from the list of acts infringing patent rights via limitation of software patent infringement solely to software use, and secondly by decreasing the privileges of software patent holders via a system of automatic licenses at a single, non-discriminatory price. Moreover, for this scenario, we recommend that use of the patent should be regulated by an overriding "right of compatibility" which would forbid any form of protection for software interfaces, whether by copyright as already laid down in the 1991 Directive on software, or by patent.

Finally, we recommend that changes in patent law be adopted in concertation with all the interested economic players and not simply be made on the say-so of the professionals of industrial property, who have vested interests in this field. It is up to member States to exercise control over
the European Patent Office and prevent them from making distorted interpretations detrimental to economic development.
Europe is preparing to adopt a Community patent in order to harmonise and simplify its system for the protection of innovation. Within the framework of this reform, the European Commission recommends a "clarification" of the law to ensure that positive law is in line with the case law developed by the European Patent Office (EPO), and this means doing away with the exclusion of computer programmes from patent protection. Such a step would conform to the American policy of extending the patenting system to all forms of intangible inventions: software, services, business methods, consultancy, educational methods, corporate management, medical treatment, etc.

While there is wide interest in Europe in the Community patent, the extension of patent protection to computer programmes has been the subject of a growing debate. The series of patents for business methods (patent on airline ticket sales, patent on putting customers and suppliers in contact) or for obvious customer interface methods ("one click" patent) has fuelled a growing number of questions regarding the effectiveness of the American system of software patents. Furthermore, when British Telecom initiated lawsuits in the United States against all Internet hosts for infringement of its patent on "hyperlinks", the American patenting system emerged in a crude and, in some respects, disquieting light.

Europe might have felt itself safe from such problems if the European Patent Convention, which excludes from patent protection "plans, principles and methods in the exercise of intellectual activities, with respect to games, or in the area of economic activities, as well as computer programmes", had not been interpreted by the EPO in a number of strange ways. Over the past 10 years the Office has quietly and insidiously extended patent protection to software and intangible methods. There are innumerable European patents on information processing "systems or devices", which in reality are nothing more than applications of computer programmes to a business method, to mathematical formulae or to a corporate management method.

The aim of this report is to examine means of stimulating innovation and competition in the information society, pursuant to the general objectives of the Treaties of Rome, Maastricht and Amsterdam in respect of competition, research and industrial development. In particular, we will question whether it is opportune for Europe to adopt a patenting system for intangible inventions, based
on the existing American model, or whether it is worthwhile to devise a system of protection specific to intangible inventions at the European level.

This report is in five parts. The first part provides a reminder of the legal tools used for the intellectual and industrial protection of digital works (including software) and digital services (including Web sites). The second part sets out the historical and economic foundations of patenting, detailing its implementation in France and Europe, and shows the advantages of patents in fostering innovation.

The third part studies the origin of the harmful effects observed in the United States following the extension of patent protection to software and intangible methods, notably digital services. In particular, we will look at the economic effects of patenting on innovation and competition in software publishing, based on the economic model established in November 1999 by the Department of Economics at the Massachusetts Institute of Technology (MIT). Finally, we will demonstrate that the software patent can result in less sharing of technical knowledge because of inconsistencies between copyright and patent law.

The fourth part proposes three approaches to the protection of intangible inventions in the information society, which simultaneously respect innovation, competition and the sharing of knowledge. These three approaches are based on diluted forms of industrial protection. The first is based on implicit protection via secrecy and copyright, suitably adapted for software publishing. The second approach adds patent protection, but limits the privileges granted so as to avoid the blocking effects and unhelpful inflexibility induced by the American patenting system. The third approach, which is the one we prefer, proposes a *sui generis* right instead of the patent, with a view to providing immediate, effective but short-term protection.

The fifth part examines how clear limits can be drawn between the protection of inventions by patent and the protection of intangible inventions by a *sui generis* right. The European approach to software patenting is analysed. The principles of positive law stipulating that, in Europe, intangible inventions cannot be granted patent protection are reviewed. However, the European Patent Office has nevertheless granted software patents or patents on intellectual methods. The legal notions that led to this situation are analysed. We then show that these notions, which the EPO and European Commission propose to enact in positive law, do not allow clear limits for the scope of patentability to be defined. There is therefore a risk of the patenting system spreading into the fields of culture, education, finance, consultancy, corporate management, democracy, the running of the State, etc. We then put forward suggestions as to how the patenting system can be given clear limits to ensure that political decisions as significant as software patentability or non-patentability will not be taken without the effective participation of governments. The question of the 10 000 to 20 000 software patents already issued by the EPO is then examined.
digital work can be defined simply as a sequence of noughts and ones. This sequence of 0 and 1 can correspond to a text, picture, sound, or series of instructions (also called a computer programme), or else to a structured collection of digital works (also called a database). A digital service is defined as a digital work processing service. The processing can be done automatically by an Internet server (e.g. a business transaction on a software−downloading site) or semi−automatically by operators interactively handling the software (e.g. the translation of an e−mail by a human translator using word processing).

The legal tools generally used to protect digital works and services are: copyright, trademark, database law, secrecy and limits to competition based on the concept of unfair competition. Furthermore, patenting has been used in the United States and Japan to protect some digital works.

This chapter deals with copyright, trademark, secrecy, database law and unfair competition as applicable to digital works. Patenting will be considered in the following four chapters.

1.1 Copyright

Copyright was created to protect original works, that is to say works bearing the imprint of their author’s personality. In Europe, programmes are protected by an adaptation of copyright that includes software−specific features. Copyright also includes specific clauses relating to database protection.

1.1.1 Automatic granting of an exclusive monopoly on an original work

The copyright system evolved as printing developed. A first system, inspired by the English, was
originally oriented more to protection against the reproduction of a work, hence the term *copyright*. A second system, inspired by the French, focused more on the protection of authors’ rights over their works. Originally, the protection of authors’ rights was granted by means of royal privileges giving an individual (typically a printer) the exclusive right and privilege to print and distribute a given work. This system of privileges also allowed for censorship of ideas and avoidance of political dissent.

Copyright protects original works. Care must be taken to distinguish the term "original" from the term "new". In particular, a work need not be new to be original. For example, a famous landscape can be painted by different painters, each producing an original painting, although the painting will not be new since it depicts a famous landscape. Conversely, a work can be new without being original. For example, in 1994 a Tokyo court held that a software installation script could be new without being original since there was no opportunity for the author to stamp his mark on a sequence of instructions imposed by the very structure of the host system.

1.1.2 Non−pecuniary and economic rights

When creating an original work, the author is granted an exclusive worldwide monopoly on the work, automatically and without any procedure, under the Bern Agreements. Within this monopoly, a distinction is made between non−pecuniary and economic rights.

Non−pecuniary rights are perpetual, inalienable, and not subject to time limits. They are transferable to others only by bequest or inheritance after the author’s death. They guarantee the author the respect of his name, position and work. Examples of violations of an author’s non−pecuniary rights are: printing a painting on a car, thereby turning a work of art into an advertising design; adding a mezzanine to a building, thereby breaking the harmony of the entrance hall.

Economic rights are related to the use of the work. They include the right to represent the work (e.g. public performance of a play) and the right to reproduce the work (e.g. printing a book). Representation and reproduction rights are transferable, with or without a fee, within the framework of contracts, the scope of which is limited to the sole uses explicitly specified in the contract. Thus, ten or so years ago, the restricted character of these contracts raised numerous questions as to whether or not the reproduction of a work on a digital support was covered by a copyright transfer contract drawn up at a time when this means of reproduction did not yet exist.

Economic rights are limited in time (70 years after the author’s death) and include exceptions if the work has been disclosed. Generally, the author cannot prevent:

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9 Copyright, presented here as the granting of a monopoly, which it most closely resembles in economic terms, is sometimes also considered as a property right by some authors. We acknowledge the wide debate on whether the legal nature of copyright is that of a property right or a monopoly right. Having opted here for an economic approach, we will not enter into this debate.
10 http://www.wipo.org/fre/general/copyrght/fbern.htm
Chapitre 1 – The protection of digital works and services

- private representations being carried out free of charge within a family circle;
- copies or reproductions strictly reserved for personal use by the copyist and not for collective use;
- analyses and short quotations, press reviews, broadcasting, reproduction in an auction catalogue;
- parody, pastiche and caricature;
- any action necessary to access the content of an electronic database.

1.1.3 Copyright and software: backup copy, decompiling and interoperability

In the case of software, however, these exceptions are themselves subject to exceptions. For software, the right to personal copying is strictly limited to the backup copy. In this sense, software copyright reinforces the protection of authors in comparison to the general copyright regime. This protection is also strengthened by the prohibition on decompiling software (i.e. analysing its working principles through reverse engineering), although it is explicitly permitted to analyse or even dissect a literary or musical work, for example. The prohibition on decompiling applies in Europe and the United States. In Japan, this prohibition only applies in practice to American software, following bilateral agreements.\(^{11}\)

However, so that the prohibition on decompiling should not harm free competition, Europe has introduced a principle of interoperability into its software law. This principle stipulates that software interfaces (i.e. the set of information necessary to allow communication between software) are not protected by copyright, and that the prohibition on decompiling software does not apply when decompiling is performed in order to achieve interoperability, always provided that the author of the programme did not himself wish to make the changes necessary to achieve compatibility of his programme with another.

The principle of interoperability in European software law has been taken up by Australia and other countries, sometimes with a right to modify faulty programmes. In practice, however, European measures, taken to favour what can be considered, on the one hand, as a "right to compatibility" and, on the other hand, as a "right to security" for programmes, turn out to be fairly narrow in scope. Indeed, a publisher can claim that he is going to carry out the changes needed for the compatibility of his programme with another or that he is going to correct faults, without, for all that, achieving these goals. Even in this case, the prohibition on decompiling prevails. Moreover, the publisher of the programme can demand the payment of high development costs to carry out these


\(^{12}\) For a very good introduction to decompiling, see http://wwwsoftpanorama.org/SE/reverse_engineering_links.shtml

adaptations by predicting a long completion delay, which he might, in any case, not meet. A publisher can thus ensure that his programmes have difficulty communicating with those of his competitors, and, even better, that they only imperfectly implement some communication standards. In theory, this lack of conformity to communication standards is actionable under consumer law. But, when all his products present the same fault in implementing a communication standard, it enables a publisher to guarantee a good level of compatibility only between his own computer programmes.

For the last 10 years, this type of strategy, called "embrace and extend", has been used regularly by publishers, Microsoft being one, in order to hamper competition. There is a long list of standards that Microsoft has not complied with\(^{14}\), including file formats and network protocols created by itself: RTF, HTML, Kerberos, Word 6 for Macintosh, SMB, CHAP, Java, SNMP, etc. The European Commission, which is considering suing Microsoft for abuse of dominant position in the sector of servers, has therefore envisaged demanding that Microsoft publish the interfaces of these programmes insofar as these interfaces are not protected by copyright and as their public disclosure would be the best way of reintroducing a satisfactory level of competition in the micro–computing market. But, on account of ambiguities in the drafting of the 1991 Directive on software, the principle of interoperability is subject to interpretation, with Microsoft claiming that it is sufficient to guarantee the possibility of remote displaying its programmes under Windows on a terminal not running under Windows, although the doctrine\(^{15}\) underpinning the 1991 Directive on software is that these programmes should be able to communicate directly by file exchange or via a network protocol.

As for the possibility of correcting software faults, this is impossible to achieve in practice when the programme source code is inaccessible, which is the case for the bulk of the software on the market. Combined with poor software interoperability, not being able to correct software can have disastrous consequences for the durability of digital works. It is for instance very difficult to replay a piece of electronic music composed in the 1980s at the IRCAM (French Music–Acoustics Coordination and Research Institute) by means of software, because these programmes, mostly provided without source code, are no longer suited to modern computer technology and the original machines are often no longer operational. Similarly, educational software, designed a few years ago through multimedia creation and development means, is difficult to use today, particularly when the authors and publishers responsible for the development environment of educational software have abandoned the product or placed new, incompatible versions on the market. In practice\(^{16}\), this


\(^{15}\) J. VIET, Quel droit d'interopérabilité?, Expertises, November, 1994, p.386.

BITAN, Protection des logiciels: réflexion sur la nouvelle loi, Expertises, November 1994, p.384

See also http://www.c−dump.com/serieux/law/law2.html

\(^{16}\) This example was supplied by the company Pierron SA, which, alongside regular educational products, publishes educational software, for which the follow−up over several years is often impossible due to a lack of continuity in the conceptual and developmental environments for multimedia educational software.
situation leads to abandoning the publication of educational software after 3 years for absurd technical reasons, when the educational content of this software, designed by enthusiastic secondary school teachers, would warrant publication and availability for at least 10 years.

1.1.4 Towards an abolition of the right to personal copying?

Private copying of a database is prohibited under copyright. This means that the reproduction of an original version of a copyrighted database for personal use is prohibited. Now, a growing number of digital works, particularly multimedia works, are technically comparable to databases. In the same way, most Web sites are technically built as real multimedia databases of original digital works.\[^{17}\]

Does that mean an abolition of the historic principle of the right to personal copying?\[^{18}\] It should be borne in mind that the generalisation of such an abolition would mean, for example, that it would no longer be possible to keep a trace of a radio programme that was broadcast on the Internet, on hard disk, or to record a video seen on the Internet, or a daily newspaper read on the Internet, on hard disk. Such an approach would also mean having to trust publishers to carry out their legal obligation to keep information as a matter of public record, when it is perfectly obvious that they cannot be relied upon to do so, even with the best of intentions, if only because the centralisation of works in a single place has always led historically to their accidental or deliberate destruction. Furthermore, publishers do not have the economic continuity necessary to fulfil their legal obligation to keep information as a matter of public record.

If it can be considered today that personal copying of most digital works remains permitted, three recent events definitely show that personal copying rights are about to be abolished, after having been restricted (software) then done away with (databases), in specific cases. The Digital Millennium Copyright Act (DMCA), adopted in the United States in 1998, provided for the pro−

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\[^{17}\] Two different notions should be distinguished: the copying of a database and extraction from a database. For example, e−mailing the source file of a database (e.g. ASCII format or FileMakerPro) constitutes database copying. On the other hand, when consulting a Web site, the software server carries out database extraction, then transmits the results of this extraction to the user. In no case does the server transmit the source file for this database. However, the technical structure of an HTML file is similar to that of a database source file. The question then is whether an HTML file, which can be compared technically to a database structure, can be copied. Nevertheless, case law tends to reject the originality of such structures, which in practice leads to copyright never affording databases any protection.

\[^{18}\] Les producteurs veulent remettre en cause la notion de copie privée. Solveig Godeluck. Interview with Alain Giffard, technical adviser to the Ministry of Culture. http://www.transfert.net/fr/dossiers/article.cfm?idx_rub=87&idx_art=537

\[^{19}\] 700 000 books, many of them originals never copied, perished during the fire which took place in 47BC under Caesar.

\[^{20}\] Not to mention George Orwell’s famous 1984, which still belongs to science fiction but to which some a posteriori “re−writing” practices of Web sites bear similarities, the war in Yugoslavia has shown that the destruction of libraries could be part of a plan to erase a culture. http://www.applicom.com/manu/blazina.htm

hibition of the production or dissemination of any device or software for bypassing the technical means designed for checking rights of digital representation or reproduction. The wording of the Act can be interpreted to mean it denies the fundamental principles of free speech and, as a result, it is giving rise to growing protest in American intellectual circles. The Uniform Computer Information Transactions Act (UCITA) then legalised "shrink wrap" contracts in the United States, providing that the opening of the packaging around a digital work constituted an implicit acceptance of the contract appearing outside the packaging and including many abusive clauses detrimental to the consumer. Finally, the recent controversy launched by publishers in France on the right of borrowing, must be understood first and foremost as a protective reaction of publishers in the face of the risks inherent in the digitisation of works, including literary works, and the incompatibility of a "pay per copy" model with the plans for an "electronic public library" that would be universally accessible. It should be noted in this respect that most of the DMCA provisions contested in the United States have been incorporated into the European Directive proposal on the harmonisation of copyright, and are most likely to cause similar contestation in Europe.

Electronic books, or any other form of intangible reproduction of digital works, destroy the balance that the paper book afforded between the sharing of knowledge and the remuneration of authors. Once bought, a paper book becomes its buyer’s property, and can be read by several people. A book’s content can therefore be "freely" passed on by passing on the book, but in a restricted manner because two people are unable to read the same book at the same time. On the other hand, an electronic book can be duplicated free of charge. The content of an electronic book can therefore be passed on much faster to a large number of people than that of a paper book. In this context, an electronic library would become a free bookshop, and there would no longer be either bookshops or remuneration of publishers. That is why the electronic libraries in existence today cannot be consulted via the Internet. For example, it is necessary to go physically to the French National Library to carry out an electronic search, although information technology was meant to abolish travel and distances.

Confronted with this danger, publishers have been trying to put in place a system for consulting digital works that allows only a single reading. For example, there are compact discs covered with a chemical substance that "rots" when illuminated by a laser, this leading to the total erasure of the


23 To find out all about the UCITA, see http://www.nccusl.org/uniformact_summaries/uniformacts–s–ucita.htm then read http://www.badsoftware.com/ (To be read)


L’adaptation communautaire du droit d’auteur et des droits voisins à un environnement numérique. Xavier Buffet Delmas d’Autane and Elsa de Noblet – Gazette du palais – Friday 23, Saturday 24 June 2000
The protection of digital works and services

disc after a few readings\textsuperscript{26}. Another method, legal in the United States, involves using patents on digital work enciphering and deciphering processes, and granting licences on these patented processes only for software in which the deciphering process also incorporates a built-in consultation fee mechanism and eliminates all temporary files. Thus, by making use of patented communication standards as well as technical-legal artefacts, publishers are able to control the reproduction and representation rights of digital works, prohibit all forms of personal copying of disclosed works, and force small publishers to have their catalogues distributed by a few large conglomerates which own the communication standards that have become the market norm\textsuperscript{27}.

This development is not just a moot issue. For example, in the United States, RealNetworks, one of the eulogists of the DMCA, sued Streambox VCR, which makes Internet videorecorders, on the grounds that the Streambox product contained elements enabling it to bypass the technical protections against copying put in place by RealNetworks\textsuperscript{28}. Therefore, it is necessary to be aware that, in the short-term, abolishing the right to personal copying favours publishers, which hold the economic rights, to the detriment of consumers, the sharing of knowledge and the collective legal obligation to keep information as a matter of public record.

1.1.5 Free contents: a self-regulatory tool in the publishing market

Faced with this model of maximum appropriation of digital works by publishers, models for publication of digital works via so-called "free" licensing contracts have attracted increasing interest\textsuperscript{29}. From a strictly legal point of view, the publication of free works involves a contractual guarantee, to the user of a digital work, of a right of free reproduction and free representation; the contract may possibly have accompanying clauses to prevent its beneficiary from appropriating the digital work and forbidding others free reproduction or representation. In sum, instead of using the law to forbid copying, it is a question of authorising copying by contract and sometimes even "forbidding to forbid".

Numerous models for the remuneration of authors of "free" digital works have been developed in the case of software\textsuperscript{30} or artistic creations\textsuperscript{31}. These models have demonstrated their economic effectiveness in the case of infrastructure software such as operating systems, development environments or Web servers, where the notion of "zero marginal cost" fits in well with universal dissemi-
nation of software and free reproduction rights.

"Free" models are usually very well suited to the advancement of open communication standards: the Internet would never have existed without free software\(^\text{32}\); free software would never have existed without the Internet\(^\text{33}\). Free models are also applicable to collective works such as dictionaries\(^\text{34}\), reference manuals\(^\text{35}\) or to ensure rapid promotion of unknown artists\(^\text{36}\).

The economic viability of free models based on communities or those promoted by small publishers is greatly reduced when dominant publishers of digital works volunteer to apply flexible operating conditions for users (e.g. access to software source code, right of free reproduction of textbooks within educational institutions) and, *a fortiori*, when they adopt a free model. Indeed, in this case, a free works publisher can, as a challenger, no longer claim a significant competitive advantage for its users. Conversely, if publishers retain a rigid attitude with respect to economic rights, the economic validity of "free" models tends to spread, including into sectors which are *a priori* little suited to these models: professional software, commercial artistic creation, etc. A rigid stance by dominant publishers in fact encourages users to support the development of competition that is less rigid and more open to their needs, particularly in the form of free contents developed by sharing (consortiums, associations, etc.).

"Free" models must then be considered as a self-regulatory tool for the digital publishing market, which leads to a reasonable balance between the publishers’ desire to control the market of economic rights as much as possible and the users’ desire to benefit from the greatest possible freedom. These models should therefore be protected by the public authorities in the face of the threats from some publishers, without, for all that, taking them for a panacea because they are not always the most suitable economically.

1.1.6 Technical protection devices

The reproduction or representation of digital works, original or not, can be prevented or authorised via a technical device. The general principle of these devices is, first, to encipher a digital work and then, to watermark it. Enciphering allows prevention of the representation of a work without a deciphering key. Watermarking allows the indelible inscription in the work of the identity of the

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\(^{32}\) Most Internet server software is free: e-mail (Sendmail), domain management (BIND), Web server (Apache).

\(^{33}\) The rapid development of free software requires being able to share the software source code and enabling the community of developers to access rapidly the latest update Without the Internet, this form of development by virtual sharing is almost impossible. With the Internet and tools such as CVS, which enable update follow-up and control, the development of free software by virtual sharing becomes a perfectly efficient form of software engineering.


\(^{35}\) Computer Science Courses, Michael J. O'Donnell. Lecture notes, links, and supporting materials for some computer science courses offered at University of Chicago. http://www.cs.uchicago.edu/~odonnell/

person who obtained a copy from the publisher. When the deciphering key and the watermarking are closely linked, the digital work can be reproduced only by the user who obtained a copy of it from the publisher.

The drawbacks to this are technical and legal. From the technical point of view, it is always possible to convert a digital work protected by a technical device into a digital work without technical protection, by emulation. This probably explains why leading publishers such as Sony are fighting against emulation software, although it can be very useful in terms of the interoperability and durability of the digital heritage. From the legal point of view, technical devices de facto allow a monopoly to be obtained on the reproduction and representation of a work without originality, a work from the public domain, and prohibition of personal copying of an original work, citation, etc., thus rendering copyright meaningless and making the statutory obligation to keep information as a matter of public record difficult to enforce.

1.2 Registered Trademarks

Trademarks or trade names form the oldest and most universal system of protection for intangible assets. Since antiquity\(^\text{37}\), craftsmen making a vase or working in gold or silver have engraved the object with a geometric symbol, as a signature allowing, first, for the work to be recognised as one of quality and, second, for the work to be distinguished from that of competitors. Trade names also serve to identify a legal person (e.g. name of the company) independently of the individuals in it (e.g. family name of the CEO or employees).

A trademark is a temporary, limited concession (10 years, renewable indefinitely) for exclusive use of a non-descriptive sign allowing a product or service to be distinguished\(^\text{38}\). A trademark is obtained by simple registration (with the Institut National de la Propriété industrielle – INPI – in France) or automatically acquired without registration when a product or service is renowned. Conversely, a registered trademark can be "lost" if it is not used regularly.

Trademarks offer protection limited to a given geographical zone and to a speciality. In practice, the speciality in Europe corresponds to a classification of industrial and service activities (e.g.

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\(^{38}\) The trademark, trade name or service mark is a sign susceptible to graphics representation used to distinguish the products or services of a legal or natural person. The sign of a trademark can be made up particularly of words, groups of words, family or geographical names, pseudonyms, letters, numbers, musical phrases, designs, labels, stamps, borders, reliefs, holograms, logos, synthetic images, the form of the product or its packaging, forms characterising a service, the arrangement, combination or nuances of colours.

Some signs cannot be used as marks because of their lack of distinctiveness (i.e. their inability to distinguish one product or service from another). These exceptions include everyday or professional language denominations, signs or denominations which can be used to describe a characteristic of the product or service (type, quality, quantity, destination, value, geographical origin, time of production, etc.), and signs made up exclusively by the form imposed by the nature or function of the product. However, these exceptions do not apply to signs for which the distinctive quality was imposed by custom.
woodwork, musical instruments, training, etc.). A trademark must be registered in each country to obtain world wide coverage. From the initial registration of a trademark in a country and for a period of 6 months\(^\text{39}\), a priority system permits the trademark to be extended to other geographical zones while benefiting from its initial registration date, thus minimising the risks that the trademark be "purloined" by a third party in another geographical zone before the original owner has had time to extend his trademark to other geographical zones.

Fees for trademark registration in France are about FRF 1 300 (about 200) for 3 categories, to which must be added between FRF 2 500 (about 380) and FRF 4 000 (about 610) for the industrial property attorney. Prior search for equivalent trademarks costs about FRF 5 000 (about 760). The fees for registering a European trademark\(^\text{40}\) are about 2 000 for uniform protection in all member States, to which must be added 400 per category and the fees for the industrial property attorney. For protection in OECD countries, close to FRF 100 000 will be needed for the fees and expenses of industrial property attorneys. Trademarks must then be maintained, something that involves new expenses. The base rate for renewing an individual European trademark is 2 500, to which 500 must be added for each category.

The monopoly granted to the holder of a trademark allows prohibition of reproduction, use or labelling with the trademark for products or services identical to those designated in the registration. This prohibition applies even when words, such as "formula, manner, system, imitation, type, method", are added. The monopoly granted to the holder of a trademark also allows prohibition to remove or alter a trademark properly affixed to an object. These prohibitions also apply to similar trademarks or trademark imitations where there is a risk of confusion.

A trademark affords protection of digital works and services on the Internet. This protection is independent of that for works via copyright. In particular, it is possible to benefit from trademark protection for an open source or free digital work. For example, use of the "Java" trademark is restricted although "Java" software is free. Therefore, claiming that another software is a version of Java or is compatible with Java can lead to litigation for trademark infringement if the holder of the Java trademark has not given consent. The same applies to Unix, a Unixsystem Laboratories Inc. registered trademark, the use of which is restricted. Claiming that "Linux is a Unix", for example, constitutes trademark infringement. Therefore, it is preferable to claim that "Linux is a Unix-type operating system" to avoid infringement litigation. Linux, the archetype of free software, was itself protected by a trademark held by its creator, Linus Torvalds, after user groups, went to court to obtain the transfer of ownership of the "Linux" trademark, which had been wrongly attributed to another person seeking to use it illegally. Therefore, in theory, use of the Linux trademark without its holder's consent can lead to infringement litigation.

\(^{39}\) Article 4 of the Paris Convention on the protection of industrial property of 20 March 1883 – http://www.wipo.org/fre/iplex/wo_par0_.htm

\(^{40}\) An overview of Community trademarks– http://www.ipr-helpdesk.org/t_fri/ctm/home.asp
1.2.1 Domain names on the Internet

The management of domain names on the Internet can be considered as a form of trademark law governed by a combination of contract law and case law. Domain names are obtained under a national system, with no priority mechanism between national organisations managing domain names. Hence the holder of the domain name "foobar.com" in the United States will have no priority in registering the "foobar.com" domain in France.

In the United States, case law allows holders of a regularly used trademark to obtain a court injunction on using this trademark in the form of a domain name, but it does not prevent it being registered with registration offices for domain names. Conversely, the holder of a properly operated domain name may claim priority in the event of litigation involving the holder of a trademark registered subsequently.

In some countries such as France certain forms of priority have been established between trademarks and domain names. Only the holder of the trademark "foobar" can obtain a "foobar.tm.fr" type site. And obtaining a "foobar.fr" site requires either a prior listing under the title "foobar" in a trade register or benefiting from professional association status registered under the name "foobar".

1.2.2 The role of trademarks in increasing the value of intangible assets in the information society

In the information society, models for increasing the value of a trademark are based on attention economics, that is on the capacity of a software publisher or Web site to attract a consultation flow, to capture this flow and to exploit it commercially. This economics has been explained by Noémie Behr (Ecole des Mines) in the case of the Yahoo portal, which is a Web site featuring neither technological invention (at least not originally) nor original content in the copyright sense (except for the Yahoo! logo), and which is, for all that, the largest listed company of the information society.

Trademarks are a major component of the portal industry in that they allow flows to be attracted and captured. Yet the Web trademark differs from the traditional trademark.

The traditional trademark is a one–on–one information flow from the company to the consumer, which usually generates a specific payment agreement. Internet trademarks are bilateral information flows between the internaut and the company which dynamically structure the former’s exit cost.

The difference between a standard trademark and an Internet trademark stems from the dynamics of the exit costs they each generate. The standard trademark is a pool of information communicated by some media. It generates a desirable representation by the consumer, whose individual appropriation is not controlled by the trademark outside of its communication. In the end, the exit cost is the giving
up of an idea or a symbol (possibly expensive). The customer devalues his own investment and the trademark’s pool of information for himself.

The Internet trademark is an interactive information flow. It offers individualised appropriation; in other words, it offers personal and controlled understanding of objects, services and symbols of the trademark. It is a mutual learning process, comparable to the relationship that develops between a client and his bank. This learning constitutes an identifier of the trademark and the portal, but also of the customer’s steps towards the portal: Yahoo! identifies a home page, but also the transfer of information and the personalisation of the passage from Yahoo! to My Yahoo!. The exchange of information between the customer and the trademark is cumulative. Well used by the trademark, the information sent by the customer serves to anticipate his wishes, widen the range of personalised services and raise the exit cost. The exit cost is not only the loss of information, but also of the benefits arising from the capacity of the portal to enhance its value.

1.3 Database law

Database law is a recent *sui generis* right created to provide database producers with a means of protecting their investment in production of this collection of data, particularly when copyright is not applicable. For example, the alphabetical list of the street names of a city is not an original work because it does not bear the imprint of its author. Nevertheless, it can involve considerable work.

1.3.1 A *sui generis* right

Intellectual property law states that "the database producer, understood to be the person who takes the initiative and the investment risk involved, benefits from protection of the content of the database when its assembly, verification or presentation incurs a substantial financial, tangible or human investment". The French Code adds that "This protection is independent and is without prejudice to the protection afforded by copyright or any other law on databases or any of the elements therein". This is one of the first examples of intellectual or industrial property law taking into consideration the size of the investment in its criteria for granting a monopoly. This approach therefore represents a major departure from principles aimed at stimulating investment and not automatically granting a sort of "investment title".

Database law offers a 15–year protection, starting from the date of the final completion of the product. This protection is renewable for 15–year periods at each substantial investment, and can be extended to 15 years from the time of first public availability.

A database producer has the right to forbid:

- extraction, by permanent or temporary transfer, of the entirety or of a qualitatively or
quantitatively substantial part of the content of a database to another support, whatever the means or form of that transfer;

- re-use, by making available to the public the entirety or a qualitatively or quantitatively substantial part of the content of the base, whatever its form.

These rights can be transmitted or granted, or be made subject to a licence. The producer can also forbid the extraction or repeated and systematic re-use of qualitatively or quantitatively insubstantial parts of the database when these operations clearly exceed normal conditions for use of the database.

Finally, when a database is made available to the public by the holder of the rights, the latter may not forbid:

- extraction or re-use of a qualitatively or quantitatively insubstantial part of the content of the database by a person who has lawful access to it;
- extraction for personal ends of a qualitatively or quantitatively substantial part of the content of a non-electronic database, subject to observation of copyright or neighbouring rights on the works or elements incorporated into the base.

The right to personal copying, which does not exist for original databases under copyright law, does exist partially for the consultation of databases that required substantial investment. The distinction between these two cases depends on the originality or otherwise of the database. A database with the structure of a directory and a content corresponding to telephone subscribers is not original since neither its structure nor content bears the author’s imprint. A database with a directory format and an original content (e.g. family and first names created by the author) would probably not be considered original under current case law. However, a database with an original structure could be considered to bear its author’s imprint. Personal copying would be forbidden in this case. However, the issue case is largely theoretical in view of the dearth of case law in which the original structure of a database was recognised by a court.

1.3.2 Databases and the economics of digital services

As seen above, the Internet trademark corresponds to an appropriation of interactive and personalised information flows, between the Web site and the consumer or between two Web sites. Being generally stored in databases, this information is subject to protection and therefore to an increase in value. For example, when e-mail software is used, user-profile information, such as the list of most frequently visited sites or time patterns for Internet use, is sent to an e-mail server that sorts this information into a database. The information thus collected allows personalised advertising programmes to be established or search engine results to be optimised according to each user’s personality. This information is of great value because it enables a better definition of the e-commerce market. Thus, the intangible assets of an e-mail company are of at least two sorts: its trade name
The model of double protection via trademark and database law can be extended to all digital services operated via an Internet site, Intranet, or database management software. The trademark represents a value increase in the capacity of the service to attract flows while the database represents a value increase in the commercial know-how. That is why some companies are worth so much although they keep losing money; the losses represent an intangible investment in a trademark and in a database, the market value of which can exceed the investment involved. This value increase is all the more significant as network effects or market saturation factors can prevent the emergence of a new competitor. This is the principle of "first mover takes all".

As an example, the *sui generis* right for databases has had a most amusing effect in France on the sale of books on the Internet. One of the most unpleasant tasks in setting up an online book sale site on the Internet is the digitisation of a catalogue of book titles in the form of a database. Such catalogues were very scarce in France and belonged to large bookshops. Most of them have been taken over by companies such as BOL, Alapage, etc. Amazon, the American leader, wishing to expand in France, is currently facing great difficulty in setting up a catalogue of works. But the *sui generis* database right prevents the company from setting up this catalogue by automatically copying information available on its competitors' Web sites, even though this information is not original. Amazon will therefore have to invest high sums in France to obtain a catalogue. This mechanically leads to increasing the value of competitors' databases, which now vastly exceed what they cost when acquired a few years ago, while at the same time guaranteeing Amazon's competitors on the French market protection of their commercial investment and a head start of one or two years.

1.4 Trade secrecy

Trade secrecy is a form of protection that is very common in digital works and services. Certain original administrative reports can be kept secret to avoid any appearance in the press. Certain industrial processes are also kept secret to prevent the competition accessing information. For example, Michelin, to avoid any possibility of industrial spying, is reputed to prefer secrecy to patenting, or of using indicators graduated by means of "in-house" units in its factories.

Trade secrecy can be protected legally, provided clauses are added to staff contracts or third party licensing. For example, provided the appropriate clauses figured in the work contract, it is possible to sue for illegal use of an industrial or commercial secret when a competitor hires staff to do the same work they were doing previously.

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43 See [http://www.inforules.com](http://www.inforules.com) for a pedagogical explanation of network economics.
1.5 Unfair competition

In some cases, the notion of unfair competition offers protection for Web digital works and services in the absence of any other form of protection. When it can be proved that someone has gained substantially from a competitor’s investment without paying compensation, this person can be sued by the wronged competitor on the grounds of "unfair competition", and made to refund the competitor’s loss of profit.

In theory, unfair competition allows protection of all forms of digital works and services, but comes up against the problem of proving profit without compensation on an investment made by a third party. It is therefore used only as a last resort, when other forms of protection of digital works and services are not available.

For example, when the *sui generis* right for databases did not yet exist, recourse to the notion of "unfair competition" could have prohibited the practice of uncontrolled extraction from a freely accessible database in order to set up a similar, competitive service. The abusive use of hypertext links offers an example of possible application of the notion of "unfair competition". In fact, hypertext links are used to insert the content of one site into another (in-line link or link by framing). Framing processes are particularly used in parasitic attacks on another site. They also allow confusion to reign and denigration to be spread. It is not always easy to prove that the use of a link is in violation of economic rights since the principle of the link is specifically to prevent the reproduction of a work. Moreover, the right of representation of the work can be considered as implicitly granted if the work is published on the Internet. Hence, when this type of practice cannot be subject to litigation under copyright and, in particular, non-economic rights, recourse to the notion of "unfair competition" must be considered. Finally, in the absence of software patenting, the notion of "unfair competition" could also be considered as grounds for suing a software publisher who simply copied the functions of competitors without innovative input, on the understanding that this type of reciprocal imitation would generally be accepted for the sake of competition.

The notion of "unfair competition" must therefore be understood as a form of protection against competitors who, while respecting the letter of the law (copyright, trademark, and database law), abusively resort to parasitic trade practices.

45 **THE ISSUE OF HYPERTEXT LINKS: BREACH OF COPYRIGHT, UNFAIR COMPETITION OR DEFAMATION?**
http://www.lexum.umontreal.ca/cipertexte/information/enjeux.html
http://www.lexum.umontreal.ca/cipertexte/protection/effets.html
Copyright and trademark law allow protection of software against pure and simple imitation, but authorising inspiration to be drawn freely from the functions or principles of software in order to incorporate them into other software. Digital services further benefit from protection of databases where user-profiles and historical production follow-up for the service are stored. As a last recourse, the notion of unfair competition allows litigation to be initiated in the case of "parasitic trade practices" on digital works and services, including when these parasitic practices do not formally arise from copyright, trademark or database infringement.
The historic objective of the patent was to foster transmission and dissemination of technical knowledge between craftsmen, for the benefit of society as a whole. During the nineteenth century, the patent became an instrument for stimulating innovation and increasing the value of the technological assets of industry. It proved its worth: over the period from 1860 to 1873, a wave of liberalism led some European countries to question the usefulness of patents; the Netherlands even decided to abolish the system, but after some ten years, observing that their industry had stagnated compared to that in other European nations and that it was less competitive, they quickly re-introduced patents.

There have always been many partisans of the patent because it encourages innovation while offering remuneration to inventors, and protects industrial investments in use of the patent. The economic vitality of an industrial sector or an R & D system is sometimes measured by the number of patents it engenders. Some famous industrial patents have made the fortunes of those using them and the fame of their inventors. However, it costs a great deal of money to obtain patent rights and protect the inventor against infringement.
There have always been people opposed to patents, some as famous as Bismarck or Lincoln, for patents create personal monopolies by turning "common property"\textsuperscript{47}, constituted of divulged technical knowledge, into private property. Now, it has been shown in economics that privatisation of a common property is a loss for society, since the effect of privatisation is to deprive part of the population of the benefits of the invention. Moreover, a patent can in some cases cost the society more than the advantages afforded by the invention. An efficient patenting system should be designed to provide a balance between inventors and society, in the general interest and not with the aim of reserving knowledge to a minority.

2.1 The patent: granting of a privilege in the general interest

Contrary to what might be understood by the term "industrial property law", the patent is not a natural property title. It is, rather, a privilege granted to inventors by society for a limited period in respect of what is, at first view, common property: technical knowledge. In this sense, the patent resembles other forms of regalian concession: mining concessions, oil exploration concessions etc. The patent is the result of a social contract between inventors and society, the latter wishing to encourage the activities of inventors.

2.1.1 Fostering dissemination of technical knowledge

Speaking historically, the patent appeared when it became necessary to induce craftsmen to reveal their technical knowledge so that their know-how would not die with them\textsuperscript{48}. The principle was simple: the inventor who agreed to make a complete, reproducible disclosure of all the devices and procedures of his invention, would in return benefit from a monopoly on the use of his own invention for a determined period of time.

This was a win-win contract between the inventor and society. Because he benefited from a monopoly, the inventor ran no risk of a competitor copying his invention. Because the inventor had to divulge his invention in complete detail in order to obtain the monopoly, society no longer ran the risk of seeing highly valuable technical knowledge, which otherwise would have been kept secret, disappear.

The Patent Offices, which examine, keep and file the descriptions of patented inventions, are potentially formidable instruments for dissemination of technical knowledge, using the data base of technical knowledge that they publish.

\textsuperscript{47} Alain Wolfelsperger, LES BIENS COLLECTIFS, Presses Universitaires de France, 1969.
\textsuperscript{48} See, for example, the paragraph on "exchange–for–secrets" in Patent Background, Economic and Historical perspectives",– http://www.fplc.edu/tfield/iip/iip1.htm
2.1.2 Creating an economic environment to foster innovation

According to classical economic theory, patenting enables innovation to be stimulated. If an innovation has required a large investment in R & D and yet a competitor can copy and market this invention without himself having made any research or development, the more innovative companies are likely to be unable to reap the benefits of their investments in R & D, while the competitor will be able to undercut their prices. Without patenting, such companies will not be able to amortise their R & D investment, unless they succeed in keeping their inventions absolutely secret, which is not always possible.

By guaranteeing a monopoly of use that is sufficiently long, the patent allows innovative companies to amortise their investments in research and development, by placing high prices on the patented products, or marketing licences for use of the patented product. Here again it is a win–win situation for the inventors and society. In the event of success, the patent rewards the inventor with a monopoly that allows him to amortise his R & D investment. In return, the patent creates conditions that encourage funding of private research and so society does not have to fund R & D by means of taxation.

The patenting system cannot therefore be justified as such or because "it is unjust for an inventor to be rewarded by a property title on his invention", but because there must be an economic middle way between inducement to invent and the sharing of knowledge, on the one hand, and the cost to society on the other.

2.1.3 Patenting entails associated costs for society

The patenting system also has its drawbacks for the society. Patenting tends to weaken competition, increase consumer prices and gradually make market operation more inflexible, since it grants monopolies. Moreover, patent holders can, by their licence granting policies, curtail their patents’ scope of use, which thus deprives society of a proportion of the invention’s usefulness.

Finally, management of the patenting system entails quite considerable operating costs for the applicant, the industrial property attorneys and the lawyers engaged for lawsuits. Forms must be filled in, prior art researched, search reports drafted, Patent Offices paid, and litigation funded. All this can be financed by a system of fees paid by patent holders on a "user pays" principle. This type of financing leads to discrimination between rich and poor inventors although this is not the case for instance, for copyright, where there is automatic protection. It discourages poor inventors from inventing, because they cannot afford a patent, which would give them the same protection as the richer inventors. Another solution might be to fund patent operating costs by taxation, but this is rarely chosen.

49 Copyright and trademarks also entail costs for society, but they are lower than those for patents.
2.2 Patent scope: subject, field, cover, term and privileges

The patenting system has several aspects that should be distinguished before examining its effects:

1. The subject of the patent (for instance, the patent concerns the invention of a process);
2. The patentable field (e.g. mathematics are not patentable, but chemical processes are);
3. The geographical area covered by the patent (such as France, Europe, or Europe + the United States);
4. The term of the patent (for instance, 20 years as of application date);
5. The privileges granted by the patent (e.g. a private monopoly for any commercial use).

By adjusting these parameters, it is possible to adapt the patenting system to many situations and to optimise its economic effects. If the scope of patentability were extended at the same time as privileges were increased, this might lead to economic inflexibility which would be detrimental to innovation or competition. On the other hand, if the patent protection were cut to ten years in fields such as pharmaceuticals, then it would be useless because the procedure of putting products on the market is so long that inventors would be encouraged to keep inventions secret.

2.2.1 Patented object, patented process, patented question

Patents protect inventions, a term which has been defined neither constructively nor precisely in European positive law. According to the European Patent Convention, which lays down the common rules for granting patents in Europe, "only new, inventive inventions capable of industrial application" can be patented.50

In the United States, inventions must be "new, useful and non trivial". In Japan, an invention is defined as "a highly advanced intellectual creation, based on technical ideas and implementing laws of nature". The TRIPs agreement provide that all new, inventive inventions capable of industrial application should be patentable. A footnote indicates that such constraints can be diluted by some States party to the TRIPs agreement by replacing "inventive" by "non trivial", and "industrial application" by "usefulness".

Since it has not defined what an invention is, the European Patent Office has built up a definition of inventiveness in its rules (rule 27) and case law, as "the technical solution to a technical problem". This definition is more and more being taken for a definition of an invention itself, al–

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51 http://www.billaw.com/patent/requirements.html
52 http://www.jpo-miti.go.jp/shoukaie/patent.htm#2
53 Due to repairs, the text of the TRIPs agreements is no longer available on the WIPO site (http://www.wto.org/wto/intellec/intellec.htm). A copy can be obtained on http://www.arcanum.com/free_zone/epo/fre/wt_trl01.htm and http://swpat.ffii.org/vreji/prina/trips27.pdf
though this is an error in the light of positive law. An invention, in fact, must meet two other criteria: novelty, and industrial application. Now, while the first criterion is always taken into account, the second is increasingly overlooked, because there has been a semantic misapprehension over the quasi-equivalence between "commercial" and "industrial" in English or German\(^5\), which has led to decisions in which the industrial criterion was deemed to be met if the invention had a commercial application. Without going into semantics here, there is no doubt that, when the European Patent Convention was concluded, there was, in French, a difference between industrial and commercial applications. The industrial application was understood to mean the production of tangible goods, while the commercial application concerned intangible goods or services. However, the term "industry" today is more and more used in French to designate intangible activities such as banking or IT services. This is why it would be a good idea, when the European Patent Convention is redrafted, to specify whether the patenting system concerns only production of tangible goods or if it also concerns production of intangible goods.

The examples which follow will give an idea of the potential scope of what could be considered as a patentable invention.

**Patent on an object**

An invention can take the form of an object. For instance, the Zip fastener was patented at the beginning of the century. The patent holder thus obtained a private monopoly on production of Zip fasteners, which meant that he could keep the exclusive right to produce Zip fasteners and prevent any other manufacturer from producing them, or he could grant the right to produce them to manufacturers of his choice in return for a fee, but he could not NOT use the patent by forbidding any form of production of Zip fasteners (see 2.2.5).

**Patent on a process**

An invention may take the form of a process. For instance, the production of sodium by the Solvay method was patented in 1861. The patent holder in this case did not possess a private monopoly on sodium, but a private monopoly on the use of his process, which meant that he could keep the right to produce sodium by the "Solvay" method, or he could choose to grant this right to manufacturers of his choice.

In French law, patents on processes also allow the holders to sue any producer suspected of using the patented process for infringement. It is then up to the suspected producer to prove to the court that he used another process, and he must therefore disclose some of his industrial secrets in order to show that he is not in infringement of the patent.

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\(^5\) The German *Gewerbliche Anwendung* means, literally, "an application entailing commercial organisation". This does not, for example, include medicine, consultancy, or intellectual services. The term *Gewerbliche* is also used in the German tax code to define any form of organisation for the purpose of sales.
Patent on a question

Sometimes, the invention is neither an object nor even a process, but a question. This is the case, for example, in information technology, where the inventive impulse involves the proper formulation of a problem, i.e., asking the right question, and not solving the problem; for once the question is formulated, any person of the art can do that. For example, in auction sales on the Internet, the main difficulty was to arrive at the question "how can auction sales be set up on a Web server" and not how to solve the question by "storing the identity of each bidder and the value of each bid in a relational data base". The asking of the question undeniably formed an invention at a time when e-commerce was in its infancy in the United States, and virtually non-existent in France, where Internet access for the great majority was still rare.

While it is not yet possible to patent the formulation of a question, the industrial property lawyers in the Patent Offices are increasingly viewing the formulation of a problem as being a patentable invention. This is sometimes called a "problem invention". Until case law or positive law are adapted to this, patents on questions will continue to be drawn up like patents on objects or processes, with long lists of obvious techniques solving the problem posed. Patents on "Internet auction sales" thus include over one hundred pages listing hundreds of possible combinations of a database, a Web site, a user identifier and a credit card. These patents are giving rise to increasing protests from programmers who cannot see how the processes described can be considered as an invention since they are so obvious for someone of the art once the question "how can auction sales be put on the Web" has been asked. Again, the invention, in this type of patent, is above all in the right formulation of the question. While there is no doubt that some solutions to new questions should be patentable (see Chapter 5.3), including where the inventiveness does not reside in the solution, it would seem rather unsuitable, in our view, to grant a private monopoly on a question which not only involves an idea or a concept, but also is almost always formulated by the customer or the market, and not by the inventor of a particular solution.

Ideas and concepts are not patentable in theory, but in practice they are

There are inventions which are not patentable because of their subject. An invention involving an idea or a concept is not patentable. This is because the inventive effort leading to an idea or a concept, albeit new, is deemed to be too small to justify the social cost of a patent. For instance, to grant a patent on the concept of "adhesive for woods" would mean recompensing a slight inventive effort, of uncertain novelty, because it is very rare that similar ideas are not invented by several people in the world at one and the same time. Moreover, this type of patent could discourage the inventors of new "materials for gluing wood" who, despite having devoted far more effort to designing and producing a special glue, could see themselves forbidden to market their invention as they would like, because they would be infringing a patent on the concept of "adhesive for woods".

The prohibition to patent ideas or concepts may, however, be avoided by formulating an idea or
concept as a technical problem and patenting several hundreds of technical processes solving this technical problem. Thus, most of the patents on e-commerce concepts are formulated in this way. The main result of this is to create an uncertain legal environment which tends to hamper competition because of encirclement.

2.2.2 Scope of Patentability

Some inventions are not patentable, not because of their subject but because of their field of activity. In France and in Europe, positive law provides for exceptions to patentability: computer programmes, living organisms, intellectual methods etc. There are also restrictions for patents on weapons. These exceptions were laid down on grounds of ethics, legal consistency, sociological context and opportunity. It is not, for instance, acceptable in our civilisation that a living person be patented, because that would mean that any reproduction of the species would infringe the patent. Nor would it be logical to patent intellectual methods, since it would mean that to think might be in potential infringement of a patent, which would be in contradiction with the freedom of ideas. Moreover, such infringement would be impossible to check, since no-one can read another’s mind. It might be possible, in the field of mathematics, to patent certain techniques of demonstration, insofar as they are of technical nature and are the solution to a problem. Nevertheless, to introduce patenting into mathematics would be contrary to the organising principles for mathematical research, which are based on sharing knowledge via publication. The patent would, in fact, only have a limited effect since the State is both the chief provider of funds and the chief user of techniques for mathematical demonstration. Finally, mathematical formulae, and indeed any scientific discovery, cannot be patented independently of their application, since that would mean granting a monopoly without obliging the patent holder to reveal how his discovery could be applied.

The case of computer programmes is a complex one. Because they are of the same scientific nature as a mathematical demonstration (a series of logical predicates), and because they are of the same ontological nature as an intellectual method (a series of steps in reasoning), it would be illogical to patent programmes, which are a series of logical and mathematical operations, but not patent mathematics or intellectual methods. Moreover, because programmes recorded on an IT support are of the same informational nature as a patent application (description of a series of steps in a process for information processing), it would also be illogical to authorise the reproduction of a patent on a computer programme and yet forbid reproduction of the programme itself. On the other hand, computer programmes are progressively replacing tangible devices that were patented in earlier times. It would therefore seem logical to patent computer programmes just as, in industrial tradition, mechanical devices were patented.

55 PATENTS AND INNOVATION IN THE INTERNATIONAL CONTEXT – OECD/GD(97)210 – p. 30
57 The notion of "discovery" should here be interpreted as the fact of finding something that exists; discovering a chemical element, a property of a molecule, DNA etc.
Geographical coverage for patents: a system of national patents

Patenting works on the principle of national protection. Therefore a patent must be applied for in each country if wider geographical coverage is sought. In practice, a patent application is filed in one country and then it is extended to other countries for a priority period of twelve months, which allows patents applied for in other countries to benefit from the date the first application was filed.

The rules for granting of patents change from one country to another. Thus it can happen that a patent granted in one country will not be granted in another. For example, a patent granted for a management consultancy process in the United States will probably not be granted in Europe, unless it is re-drafted to resemble a technical problem.

The privileges afforded to the holder of property title can vary from one country to another. It is therefore possible for a patent holder in one country not to be able to benefit from an exclusive monopoly as completely as in another. An American patent, for instance, covers the personal use of an invention by an individual, which is not the case for European patents. It is therefore possible for a private citizen in Europe to reproduce a patented invention for his own use. He could not do this in the United States. Another example is weapons: any American patent on an invention used in producing weapons might be extended to France, but if the French army wanted to use it, it would be compulsory for the holder to grant it a licence for use. This would slightly curtail the private monopoly compared to that for ordinary patents.

A twenty-year term harmonised at international level

The privileges granted by a patent are valid for a finite period. The term of a patent today is under twenty years, calculated from the date of the application. This term, which has not always been the same in every country, nor in every field of industry, was harmonised by the TRIPs agreement.

The term of a patent has been the subject of much discussion. Twenty years might, for example seem short in pharmaceuticals, where it may take ten years to market a drug. That is why most countries allow an extension to twenty-five years for drugs. Conversely, twenty years appear too long in information technology, since that would cover the period over which technology has developed from the Sinclair computer in 1980 (with a 8/16-bit processor at 1 Mhz with 1 Ko of RAM) to the top-of-the-range PCs of today (with a 32/64-bit processor at 1000 Mhz with 128 MO of RAM) – the equivalent of 3 or 4 major technological leaps and 2 or 3 orders of magnitude in terms of performance, at constant prices.

The debate over changes of term therefore flares up regularly and as quickly dies down: since a minimum term has been fixed by the TRIPs agreement, it will mean re-negotiating them to change the term, a hypothesis that seems all the less likely in the short term as there is no international consensus on the length of this term.
2.2.4 Privileges laid down by national law and limited in scope

The privilege granted to an inventor by the patent is a private monopoly which is limited in time and scope. As a rule, inventors can forbid use of their inventions by third parties because they have their exclusive monopoly. Or they can permit use of the invention exclusively in a contractual framework that they can determine freely.

Where a third party uses a patented invention without the explicit permission of the patent holder, there is infringement of the patent. There is infringement even when the infringer is in good faith, that is, including where he or she is not aware of using an already patented invention without the permission of the patent holder. Infringement is punished in France by a maximum sentence of two years’ imprisonment, and a maximum FRF 1 000 000 fine, but in fact prosecutions are rarely undertaken in practice. Only recidivists or those in bad faith are prosecuted. It is usually in the civil courts that legal redress is sought. The infringer is usually notified of an order not to use the invention, and is also ordered to pay damages plus a sum corresponding to the loss caused by his use of the invention without the patent holder’s permission, or else he or she is ordered to buy a licence the price of which will correspond to the period of infringement.

There is also infringement in some cases where a third party provides the components which will enable an invention to be used without the permission of the patent holder, in the form of "spare parts". This is known as "infringement by providing means", or "providing infringement means". The scope of the patent holder’s privileges is more limited in this case than in that of "direct" infringement. Thus, in French law, provision of means can only be punished if the provider, who has infringed by providing means, is acting in bad faith, whereas in "direct" infringement, the offence is punishable even if it was committed in good faith. Infringement by providing means does not apply to written works containing a description of the invention, since the aim of patents is to disseminate technical knowledge. Similarly, teaching of the principles of an invention cannot be considered as patent infringement by providing means.

However, there are cases in which use of a patented invention without the permission of the patent holder does not constitute infringement. The law does in fact limit the scope of the privileges granted by the patent so that the patenting system does not cost the society more than it is worth, by creating obstacles and limits to the use of inventions.

It would, for instance, not be in the general interest to grant a personal monopoly to inventors having chosen not to use their inventions, because that would mean that society is being deprived of an invention with nothing in exchange. Therefore, in French law, there is a notion of "compulsory licensing" under which an inventor holding a patent must grant licences to any person requesting them at a reasonable price. This can be judicially enforced after a relatively short period of three years of non-use.
Similarly, it would probably be detrimental to innovation if patent holders were able to forbid researchers to improve on their inventions, because that would mean that innovation was curbed with nothing in exchange for society. Most laws therefore provide for the monopolies on use of inventions not to be applied to research on the patented invention. There are, however, various interpretations of these provisions, which render them highly restrictive in the United States, but much more liberal in Europe or Japan.

The scope of the privileges granted by the patent is also curtailed in the area of French national defence, since "the State may, at any time, obtain a licence as of right for the use of an invention for which a patent has been applied for or granted, for the purposes of national defence, whether it uses it itself or delegates that use" (Article L613-19 of the French Code of Intellectual property). Moreover, it is forbidden to publish the content of a patent the knowledge of which could allow a foreign power to threaten national security. More particularly, these provisions can concern all encryption technology in the software field.

2.3 Patents, instructions for use thereof

There are three main stages in a patenting system: filing an application, examination, and use of the patent.

2.3.1 The application: a text comprising the description and claims of the invention

To obtain a patent, the first thing to do is fill in a patent application form. In addition to information such as the inventor’s name, the particulars of the holder etc., the application form must include a description of the invention and the claims as to the scope of the invention:

- "The complete description of the invention shall be such as to allow a person of the art to reproduce it. It shall include references to the current state of the art and explain how the invention contributes to the state of the art. This description shall, where necessary, include diagrams showing the invention in the form of plans (for an object), chemical formulae (for a molecule), sets or sub-sets (for a system) or flow charts (for a process).
- The claims shall define the invention in the form of a series of essential characteristics".

The patent claims are, in fact, the most important part of the patent. They determine what the patent covers, in other words, the extent of the personal monopoly granted by the patent. A disputed object does not, a priori, constitute infringement of the patent if it does not reproduce all the characteristics listed in the claims. Examples of patents are provided in appendix 6.7.

French patent applications may be filed for FRF 250. The applicant then has eighteen months in
which to request a search report, for which he pays search fees. If this is not done, the patent applica-
tion is turned into a utility certificate, which is valid for only six years. The application must be
kept up each year. Once the application has been filed in France, the applicant has one year to ex-
tend his application to countries of his choice. The patent must then be translated into the language
of each of these countries. The costs of translation, filing and agencies (which are needed in other
countries for non–residents) amount to some FRF 100 000 for filing in the main countries. Total
expenditure, including procedural costs, will be between FRF 200 000 and 300 000 over the first
seven years, and nearly FRF 600 000 for the entire life of the patent. When these costs are added to
those incurred by use and defence of the patent, the total cost, in a probabilistic model, will be
nearer several million francs.

Table 1. Fees and costs of patents for Europeans (in euros) – Source European Commission

<table>
<thead>
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<th></th>
<th>Europe (8 countries)</th>
<th>United States</th>
<th>Japan</th>
<th>World</th>
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</thead>
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<td>690</td>
<td>210</td>
<td>2242</td>
</tr>
<tr>
<td>Examination</td>
<td>1431</td>
<td>1100</td>
<td>2531</td>
<td></td>
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<tr>
<td>Granting</td>
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<td>850</td>
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<td>2730</td>
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<tr>
<td>Agent</td>
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<td>5700</td>
<td>8450</td>
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<tr>
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<td>12330</td>
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<tr>
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<td>20000</td>
<td>100000</td>
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</tr>
<tr>
<td>Serious litigation</td>
<td>500000</td>
<td>100000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.3.2 Examination: is this really an invention?

Once the patent application is filed, there are two options for the applicant in France: do nothing,
or apply for a search report.

- "If the applicant does nothing, the patent application shall automatically be transformed
  into a utility certificate after eighteen months (a sort of patent which protects for six years
  and only requires a search report where a lawsuit for infringement is taken out).

- In the event that the applicant pays the search fee within the eighteen–month period, the
  administration (INPI) shall draw up a search report (a simplified examination in
  comparison with those in other countries)".

The purpose of the examination will be to check that the claims are not abusive (that the inven-
tion meets the statutory patentability criteria upon examination of the documents provided in the
search report). Following the examination, the patent application is accepted, with more restricted
claims as the case may be, or rejected.
In France, there is only one search report, which costs FRF 2 100. The applicant decides what he will do with his application once he has seen this search report. The INPI does not check whether the applicant’s decision is grounded or not. It is the courts that will decide that, in the course of infringement litigation.

In other countries, the applicant is confronted with an examiner with whom he will argue the exact scope of his claims. This negotiation will proceed by an exchange of arguments, with an average 2 or 3 notifications from the examiner and replies from the applicant. This examination procedure is usually expensive, since it is conducted through agents. The average cost is KF 10 to 50 per country, depending on how complex the file is and how many intermediary translations are needed.

In theory, it is filing which, in France, marks the beginning of the term of protection afforded by the patent. However, it is unlikely that a patent that has been applied for but not granted will allow the holder to win an infringement lawsuit. As a rule, judges suspend judgement until the granting of French or European patents (as the case may be) if there is an infringement case before them. They may make provisional orders not to use the invention, or set up a guarantee fund, for the interim period. Therefore, in practice, there is a delay of a few years before effective protection can be enjoyed.

2.3.3 Defending patents: eliminating infringements and avoiding annulment

Let us suppose that an applicant has succeeded in obtaining a patent on his invention.

In the best case scenario, he will enjoy a personal monopoly on use of the invention and will not have to defend it against infringements. However, competitors, in good faith or otherwise, sometimes become infringers, and in most cases, they will contest the validity of the patent in any lawsuit.

Let us suppose that a competitor has infringed the patent. The patent holder can offer to settle out of court: infringement ceases immediately and the loss caused is refunded. Infringement may cease either because the patented invention is no longer used by the infringer, or because he takes out a licence for use of the patented invention. This procedure is set in train by a warning letter sent by the patent holder or his agent.

However, some infringers will choose not to cease infringement after receiving the warning letter. This is because the costs of infringement litigation can be high (KF 150 per case in France, and up to US$ 1 million for every six months the case lasts in the United States). An infringer with a good legal department knows full well that a small inventor has little chance of having enough

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58 It is very difficult, today, to obtain reliable statistics by which to assess the patenting system. If Offices published regular, detailed statistics, including delays, cross references etc., on patent applications and granting, it would be easier to control them.
money to start a successful lawsuit, especially in the United States. Thus, the inventor of the "Per−itel" connection, which is used on every television set in France and Europe, was never able to win infringement lawsuits against companies like Thomson, Philips, NetGem etc. despite being the patent holder.

Furthermore, in the event of infringement litigation, an infringer with good patent lawyers has excellent chances of getting a patent rescinded. This is particularly true in the case of software patents in the United States, since some 90% of the patents granted by the USPTO are reportedly invalid since they are not new (the invention having already been invented or published before the patent application was filed), or because they are not inventive (the invention being obvious). This type of annulment is relatively common insofar as Patent Offices recognise that they are incapable of having exhaustive knowledge of the entire state of the art, or even of having experts in all the rapidly expanding fields of invention.

It is also possible, in theory, to get a patent rescinded because it does not meet certain other statutory criteria (such as exceptions to patentability or lack of industrial application). This type of annulment is in fact a way (more overt than for the criteria of novelty and inventiveness) of criticising the examining practices of the Patent Offices. It also highlights the apparent incapacity of governments to control their Patent Offices. It will be a necessarily long task for governments to re−establish good practice in patenting. It will have no effect on an infringer who seeks to defend himself rapidly, and for whom the proper running of the State or the patenting system is not a concern. Therefore there is little likelihood that possibly abusive interpretations of the law by Patent Offices will be remedied by a judicial decision in the course of patent litigation.

IN SHORT - patents are a system of granting a personal monopoly, the purpose of which is to stimulate innovation and share knowledge in the interests of society. They are not natural property rights for inventors. The rights granted by the patent are finite in time and in the scope of the privileges enjoyed by the inventor, so that attempts to gain abusive appropriation will not harm the public interest. Compulsory licensing prevents patent holders from forbidding the use of their inventions where they do not use them themselves. In practice, effective protection of an invention by patenting costs a great deal, especially if there is infringement. Because there are ancillary costs, the patenting system also tends to create discrimination between rich and poor inventors, the latter being unable to protect their inventions.
the field of software contains great inventions, such as the principle of the public−key cryptosystem, which allows for an exchange of crypted information without ever having to provide the key which would permit decrypting. It would therefore be natural to patent software in order to reward the work of the inventor. As whole sections of the mechanical or electronic industries turn progressively into an information technology industry, it would be equally natural, following the logic of the industrial tradition, to patent software and to see to it, for example, that a word processing system can be patented, just as IBM was able to patent the golf ball typewriter.

Following these two principles – to reward inventors and to perpetuate an established industrial tradition – the United States and Japan have extended the scope of patentability to software in the past 10 years. Following the same two principles, the United States and Japan have also extended patentability to the services sector and even to mathematics on the grounds that services based on software have become a major economic sector. According to Mr Idris, Director General of the World Intellectual Property Organisation (WIPO), "the share of the Internet in the world economy will amount to $US 3 200 billion in 2003 – or less than half that if the barriers imposed by security considerations and regulations persist. Notable among these barriers are the following (...): the question of the patentability of commercial processes designed to protect new forms of transactions on the Internet, such as reverse auctions or techniques enabling single-operation online shopping (...)".

Europe, whose positive law forbids patents on computer programmes and whose policy in the

60 Patent US4405829
http://www.cyberlaw.com/rsa.html
61 Patent US5021972
http://www.wipo.org/fr/dg_idris.htm
62 We will not in this report use the traditional formula "programs as such are not patentable" since in our view this is a syntactic and semantic deformation which does not conform to the spirit of the law. In fact, it gives the
1970s led it to protect the software sector solely via copyright, is now considering a change in its positive law that could explicitly permit the patenting of software as well as information processing methods "having technical effects". Since all programmes have a technical effect and since all business models, corporate management methods, consultancy methods or educational methods operated by software also have technical effects, extending legislation in this way is tantamount to extending patenting to software and to all intellectual methods in the information society.

However, neither the European Patent Office nor the European Commission have published any study establishing that such an extension would conform to fundamental law (European Patent Convention, Treaty of Rome) and to the historical and economic objectives of the patent: to foster the sharing of knowledge and to stimulate innovation. Moreover, there is no official study on the risks and potential inconsistencies of extending a tool originally conceived for the tangible goods industry to all sectors of commerce, intellectual services and publishing. In fact, nothing proves that patents which promote innovation in manufacturing industries can similarly promote innovation in the software and new economy sectors. The American decision to patent software is the object of informed criticism in this country: it would even curb innovation, as was suggested by Jean-Yves Le Déaut (député for Meurthe-et-Moselle) in a letter addressed to the government in July 2000:

No study (has) been published by the European Patent Office to justify the economic benefit of an extension of patentability to software, even though economists have shown that the patenting system could lead to less innovation in the software economy.

We will see in this part that an extension of the patenting system to software and therefore indirectly to services, as took place in the United States, has, in a relatively short time, led to less sharing of knowledge, less innovation and less competition. In other words, the software patenting system, as developed in the United States, has unexpectedly had effects contrary to those sought when the patenting system was put into effect, as defined, for example, in article 7 of the TRIPs Agreement:

"The protection and respect of intellectual property rights should contribute to encouraging technological innovation and the transfer and dissemination of technology, for the mutual benefit of those who generate and those who use this technical knowledge, in a manner conducive to social and economic well-being, and ensuring a balance between rights and responsibilities."

impression that there could exist programs that are not "as such" and that ultimately all programs are patentable, which is manifestly contrary to the legislation (see Chapter 5). Besides, this formula is not used in the case of other exceptions.

In 1997 Mr Betten, representing the “software” Commission of the UNION (an association of more than 700 professionals in industrial property from 20 European countries), declared that, “The technical character of computer software should be generally acknowledged, this means: all computer programs are technical, and its industrial applicability should be construed in a broad manner so as to embrace the concept of enabling a useful practical result.”

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http://www.researchoninnovation.org/
Chapitre 3 – Patent and software: an unnatural union?

In order to understand these harmful effects, we will review what a software patent is before studying its effects on sharing of knowledge, innovation and competition. We will do this by comparing two scenarios: the first with copyright but without software patents, the second combining copyright and the software patent, as exists in the United States. Unless otherwise stated, the analyses proposed in this chapter relate to the software patenting system as developed in the United States.

3.1 Software patent = patent on an information processing method

The term "software patent" often leads to confusion as it implies that the software patent protects software authors. However, someone who has never written a single line of a programme and who has never written any software can obtain a software patent.

The software patent actually relates to the invention of a digital information processing method, i.e. an invention described as a sequence of elementary, digital information processing steps. But insofar as all inventions of digital information processing methods can be implemented using software, on one hand, and a computer to execute the programme, on the other hand, it is in the interests of inventors of digital information processing methods to include "all the software likely to be used in the implementation of their invention" in their patent "claims". Hence the term "software patent". To ensure as wide a monopoly as possible, it is also in the interests of inventors of information processing methods that they include in their claims tangible devices (integrated circuits, chip cards, etc.) which would permit the implementation of the process invented, as well as the supports involved in the distribution of the software used in computer-implemented processing methods.

Therefore, while not, a priori, being authors of any software, holders of software patents have a monopoly on all software which allows the implementation of the processes described in their patents. For example, the company Intermind, which publishes no software, holds a patent on a process which permits the content of Web sites to be tailored to user profiles, while guaranteeing each user that private data will not be abused. This process involves exchanging metadata (i.e. some forms of comments on the data exchanged) in order to establish a personalised communication, reflecting the user’s tastes and the accession data, between the user and the Web server. Intermind therefore demands that all software publishers wanting to use its patented process acquire a licence, but does not itself publish any software allowing the implementation of the process.

66 Needless to say, software authors who invent new information processes can also obtain this type of patent on their information methods.
3.1.1 Digital services patent

The use of software makes the provision of a digital service possible. Conversely, any digital service which can be described as a sequence of elementary steps for the processing of information, can be implemented using software. Therefore, any digital service can be the object of a "software patent" as soon as the service performed can be described as a sequence of elementary steps for the processing of information.

Thus, in an information society, where more and more of the services offered are automatically managed by software or semi–automatically managed by operator–run software, the concept of "software patent" is inseparable from that of "digital services patent". Patents on digital services are therefore relevant to the information society as a whole: by means of a software patent, commercial methods, corporate management methods, education methods, medical treatment, etc. can be the object of appropriation and monopoly.

Undoubtedly, not all digital services can be patented by means of a "software patent". For example, a Web service involving e–mailing a text for translation by a human translator and then receiving the translation by e–mail could not be patented since e–mail is not in any way new and human translation of a text cannot be described as a sequence of elementary steps for the processing of information. On the other hand, the same process, with the addition of an intermediary e–mail server so that the translation work could be shared by a team of translators, could be patented as a whole if the process for the automatic distribution of e–mails can be described as a sequence of elementary steps for the processing of information.

What stands out is that all intellectual methods combing software–implemented and human–implemented procedures can be patented as inventions of a method for the processing of information, also called a "software patent".

67 However, some EPO case law decisions state that the simple transposition of activities which could be performed with pen and paper is not patentable in Europe because of the exclusion of intellectual activities. These decisions seem somewhat inconsistent with other case law decisions and legal positions of the EPO presented in chapter 5. These inconsistencies arise from the fact that all that can be done with a computer can also be done with pen and paper.
3.1.2 Examples of software patents

A few examples can illustrate the types of software patents that exist in the United States. The quotes almost always correspond to the patent description. They give an indication of the nature of the invention. The date in parentheses is the date of granting. It would be appropriate to carry out a detailed analysis of the scope of the patent and to analyse its claims. We recommend that the interested reader visit http://ep.espacenet.com or IBM’s industrial property site http://www.patents.ibm.com; the latter is easier to use but is less safe from the point of view of economic intelligence. All that is needed is to enter the patent number in the search facility, prefacing it with US.


This example shows that for almost 20 years the United States has issued patents linked to software–automated financial services.

Data processing for an improved securities brokerage/cash management system that supervises, implements and co-ordinates a margin securities brokerage account; participation in one or more short term money market or comparable funds; and subscriber-initiated use of electronically responsive subscriber identity credit/debit media and/or checking systems. Subscriber expenditures, effected as by ‘charge card’ use, check and/or cash advance are applied on a hierarchical basis, seriatim, against the subscriber’s free credit balance, short term investment and the lendable equity in his securities account. On a periodic basis, e.g., daily, received card charges, check, securities and deposit transactions for the ensemble of account participants are verified and employed to compute an updated credit limit for each subscriber. The transactional data is reviewed against predetermined norms to detect abuses such as check kiting. The short term investment position of each account is modified as necessary to permit money market or comparable earned yields on the account free credit cash balance.


This patent is one of the earliest examples of patents relating to corporate management. Its wording is fairly technical, probably on account of patent doctrine at the time of filing. However, formulations closer to pure corporate management are acceptable today.

A general–purpose management system displays a single general format on a display unit so that items redundant in plural types of management to be performed independently, as well as items peculiar to each type of management, can be inputted successively, and includes a first file for collectively storing data relating to each of the items inputted in accordance with the display, a plurality of second files for storing data necessary for each type of management on a type–by–type basis, a data extractor which, in dependence upon the type of management to be performed independently, is adapted to extract data necessary for this management from the first file and transfer the data to a corresponding second file, and a data preparer for preparing data necessary for a specific
Software patent = patent on an information processing method

type of management and outputting these data in accordance with a predetermined format on the 
basis of the data in the first file and the data transferred to the corresponding second file.


This deals with the famous LZW patent on an innovative technique for data compression used, 
in particular, to read or record images in the GIF format. The GIF format was chosen as the stan−
dard format for Internet images prior to the existence of this patent being yet known. At that time, 
no one could have envisaged that the LZW compression method could possibly be patentable. It 
took several years for its present owner, Unisys, to reveal the existence of the patent and to start 
threatening to sue users not complying with the conditions of the licence. Needless to say, new im−
age formats have been designed as alternatives to using the LZW method. But the fact that Unisys 
judiciously waited for the GIF format to become the Internet norm before disclosing the existence 
of the patent means that such formats are now useless in practice. Thus, in spite of the existence of 
image formats that are technically superior (e.g. PNG), the GIF format remains the norm on the 
Internet, and the patent continues to hamper many software authors. This example shows that the 
effects of a patent on a technique linked to a communication standard can be long−lasting, includ−
ing when it is easy to propose better communication standards.

A data compressor compresses an input stream of data character signals by storing in a string table 
strings of data character signals encountered in the input stream. The compressor searches the input 
stream to determine the longest match to a stored string. Each stored string comprises a prefix string 
and an extension character where the extension character is the last character in the string and the 
prefix string comprises all but the extension character. Each string has a code signal associated there−
with and a string is stored in the string table by, at least implicitly, storing the code signal for the string, 
the code signal for the string prefix and the extension character. When the longest match between 
the input data character stream and the stored strings is determined, the code signal for the longest 
match is transmitted as the compressed code signal for the encountered string of characters and an 
extension string is stored in the string table. The prefix of the extended string is the longest match and 
the extension character of the extended string is the next input data character signal following the 
longest match. Searching through the string table and entering extended strings therein is effected by 
a limited search hashing procedure. Decompression is effected by a decompressor that receives the 
compressed code signals and generates a string table similar to that constructed by the compressor 
to effect lookup of received code signals so as to recover the data character signals comprising a 
stored string. The decompressor string table is updated by storing a string having a prefix in accor−
dance with a prior received code signal and an extension character in accordance with the first 
character of the currently recovered string.


This patent, owned by British Telecom, covers the use of Web hyperlinks, pertaining therefore
to all Internet sites.

Information for display at a terminal apparatus of a computer is stored in blocks; the first part of which contains the information which is actually displayed at the terminal, and the second part of which contains information relating to the display and which may be used to influence the display at the time or in response to a keyboard entry signal. For example, the second part of the block could include information for providing the complete address of an another block which would be selected by the operation of a selected key of the keyboard. The second part of the block could alternatively influence the format and/or color of the display at the terminal. When a block is read from the store of the computer the second part is retained in another store which may be located in the terminal or in the computer itself or perhaps both. The invention is particularly useful in reducing the complexity of the operating protocol of the computer.

BT is currently seeking to obtain the payment of licensing fees from all hosts in the United States. This case will set a precedent as it queries the cogency of the American approach.

It is true that there are many other patents like this. For example, accessing a database via the Web has also been patented (US5974444: Remote information service access system based on a client–server–service model). As a result, more than 34 Web site publishers are currently being sued in patent infringement simply for storing the contents of their Web site in a database.

Europe has been partly protected from this type of attack because of the principle of non-patentability of computer programmes, which is still in force today. However, current EPO case law authorises the granting of patents like that of BT or patents of the US5974444 type. Moreover, Steve Probert, deputy director of the British Patent Office has said with respect to the BT patent on hyperlinks: "there was no doubt in my mind that we would have granted it under the law as it stands today (assuming novelty and inventive step etc.). As I read the specification, it is not a computer programme as such, not least because the invention claimed involves a technical effect."


Here is a typical patent on a user–interface technique for word processing.

A word processor, including a keyboard through which characters can be inputted, a memory device for storing inputted character arrays and a display device capable of multi–color displays, is so programmed that corrections and additions are automatically displayed in a different color from the rest for the convenience of editing. Codes for indicating the color of display can be also stored in the memory device. When a completed document is finally stored in a document file, however, such color codes are deleted such that the document can be outputted in one color.
US5193056: Data processing system for hub and spoke financial services configuration

This patent is famous because it was referred to the Supreme Court of the United States. In refusing to give an opinion on an appeal decision confirming the patentability of the invention, the Court endorsed the possibility of patenting the use of mathematical formulae in a computer programme, thereby opening the scope of patentability to all financial services.

A data processing system is provided for monitoring and recording the information flow and data, and making all calculations, necessary for maintaining a partnership portfolio and partner fund (Hub and Spoke) financial services configuration. In particular, the data processing system makes a daily allocation of assets of two or more funds (Spokes) that are invested in a portfolio (Hub). The data processing system determines the percentage share (allocation ratio) that each fund has in the portfolio, while taking into consideration daily changes both in the value of the portfolio's investment securities and the amount of each fund's assets. The system also calculates each fund's total investment based on the concept of a book capital account, which enables determination of a true asset value of each fund and accurate calculation of allocation ratios between the funds. The data processing system also tracks all the relevant data, determined on a daily basis for the portfolio and each fund, so that aggregate year-end data can be determined for accounting and for tax purposes for the portfolio and for each fund.

US5835720: IP discovery apparatus and method (1996)

This patent is on a technique to determine which computers in a network are connected and are active. Here, IP means "Internet Protocol" and not "intellectual property".

Disclosed herein are methods and apparatus for discovering devices on a network. Active devices can be discovered in ARP tables from routers on the network. Pings can then be sent to the active devices for verification, or pings can be sent to devices at other addresses on the network. Devices can also be discovered by sending a batch of pings to addresses on the network and monitoring responses from those addresses over an interval. After the interval elapses, another batch of pings can be sent. The devices can be discovered by a host on the network or by a network manager. The network manager can add the discovered devices to a network topology database.

This patent contains some interesting language, such as calling the capacity to contact several computers simultaneously rather than one after the other an invention. This is tantamount to saying that adding a "fork" command in a "for" loop is an invention. This sort of language is typical of patent literature on software. What is in fact obvious is often presented as being an invention.

US5579430: Digital encoding process (1996)

This patent pertains to the sound compression process generally called "MP3". This process is based on major scientific discoveries which are not patented since they are in the fields of mathematics and psychoacoustics. More specifically, the "MP3" process concerns a minor and restricted
application of discoveries from the 1970s, involving temporal and frequential masking, on the one hand, and techniques similar to sound representation techniques using wavelet data bases developed by mathematicians in the 1980s, on the other. The numerous processes like "MP3" (e.g. SoundVQ\textsuperscript{69}, ATRAC\textsuperscript{70}, or Vorbis\textsuperscript{71}) are all members of a large family of processes involving the selection of a threshold function to eliminate frequencies the human ear cannot detect. Some of these processes are patented, the patent then corresponding to the choice of threshold function. Others, like Vorbis, are freely usable.

As in the case of the GIF standard, there is a great danger of the industry adopting patented standards, even when other technically superior and patent−free formats are available, because the existence of patents allows better market control. In this respect, the case of the MPEG and DVD standards is particularly enlightening: the standardisation committee, which is mainly controlled by professionals from the mass−market electronics industry, is acting as a club incorporating patented innovations coming from the laboratories of its members into the standard, whilst rejecting patented or non−patented innovations coming from independent businesses. Thus, professionals from the mass−market electronics industry are assured of being in a position to control the DVD market and to ensure that more innovative processes such as fractal compression, which already allows the copy of 1 to 3 DVD films onto one CD−ROM with no quality loss, are not commercialised and therefore cannot generate revenue sources beyond their control.

A digital encoding process for transmitting and/or storing acoustical sigs and, in particular, music sig−nals, in which scanned values of the acoustical signal are transformed by means of a transformation or a filter bank into a sequence of second scanned values, which reproduce the spectral composition of the acoustical signal, and the sequence of second scanned values is quantized in accordance with the requirements with varying precision and is partially or entirely encoded by an optimum en−coder, and in which a corresponding decoding and inverse transformation takes place during the re−production. An encoder is utilized in a manner in which the occurrence probability of the quantized spectral coefficient is correlated to the length of the code in such a way that the more frequently the spectral coefficient occurs, the shorter the code word. A code word and, if needed, a supplementary code is allocated to several elements of the sequence or to a value range in order to reduce the size of the table of the encoder. A portion of the code words of variable length are arranged in a raster and the remaining code words are distributed in the gaps still left so that the beginning of a code word can be more easily found without completely decoding or in the event of faulty transmission.

**US5724424: Digital active advertising (1998)**

This patent can be considered as an attempt to patent the whole of electronic commerce.

A complete system for the purchasing of goods or information over a computer network is presented.

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70 [http://www.minidisc.org/aes_atrac.html](http://www.minidisc.org/aes_atrac.html)
Merchant computers on the network maintain databases of digital advertisements that are accessed by buyer computers. In response to user inquiries, buyer computers retrieve and display digital advertisements from merchant computers. A digital advertisement can further include a programme that is interpreted by a buyer’s computer. The buyer computers include a means for a user to purchase the product described by a digital advertisement. If a user has not specified a means of payment at the time of purchase, it can be requested after a purchase transaction is initiated. A network payment system performs payment order authorization in a network with untrusted switching, transmission, and host components. Payment orders are backed by accounts in an external financial system network, and the payment system obtains account authorizations from this external network in real-time. Payment orders are signed with authenticators that can be based on any combination of a secret function of the payment order parameters, a single-use transaction identifier, or a specified network address.

US5960411: Method and system for placing a purchase order via a communications network (1999)

Here is a typical example of a patent on an e-commerce method, one which allows a user, who has placed previous orders, to order a book without again having to specify the delivery address. This is the famous "one click" patent. According to Patrice Vidon, an industrial property consultant, it constitutes a genuine invention.72

A method and system for placing an order to purchase an item via the Internet. The order is placed by a purchaser at a client system and received by a server system. The server system receives purchaser information including identification of the purchaser, payment information, and shipment information from the client system. The server system then assigns a client identifier to the client system and associates the assigned client identifier with the received purchaser information. The server system sends to the client system the assigned client identifier and an HTML document identifying the item and including an order button. The client system receives and stores the assigned client identifier and receives and displays the HTML document. In response to the selection of the order button, the client system sends to the server system a request to purchase the identified item. The server system receives the request and combines the purchaser information associated with the client identifier of the client system to generate an order to purchase the item in accordance with the billing and shipment information whereby the purchaser effects the ordering of the product by selection of the order button.


While the "one click" patent has a user interface dimension, other e-commerce patents are much closer to pure commercial practice. This is the case, for instance, for systems which put a customer in contact with a supplier via the Internet, in return for a commission on sales.

Disclosed is an Internet–based referral system that enables individuals and other business entities (“as–
sociates’) to market products, in return for a commission, that are sold from a merchant’s Web site. The system includes automated registration software that runs on the merchant’s Web site to allow entities to register as associates. Following registration, the associate sets up a Web site (or other information dissemination system) to distribute hypertextual catalog documents that includes marketing information (product reviews, recommendations, etc.) about selected products of the merchant. In association with each such product, the catalog document includes a hypertextual ‘referral link’ that allows a user (‘customer’) to link to the merchant’s site and purchase the product. When a customer selects a referral link, the customer’s computer transmits unique IDs of the selected product and of the associate to the merchant’s site, allowing the merchant to identify the product and the referring associate. If the customer subsequently purchases the product from the merchant’s site, a commission is automatically credited to an account of the referring associate. The merchant site also implements an electronic shopping cart that allows the customer to select products from multiple different Web sites, and then perform a single ‘check out’ from the merchant’s site.


This is a patent on a public key cryptosystem, recently brought to light by a "patent hunter", Gregory Aharonian, whose job is to arrive at rescission of patents for lack of originality or inventiveness when these patents are obstructing clients. This type of patent concerns an application of the theory of numbers to encryption.

The public key encryption system of the present invention has short and easily created encryption keys and wherein the encoding and decoding processes are performed extremely rapidly, and has low memory requirements. The encoding and decoding processes use both the addition and multiplication operations in a ring modulo with two different ideals. The cryptosystem of the present invention allows encryption keys to be chosen essentially at random from a large set of binary vectors, for which key lengths are comparable to the key lengths of the most widely used prior art cryptosystems. The present invention features an appropriate security level (~280), with encoding and decoding processes ranging from approximately one to two orders of magnitude faster than the prior art, particularly the exponentiation cryptosystems.

The formulation of the claims in this patent is interesting because it is almost totally mathematical (mathematical theorem of proof of existence), whereas encryption patents have traditionally been "wrapped up" in various technical devices, thereby concealing their intrinsically mathematical nature. This patent, granted in the United States, demonstrates that, in practice, to raise questions about the patentability of software is also to raise questions about the patentability of mathematics.

A method for encoding and decoding a digital message m, comprising the steps of:

- selecting ideals p and q of a ring R;
- generating elements f and g of the ring R, and generating element Fq which is an inverse of f (mod q), and generating element Fp which is an inverse of f (mod p);
• producing a public key that includes \( h \), where \( h \) is congruent, mod \( q \), to a product that can be derived using \( g \) and \( F_q \);
• producing a private key from which \( f \) and \( F_p \) can be derived;
• producing an encoded message \( e \) by encoding the message \( m \) using the public key and a random element \( o \)
• producing a decoded message by decoding the encoded message \( e \) using the private key

US6024577: Network-based education system with capability to provide review material according to individual students' understanding levels (2000)

This is an "education" patent of the sort that is filed more and more often. With this type of patent, it is hard to tell whether the invention is technological or pedagogical in nature insofar as the pedagogical process it implements relies on computer technologies.

A network-based education system allowing an instructor to give a lecture to a plurality of students via a computer network, where the instructor can grasp the individual students’ understanding levels at his/her discretion and take appropriate supplementary actions to the students in accordance with their respective understanding levels. A questionnaire conducting unit conducts a questionnaire to survey the understanding level of each student concerning a class he/she attends. In response to this, a questionnaire responding unit disposed in each student terminal returns an answer to the questionnaire according to response data entered by the students through a keyboard or other input devices. An understanding level data displaying unit, as part of the instructor terminal, collects the responses to the questionnaire returned from the student terminals and displays the distribution of students’ understanding levels on a monitor screen of the instructor terminal. This feature allows the instructor to easily grasp the understanding levels of the individual students. Further, the system provides the students with appropriate review material suitable to their respective understanding levels, thereby allowing better supplementary actions to be taken according to each student’s understanding level.

3.2 The dissemination of technical knowledge

There are two levels of technical knowledge in software:

1. abstract technical knowledge corresponding to a natural language description of the principal information processing operations necessary to obtain a given result;
2. practical technical information corresponding to the list of computer programme instructions.

These two levels of knowledge correspond to totally distinct skills.

1. The abstract knowledge of the principal instructions to be carried out corresponds to the theoretical knowledge underlying any programme: mathematical formulae, algorithms,
corporate management, education methods, commercial methods, psychoacoustics, psychovision etc. This knowledge almost always comes from theoretical research in mathematics, algorithmics, corporate sociology, or psychophysics.

2. The practical knowledge in the programme’s list of instructions corresponds to the know−how of the programmer, who can for instance, improve performance by a factor of 10 for two different implementations of the same algorithm or the same corporate management system when designing the programme’s instructions.

The software patent, which is a patent on the invention of an information processing method, therefore concerns the abstract technical knowledge underlying the writing of the programme (level 1) and not the technical skills of the programmer (level 2).

3.2.1 Source code: the key to technical knowledge

The programmer’s technical knowledge is accessible only when the source code for the programme is accessible. Conversely, knowledge of the source code is sufficient to access abstract technical knowledge by means of an analysis of the programme, similar to the analysis of a literary work.

It should be remembered that the programme’s source code corresponds to the list of instructions of the programme in a form that can be easily read and modified by an engineer. Contrary to the source code, the term binary code applies when the programme is available in the form of a list of instructions that can be understood and executed only by the computer. The transformation of the source code to a binary code is called compiling. The inverse procedure, which is much more complex, non−deterministic, and imperfect, is called decompiling, and is generally prohibited73 by law (e.g. 1991 directive on software in Europe74) or by contract (e.g. in the United States).

The learning of information science and computer programming is greatly accelerated when students have access to the source code of the software they use, and can thereby uncover the technical skills of other programmers. This partly explains the success of programmes such as Linux in higher education or Microsoft’s decision to provide the source code of its operating system to large American and, recently, European universities. For a programmer to be able to understand another programmer’s source code is, nevertheless, a relatively slow process, one that can take from 6 months for a brilliant programmer to two years for a good programmer. Without a source code, and where decompiling is illegal, this understanding can take more than ten years for a good programmer because of the need to ascertain all the programming techniques, these being difficult to explain or to formalise without source code examples.

73 CONSEQUENCES OF DIFFERENCES IN THE SCOPE OF COPYRIGHT PROTECTION ON AN INTERNATIONAL SCALE, Pamela Samuelson, http://www.ksg.harvard.edu/iip/Illiconf/sampap.html
3.2.2 Software without patenting: source code secrecy but sharing abstract technical knowledge

In a system without software patents, those publishers who do not want their technical knowledge to benefit competitors with nothing in return can keep their software source code secret. Source code secrecy also allows publishers to conceal possible copyright infringements, thereby protecting themselves from the risk of copyright litigation. Software copyright efficiently protects source code secrecy through the prohibition on decompiling, guaranteed by positive law (Europe) or by copyright licensing contracts (United States). It is therefore legally impossible for a competitor to study the technological workings of a programme which is protected by source code secrecy. On the other hand, the range of operations of a programme cannot be protected by source code secrecy since it is, by definition, disclosed in the instructions for using the software.

Source code secrecy protects publishers efficiently, but is harmful for the consumer. When the source code is not available, it is impossible for a consumer to correct faults, or to have them corrected by a third party, when the publisher no longer provides maintenance or when he has disappeared. And yet the average publishing lifetime of a software publisher is only about a few years in the United States. Equally, at the time of the Y2K bug, it was noticed that certain publishers used source code secrecy to force consumers to make costly changes to new software, whilst correcting the software already in use was not necessarily expensive. Finally, source code secrecy sometimes shortens the lifetime of the data produced by the software, in particular when the data format is unpublished and it then becomes difficult to retrieve the data using other software.

Consequently, not all software publishers choose to keep their source code secret; in so doing they are able to offer a better service to the consumer and, in the case of some small publishers that could possibly disappear overnight, to guarantee the consumer a level of durability and security comparable to those offered by a large publisher. Other publishers of free software (e.g. Troll\textsuperscript{\textcopyright}, MySQL\textsuperscript{\textcopyright}) not only publish their source code but encourage customers collectively to improve it. Other publishers, for example the Danish publisher FrontBase\textsuperscript{\textcopyright}, which is currently offering one of the only database servers designed in Europe technically capable of competing with Oracle, offer their big customers the option of accessing the software source code under a non-disclosure contract, with a view to guaranteeing a high level of durability and reliability for the product. Finally, some software publishers choose to publish source codes in order to facilitate the emergence of standards. For example, this is the case for Sun, whose language, Java, provides a typical example of proprietary software with a published source code facilitating the emergence of a universally accepted standard, one used by Sun’s competitors such as Microsoft.

Therefore, in a world without software patents, the decision to publish or not to publish source codes depends solely on a balance between the wish to protect a know-how through secrecy and

\begin{footnotesize}
\begin{itemize}
\item[75] http://www.troll.no
\item[76] http://www.mysql.com
\item[77] http://www.frontbase.com
\end{itemize}
\end{footnotesize}
the wish to offer guarantees to the consumer or to encourage the emergence of a standard.

3.2.3 *Patented software: strengthened source code secrecy*

With the introduction of patents, a software author could in theory publish the source code without jeopardising its industrial secrecy since its abstract technical knowledge would be protected by the patent. However, the publication of the source code facilitates a competitor’s search for patent infringements whereas the publication of the binary code precludes a competitor’s search for patent infringements because of the prohibition on decompiling. This suggests that the introduction of patenting increases secrecy with respect to practical technical knowledge, something that actually can be observed in the United States and that seems *a priori* very surprising since the patenting system is meant to facilitate the sharing of knowledge.

To clarify this, suppose that company A publishes software with its source code. A’s competitor, company B, legally acquires a copy of this software, and has its engineers read its source code with a view to analysing the operating principles. Following this analysis, B is in a position to determine whether the operating principles of A’s software do or do not constitute infringements of its own patents. Conversely, if B does not make its software source code available, A does not have any legal way of obtaining this source code to get it analysed by its engineers. Technically, A could resort to decompiling\(^{78}\) in order to analyse the operation of B’s software, but this could not be done legally since the law on decompiling strictly limits it use to interoperability ends, and this only in very specific cases. A, which publishes its software source code, therefore runs greater risks of being sued for patent infringement than B, which does not publish its software source code. Therefore, the introduction of patenting discourages source code publication since a company like A would be disadvantaged compared to a company like B when faced with the risk of patent infringement.

This demonstration is in fact not at all theoretical, as the case STACS versus Microsoft illustrates. STACS had a patent on a data compression technique. Microsoft buried this data compression process deep within its operating system in order to reduce the space occupied by files on a hard disk automatically. STACS therefore sued Microsoft for patent infringement, and Microsoft sued STACS for violating industrial secrecy\(^{79}\). Each company won its case!

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\(^{78}\) It is, nevertheless, a particularly delicate operation since the source code produced by decompiling a binary code is difficult for humans to understand. The understanding of a decompiled code therefore takes much longer than that of a source code. Equally, legalising decompiling for patent infringement searches would make the law more uniform, but would probably not, in practice, eliminate the reinforcement of source code secrecy brought about by the existence of software patent.

\(^{79}\) LA Law, Andrew Schulmm. Document published on the CSIRO (Australia) Web site and subsequently withdrawn following the publication of Robert Di Cosmo’s "Global Hold Up".
The effect of the introduction of software patenting is therefore to encourage publishers to strengthen source code secrecy in order to reduce or even to eliminate patent infringement lawsuits. Paradoxically, this leads to a situation where, instead of fostering the dissemination of practical technical knowledge, software patenting actually encourages secrecy.

This effect is felt particularly by independent developers and small publishers insofar as the probability of their finding themselves in patent infringement is almost a certainty (see section 3.3). This effect is felt less by a large publisher which, when it has at its disposal a significant patent portfolio and a good team of lawyers, has the means to fight most litigation for patent infringement. Therefore, the introduction of software patenting encourages small publishers not to publish the source code for their software, thereby removing an efficient means of competing with the dominating, large publishers, while at the same time failing to prevent large publishers from using the same sort of strategy against small competitors. It is worth underlining that the publication of the source code may stem from a strategy to impose a standard or even to offer the consumer a competitive advantage in terms of security and durability (see 3.2.2).

3.2.4 A patent base of little use

The building of a base of abstract technical knowledge on information processing methods via patenting is potentially of great scientific and technical interest. However, interest in this documentation base is reduced by the fact that there already exist many sources of scientific and technical information on programming methods and that many of the patents contained in this base are of little value. In practice, statistical studies by Greg Aharonian\(^81\) show that nearly 90% of the software patents granted in the United States are of no value, either because of their lack of novelty or their triviality, and that most of the other patents are based on simple application of results coming from research in applied mathematics, algorithmics, or corporate sociology. Generally these results have appeared in scientific publications, often illustrated by examples of programmes provided with their source code. Computer implementation does not require a significant inventive step, but rather an effort in programming and in optimising performance. Therefore, taken as a whole, the proportion of patents of real scientific or technical interest can be estimated at a few percent at the most.

Unfortunately, many of these patents are not usable because of industrial protection strategies based on the patent/secrecy combination. Indeed, it is sufficient to patent a subprocess necessary for the implementation of a complex information process, keeping secret other subprocesses of the same complex information process, for the complex information process to remain secret in its entirety but be protected by patent because of the need to implement the patented subprocess. In this situation, the simplest processes are generally those patented, since they are the ones most likely to

\(^{80}\) e.g. Sun with StarOffice, Matra Datavision with Cascade.
\(^{81}\) PATENT EXAMINATION SYSTEM IS INTELLECTUALLY CORRUPT, Greg Aharonian – http://www.bustpatents.com/corrupt.htm
be used by a competitor, and then the competitor is sued for patent infringement. The sophisticated processes are kept secret on the grounds that a competitor has little chance of reinventing and therefore of using them.

Thus, when the advantages of a software patent base, for which the content contributes but little and which often cannot be used, are compared with those of publishing the software source code, the introduction of software patenting can appear on the whole little conducive to the sharing of knowledge and clearly unlikely to favour consumer interests when software security and durability are considered.

3.3 Software innovation

In order to understand the economics of software patenting, it is first necessary to be aware that software is a complex system made up of many sub-systems. Consequently, the inventor of a information processing method has to combine his process with many other processes if this method is to be implemented in a commercially usable computer programme.

3.3.1 The software patent: protection offering little profit, but a source of litigation

For the sake of demonstration, let us place the reader ("you") in the role of an inventor of an information method.

Let us suppose, therefore, that you have invented an innovative information method and have decided to patent it. To be able to use your invention commercially in the form of software, you will need to combine your invention (represented below by a black square) with many other methods considered to be anodyne (represented below by grey squares). Therefore, the software that you are going to commercialise will result from assembling your invention with many other information processing methods (see Figure 1 below).
Figure 1. The application of an information invention requires the combination of this invention with numerous other information methods.

You are probably hoping that your software patent will enable you to prohibit your competitors, software publishers, from copying your invention without your consent, and that, in principle, it should therefore increase your profits sufficiently to cover your expenses in filing and searching the patent. Unfortunately, you should know that you would have to wait several years before benefiting from effective protection (see section 2.32). Furthermore, among the anodyne methods, i.e. those that all programmers in the world generally consider as anodyne, there are several that have been or are in the process of being patented (represented below by white squares). Each white square represents a potential source of litigation.

Figure 2. Of necessity, the inventor very often combines his invention involuntarily with anodyne processes (in grey) and patented processes (in white).

In the event of litigation, it will often be necessary to come to a cross-licensing agreement, in other words, to authorise your competitor to use your invention free of charge under an amicable
agreement\textsuperscript{82}. Here, the patenting system will have brought you nothing, and will have cost you money for the search and for filing the application.

Sometimes, the patent holder is in fact a patent fund, that is, an organisation that sells licences on a portfolio of software patents, but does not publish software. In this case, you will need to choose between buying the licence demanded by the fund, and suing the fund so that its patent can be rescinded. In this case, the patent will have cost you not only the money for search and filing, but also for the licence or the lawsuit.

More rarely, it may occur that the patent holder forbids you to use his invention. Thus, Microsoft refused to grant licences on the patents needed for use of its video format ASF\textsuperscript{83} available only in Windows, using Microsoft software, and at the same time subsidised Websites that agreed to convert all their videos into this format exclusively. Similar practices can be observed between Sorensen and Apple: \textit{de facto}, they prevent consultation of many Quicktime videos on systems of the Unix type or the autonomous Interned terminals such as the Netgem type.

When these scenarios are applied to the relationships between a small publisher, a large publisher with a large portfolio of patents, and a patent fund, the following results can be observed:

1. Small, innovative publishers lose money on litigation, licences or patent application costs and earn virtually nothing on their patent.

2. Large publishers lose money on filing fees and litigation; however, owing to cross-licensing of software patents, they get free use of the inventions of small, innovative publishers which they have obtained in return for stopping their lawsuits against them. Thus large publishers and patent funds act similarly towards small publishers who have no software patent portfolio. The large publishers thus indirectly benefit from the patenting system because they can limit the potential for growth of small competitors.

3. Patent funds will probably earn more from selling licences than what they spend on software patent applications, provided they are not sued for rescission of their software patents.

Although the software patenting system does not affect the activity of large software publishers, it threatens the emergence or development of young publishers, who are factors of innovation and economic development. Some young startups sometimes even conclude that the system threatens their technological investment by allowing their inventions to be appropriated by the large publish-

\textsuperscript{82} The agreement is often more complicated than this. One of the best descriptions is to be found in "Patent Wars", published in The Economist on 8 April 2000. Here is an extract: "As the arms race hots up, so does business for the international arms merchants. That is how Bob Bransom, of Bransom and Pressman, a law firm in Pennsylvania, describes himself. 'Everybody is infringing everybody’s patents all the time’, says Mr. Bransom. ‘So one guy puts a pile of papers five inches high on the table, and the other guys have a smaller pile’. The defender then calls Mr. Bransom for help in buying some patents that the aggressor is infringing. The usual outcome is a cross-licensing agreement, with or without cash thrown in, depending on the relative size of the piles’.

\textsuperscript{83} Microsoft patents ASF media file format, stops reverse engineering – \url{http://www.advogato.org/article/101.html} – \url{http://www.geocities.com/virtualdub/virtualdub_news.html}
Software innovation

Software innovation

ers with nothing in return. Philip Sargent, the Managing Director of Metaweb\textsuperscript{84}, noted that "There is overwhelming evidence that software patent portfolios are used above all as a way of applying pressure during acquisition negotiations, and as a way of eliminating small firms that do not have a large legal department"\textsuperscript{85}.

Use of the software patenting system does, however, provide a sure supply of activity for Patent Offices and industrial property consultancies, as well as for the law firms involved in software patent infringement litigation. For some industrial property consultants, like M. Tauchert, the patenting system has become an economic activity as such, and "an economic impact study on software patents is not required because it has already become common practice. The market has already made its choice: each year, thousands of companies apply for software patents and the system provides a living to 20,000 industrial property experts without the slightest State subsidy."\textsuperscript{86} However, these indirect costs weigh on the overall economy of the system and can only be justified if they contribute to stimulating innovation.

3.3.2 Effects of patenting on software innovation

The model below was generalised by Professors Bessen and Maskin\textsuperscript{87}, and is known as "sequential innovation". It applies to industries with complex systems. Sequential innovation is defined as a succession of innovations chronologically dependent upon each other. Sequential innovation can be observed in every industry where the products sold are constantly improved in successive, closely spaced intervals. This is more particularly the case of all complex systems, i.e. systems composed of many sub-systems, in which constant adding of new sub-systems providing new functions induces a process of ongoing innovation of the complex system. It is, of course, also the case of software or micro-electronics.

The theoretical study by Bessen and Maskin demonstrates the following proposition:

After the first-generation innovation, patent protection gives rise to efficient R&D (and the absence of patent protection gives rise to insufficient R&D) if and only if it is socially optimal for just one firm to invest. When having more than one firm undertake R&D is efficient, however, a regime without patents induces an R&D investment level (and hence a pace of innovation) that (although still too low) is, in general, more efficient than one with patent protection (provided that competition is sufficiently in-

\textsuperscript{84} See complete declaration on http://www.eurolinux.org/news/pr4/indexfr.html
\textsuperscript{85} However, this comment only applies to small publishers likely to cause loss to large publishers, or medium-sized businesses the sales figures of which are sufficiently high to justify the costs of litigation. In the United States, small companies content to adapt large publishers' software to little-noticed niche markets are unlikely to be subjected to patent litigation, quite simply because it would not be worth the patent holder's while.
\textsuperscript{87} WORKING PAPER DEPARTMENT OF ECONOMICS SEQUENTIAL INNOVATION, PATENTS, AND IMITATION. James Bessen Eric Maskin No. 00-01 January 2000. MASSACHUSETTS INSTITUTE OF TECHNOLOGY 50 MEMORIAL DRIVE CAMBRIDGE, MASS. 02142 http://www.researchoninnovation.org/
tense). Moreover, if innovations are sufficiently important, not only the social but the private return to R&D (i.e., a firm’s profit) is enhanced by competition and imitation.

This proposition shows that, in sequential innovation systems, the patent only offers economic usefulness where the monopoly is the most socially useful organisation. In every other case, the absence of patent protection, that is, a firm having the right to use another’s inventions freely, and vice-versa, leads to a higher degree of innovation in sequential innovation systems.

Applied to software, this proposition shows that software patents are only economically useful when the ideal form of organisation for the software industry is the monopoly. Our opinion is that competition in the software field, particularly that of the many independent software publishers, is preferable in order to stimulate innovation. Thus, in our view, the model defined by Bessen and Maskin gives a theoretical demonstration of the harmful effects of software patent protection on innovation, given that software is a complex system benefiting from sequential innovation, and not a traditional elementary system. However, it should be borne in mind that some economists feel that the monopoly might constitute the best form of organisation in the software industry. More especially, reputed American professors who specialise in industrial economy and monopolies testified at the anti-trust trial against Microsoft that a monopoly in operating systems was a factor of progress and innovation. However, we do not agree with this assertion.

Bessen and Maskin backed up their study with statistical data on software. They correlated development of innovation in the United States with the growth of the number of patent applications, and showed that the increase in software patents and the spread of patent protection in the direction of more patentability led to a fall in expenditure on R&D and less productivity. According to this statistical study, there is a correlation between the extension of patentability to software and a fall in innovation. More simply, the study by Bessen and Maskin demonstrates that in the software economy, innovators need to take inspiration from the work of their competitors and integrate their inventions freely.

The theoretical model built by Bessen and Maskin, and its econometric confirmation, might seem surprising in view of the fact that the patent is one of the foundation stones of the market economy, and that it has proved its use in promoting innovation since the industrial revolution in the nineteenth century. We will therefore attempt to make a detailed comparison of the economic models of software in a patentless situation, and then in a situation where it is patented, it being un-

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88 http://www.microsoft.com/presspass/trial/may00/05–24proof.asp
89 Supposing this were true, which we do not believe given recent developments in the market for Unix-type operating systems, this would pose complex legal problems in France, because the French Constitution provides that “any property or firm the operation of which has or acquires the characteristics of a national public service or a de facto monopoly, shall be owned by the community”. In other words, the only way for a company like Microsoft to operate a de facto monopoly in France would be to place its intellectual property in the public domain, or be nationalised.

It is, however, possible that a world monopoly might ensure local income (e.g. within the United States) where the economic advantages are locally higher than the drawbacks of monopoly.
derstood that in both cases protection by copyright would be a given.

3.3.3 No patenting system: freedom to exercise as a software publisher

In an environment without a software patent, software is protected by copyright, trademark registration and the principle of unfair competition. In theory, copyright forbids non-authorised copies of software (on CD-ROMs or diskettes), or abusive use (e.g. running of software installed on a server on several terminals). Trademark registration allows selling of software under a similar name, or using misleading formulas, to be forbidden. Finally, the principle of unfair competition may be invoked in manifest cases of piracy, as when a competitor integrates the most useful functions of innovative software one or two years later, without ever contributing to its development with inventions of new functions.

The main economic players in an environment without software patents are the software publishers and IT service firms. The main characteristic of an environment without software patents is that anyone is free to sell original software that he or she has written in person. It is therefore an environment conducive to free use of inventions.

In this environment, provided that there is enough competition (see 3.4), publishers placing well-designed software comprising useful innovations on the market have one to two years before their innovations are integrated into their competitors’ products. This time lag is what is needed for competitors to integrate know-how that is not present in their own products. During this time, the most innovative publishers can conquer market shares and the less innovative ones will probably lose shares. Publishers having gained market shares owing to an innovative product will not, however, keep their advance if they do not soon re-vamp their products with innovations. Therefore a software economy in which there are no patents will be dynamic and innovative.

It should be borne in mind that, contrary to a tangible good like a car, software does not wear out. The functions it offers at first are the same as those it offers after several years. Therefore a publisher has no chance of selling another copy of his software to the same person if he does not equip it with useful new functions. Software publishers are therefore obliged to innovate constantly if they are to survive.

In this software economy, IT service companies supply specific developments downstream of the publishers, or can act upstream of the publishers as suppliers of R&D services. IT researchers in research centres may supply an R&D service to a software publisher under research contracts, or themselves become software publishers by creating their own company to make money from their research.

90 Here, we consider that the terms author and publisher are equivalent from an economic point of view, in other words as regards economic rights.
3.3.4 With a patenting system: too much ownership kills ownership

The introduction of patenting on top of copyright induces two major effects: inventors of information processing procedures may more easily make profit from their inventions, but on the other hand, authors of original software are no longer free to publish it.

The first of these effects is the most obvious and therefore the most well-known. Patents allow researchers to obtain property rights to their inventions independently of any research contracts with publishers, and without having to develop them themselves. These rights can then be assigned to software publishers or to patent funds, thus creating a potential source of income for the researchers and their laboratories. Insofar as researchers only very rarely pay for patent applications and receive commissions once patents are commercialised, the patenting system is a distinct prospect for earning money.

The second effect is that all authors of original software would, in all probability, involuntarily infringe a software patent when they wrote or published their software. This is because a great number of information processing techniques, considered as obvious by programmers, are in fact patented without anyone, including the software patent specialists, realising it. Furthermore, in order to make software compatible with other software, patented processes are often required (see 3.4.). Standard size software comprises several thousand different processes, and major software, several tens of thousands. Due to economic and time constraints, it is not possible to check every single line of a programme to ensure that none of them infringes one of the 100 000 software patents already granted, and so original software in the American patenting system necessarily infringes other patents and its author can be sued for infringement.

Thus software authors are all in a delicate position. As the authors of software they own it under copyright law. But because they infringe software patents, they have neither the right to publish it nor the right to keep it, at least in American law. It should, here, be remembered that as regards patent infringement, good faith is not a defence. The fact that in practice it is impossible to determine the number of patents used in software without authorisation means that all software authors are placed in the position of patent infringement, even those in good faith. The software patenting system, paradoxically, results in software authors being forbidden to use their works legally, and in depriving them of their ownership when they wish to use it. In short, "too much ownership kills ownership".

However, as Bessen and Maskin have shown, patenting leads to decreased investment in R & D in the medium term in the software field. In other words, although it allows a few researcher-inventors to "win the lottery" for a short initial period, it could also, in the medium term, cut overall R & D investment and therefore the associated job. In the absence of State research facilities, the introduction of patenting in the software industry is therefore likely to lead to job losses in the privately-owned IT research sector, or forced movements into functions not connected with IT research. Only State intervention, which would be contrary to the official position of most industrial countries, would allow a level of R&D equivalent to that in a patentless software industry to be maintained.

For instance, it took almost twenty years for British Telecom's industrial property department to discover that it owned a patent on hyperlinks.
Given that patent infringement is almost a certainty, only large publishers can envisage breaking the law with impunity. To publish software knowing full well that it is probably in multiple infringement of patents is not a great financial risk for large publishers, first of all because they exchange their patents between themselves via cross-licensing, and secondly because it is not worthwhile for patent funds to attack the large publishers too aggressively, since the latter have sufficient legal weight to sue for rescission of a majority of the funds’ patents, a considerable percentage of which, as we have seen, were potentially of no value in the event of litigation. As for small publishers, statistically they have not the slightest chance of gaining any advantage from suing a large publisher for patent infringement, since the latter owns more patents than the former.

It is therefore possible to say that introduction of patenting into the software economy has no particular effect on large publishers, but that the end result for smaller ones is that they cannot freely put their software to work. When it is seen that many innovations are made by small software publishers, and that the software patenting system is intrinsically disadvantageous for them, there are legitimate grounds for arguing the inefficacy of the software patent in developing innovation.

In France, the Minister of Culture and Communication is highly aware of the concerns raised by introduction of patenting into the software economy. In July 2000 she said:

The proof of this is the issue of non-patentability of software falling within the scope of intellectual property rights. In Europe, these rights and the protection they offer have proved to be legitimate and effective. However, intellectual works, ideas, mathematical formulae, software codes, or new formal expressions cannot be patented without first ensuring that the source of creation will not dry up.

If they change categories this might lead to the reverse of what we seek to obtain for our culture. We seek cultural diversity, exchanges of cultures, and creation. A detailed analysis of the economic and intellectual impacts of this change in intellectual property rights would be most precious in this regard.


3.3.5 Other economic analyses of innovation

Professor Hal Varian, the author of the best-seller "Information Rules"93, said, in a speech given on Tuesday September 14 1999 at the Club de l’Arche in Paris94, that he hoped Europe would not take the absurd route that the United States had in the field of software patents. He noted that in the area of information technology, the positive effects of networks already gave an automatic, temporary monopoly to the inventors who had been the first to put their ideas into practice, following the principle of first mover takes all. Thus, the introduction of patenting as a kind of reward in fact of—
fered no real incentive. The negative effects of the system, on the other hand, would be felt with no gain to society in return.

The view of Robert Hunt\textsuperscript{95}, an economist in the Research Center of the Federal Reserve Bank in Philadelphia, was that if the level of inventiveness required for granting of a patent were to fall, it would be detrimental to sectors where there was fast innovation. Mr. Hunt’s article begins by showing that if more patents are granted, the value of each is diluted. It then remains to be discovered whether the fact of granting a large number of low-value patents leads to more innovation than a small number of high-value patents, or less. The complex economic model built by Mr Hunt arrives at the conclusion that extension of the patenting system by lowering the standard of inventiveness required may lead to lower R & D investment in fast innovation sectors. Mr. Hunt therefore does not believe that the considerable investment in the e-commerce sector is due to the policy of lowered standards of inventiveness implemented by the USPTO\textsuperscript{96} since the early nineteen-eighties for the purpose of increasing the number of patents. On the contrary, he believes that, judging from the few empirical studies made in the United States, such a policy could be dangerous for innovation.

In the view of the author of this report, introduction of patenting into an economy structurally subject to recurrent concentrations will lead to patent licences being sold at knockdown prices\textsuperscript{97}. The rules of the market are such that the biggest publisher will get the exclusive licences at a price the second largest publisher is prepared to pay. If, after successive concentrations (e.g. Microsoft and the Adobe office applications, and graphic applications), the second largest publisher is too small to have the means for acquiring an exclusive licence, the price will equal, at most, the larger publisher’s internal R & D costs for equivalent technology, possibly compensated for by the time-saving factor. But the time-saving factor usually does not operate because the large publisher can maintain its dominant position whatever the order in which it integrates innovations in its products. There is then truly a market with knock-down prices, mostly cost prices, which means that R & D investment in software is not attractive and the rate of innovation falls.

3.4 Software competition

The history of software is that of a series of dominant positions or virtual monopolies: the big names such as IBM, Microsoft, CISCO, etc. occupy or have occupied over 80% of the world mar-


ket. Over this period, micro-enterprises, more like cottage industries than structured organisations, managed to grow and threaten the dominant players, even joining them in some cases: Microsoft was first a micro-enterprise before becoming a powerful multinational; the first version of the Linux core was written by a single individual before being taken over and integrated into its OS/390 mainframes by IBM, and becoming the market standard for e-commerce, to the chagrin of Microsoft; and StarOffice was developed ten years ago by three German developers before becoming the temporary office standard in the German banking sector, then the only potential competitor of Microsoft Office and finally the property of Sun Microsystems.

The fact that it is possible for a few individuals to write complex software together, sell it at low cost (e.g. 100) over the Internet, and procure a comfortable source of income from the global market to fund company growth, is one of the most astonishing features of the software economy. This feature is found in no industry of tangible goods, since the physical constraints involved in production and distribution require both a higher level of R&D and considerable commercial investment to reach the global market.

Although there is virtually no "packaged" software publisher of any size in Europe, there are plenty of small, independent publishers. The table below shows a few examples of these.

Table 2. Examples of small European publishers which are global leaders in their fields:

<table>
<thead>
<tr>
<th>Company</th>
<th>Web</th>
<th>Field</th>
<th>Country of origin</th>
<th>Main competitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-Secure</td>
<td><a href="http://www.f-secure.com">www.f-secure.com</a></td>
<td>Anti-virus, encrypting and security</td>
<td>Finland</td>
<td>Network Associates</td>
</tr>
<tr>
<td>Netpresenter</td>
<td><a href="http://www.netpresenter.nl">www.netpresenter.nl</a></td>
<td>Inventor of “push” on the Internet</td>
<td>Netherlands</td>
<td></td>
</tr>
<tr>
<td>4D</td>
<td><a href="http://www.4d.com">www.4d.com</a></td>
<td>Data base and rapid development</td>
<td>France</td>
<td>Microsoft (Access)</td>
</tr>
<tr>
<td>MySQL</td>
<td><a href="http://www.mysql.com">www.mysql.com</a></td>
<td>Data bases for the Internet</td>
<td>Sweden</td>
<td>Microsoft (MS SQL)</td>
</tr>
<tr>
<td>FrontBase</td>
<td><a href="http://www.frontbase.com">www.frontbase.com</a></td>
<td>High-performance data bases</td>
<td>Denmark</td>
<td>Oracle</td>
</tr>
<tr>
<td>Systran</td>
<td><a href="http://www.systransoft.com">www.systransoft.com</a></td>
<td>Automated translation</td>
<td>France</td>
<td>Lernout &amp; Hauspie</td>
</tr>
<tr>
<td>Emagic</td>
<td><a href="http://www.emagic.de">www.emagic.de</a></td>
<td>Musical IT</td>
<td>Germany</td>
<td>Steinberg</td>
</tr>
<tr>
<td>Steinberg</td>
<td><a href="http://www.steinberg.de">www.steinberg.de</a></td>
<td>Musical IT</td>
<td>Germany</td>
<td>Emagic</td>
</tr>
<tr>
<td>Native Instruments</td>
<td><a href="http://www.native-instruments.de">www.native-instruments.de</a></td>
<td>Virtual musical instruments</td>
<td>Germany</td>
<td>Yamaha</td>
</tr>
<tr>
<td>Maxon</td>
<td><a href="http://www.maxon.de">www.maxon.de</a></td>
<td>3D synthesised image</td>
<td>Germany</td>
<td>SoftImage</td>
</tr>
<tr>
<td>Blender</td>
<td><a href="http://www.blender.nl">www.blender.nl</a></td>
<td>3D synthesised image</td>
<td>Netherlands</td>
<td></td>
</tr>
</tbody>
</table>

Some of these publishers are in competition with very powerful companies which are not always software publishers. The case of Native Instruments is one of the most interesting. This company produces software for simulating analogue and digital circuits for processing sound. With this software it is possible to simulate electronic musical instruments, more particularly, those of the Japa-
nese giant Yamaha (e.g. the DX7 or Prophet 5). The software also allows new, particularly original electronic musical instruments to be created. It is a major innovation for musicians, and, at the same time, it constitutes a threat to Yamaha, which could see the market in tangible electronic musical instruments in which it is global leader (e.g. synthesisers and rhythm boxes) slowly give ground to virtual electronic instruments simulated simply by a computer. Indeed, the Native Instruments software is so powerful that Yamaha, which generally distributes all musical IT software in its sales network in Japan, seems to have chosen not to sell that of the German micro-enterprise. Moreover, Yamaha, which owns a large portfolio of software patents on digital techniques for signal processing (FM synthesis, synthesis by physical models) is reputed to use its patents aggressively, to cut out any form of competition which might jeopardise its leadership.

The case of musical IT could seem insignificant if, in many cases, the developments in this field did not prefigure, in many cases, those in the multimedia, electronics and telecommunications industries. Many products such as VCRs, telephone exchanges or routers are, or will increasingly be, replaced by generic computers running suitable software and dressed up attractively. This means, therefore, that just as Native Instruments threatens the business model of a giant such as Yamaha, micro-enterprises publishing software could threaten the business models of electronics giants such as Siemens, Lucent, Thomson Multimedia, Cisco, Alcatel etc.

To combat this threat, patenting offers these large groups three effective strategies against competition: it hinders interoperability, limits Internet dissemination, and places small publishers at the risk of patent infringement. But these strategies are not always in the general interest, insofar as they slow down the mechanisms of "destruction which creates value" proper to the most dynamic economies.

3.4.1 Interfaces: the Key to Competition

Interfaces are the key to healthy competition in information technology.

The principle of interoperability set forth in the 1991 Directive on software\(^{99}\) is a basic principle of competition law. It is probably the strongest and most judicious provision of this Directive. It has inspired many countries and often been copied. It provides that "only the expression of a computer programme shall be protected, and the ideas and principles which serve as a basis for the various parts of a programme, including those serving as a basis for its interfaces, shall not be protected by copyright under this Directive". It further provides that "the authorisation [for decompiling] of the copyright holder is not required where reproduction of the code or translation of the

\(^{99}\) Strategies to strangle competition and create oligopolies allow value to be concentrated within a limited area over a determined period of time, with effects of apprenticeship and critical size which, initially can be positive. This is why "destruction that creates value" with its short cycle is not always the optimum strategy in terms of general interest.

form of this code under Article 4 a) and b) [of the Directive] is indispensable in order to obtain the
information needed for a computer programme created independently to work with other pro−
grамmes [interoperability]"

This principle is doubly jeopardised today in Europe. First of all, by the pressure on the Euro−
pean Commission to ensure that the principle is interpreted in its narrowest sense. Thus, for Micro−
soft, it would be enough to display a Windows application on a distant Linux terminal for the prin−
ciple of interoperability to be verified. And yet, defining an interface as "the parts of a programme
which ensure interconnection and interaction between the parts of software and hardware to allow
full working of all the soft and hard ware with other soft and hardware and with users", the 1991
Directive on software must be interpreted as a right for developers of operating systems to be able
to guarantee harmonious integration of Windows 2000 with other operating systems. More espe−
cially, where Microsoft deliberately fails to respect standards or refuse to ensure this harmonious
integration, the "principle of interoperability" provided in the 1991 Directive should be construed
as meaning the right to decompile.

Secondly, the principle of interoperability is challenged by patenting. Thomson Multimédia, for
example, considers that writing software compatible with standard MP3 requires its prior authori−
sation, because of the patents it owns or commercialises. This position could be interpreted in
Europe as a challenge to the principle of interoperability; it is therefore not clear whether it is legal.
On the other hand, it is in the United States, where the right to interoperability is not guaranteed.
This therefore means that patents can be used in the United States to prevent the compatibility of
software with other software, as seen earlier (3.3.1) with the case of the ASF standard or the tech−
nical prohibition to make private copies of digital works in Chapter 1. Yet everyone knows that
when a challenger’s software cannot use the data in the standard software on the market, that chal−
lenger’s software tends to disappear101.

Lack of compatibility between software is clearly the main cause for the rise of dominant market
positions and monopolies in the software economy. The patenting system as it is practised in the
United States obviously reinforces these obstacles to fair competition, including between large
companies (e.g. Apple, Microsoft and multimedia), to the detriment of the consumer. For this rea−
son, for the avoidance of ambiguity, four members of the French Parliament, Jean−Yves Le Déaut,
Christian Paul, Pierre Cohen and Patrick Bloche) introduced a bill102 providing for reinforced con−
sumer freedom and security and improved competition in the information society. This bill intro−
duces the principle of a "right to compatibility" which would prevail over any other existing (trade−
marks) or future (software patenting) property right.

101 Thus, when the French Secretariat of State for Industry was integrated into the Ministry of Economy and Finance,
the decision was taken to replace the WordPerfect office package by the Microsoft Office software due to the
problems of compatibility between the two products.
102 http://www.osslaw.org/articles.html
All natural or legal entities shall have the right to develop, publish and use original software compatible with the communication standards of any other software.

3.4.2 Diversified dissemination methods

The introduction of patenting into software has negative effects on the methods of disseminating such software if patents are granted in which the claims are for "programmes written on an information support". Where the term "programme" is used in patent claims, publication, copy and dissemination of software on an information support (diskette, CD-ROM, Internet, paper etc.) without authorisation are likely to constitute infringements of that patent. Each copy of shareware or freeware disseminated via a magazine CD-ROM or an Internet site would then be potentially in infringement of a patent, including when the copy is not used.

Patent holders can, in this case, control the methods of disseminating their software by their licensing policy, if they so wish. If they does not wish it to be disseminated in the form of shareware, all they have to do is demand payment of rights for each copy disseminated, whether used or not. Authors of shareware, who are only remunerated for copies effectively used, cannot accept a licence like this because it would mean that they would have to pay rights for copies of their software that would not bring in any profit. They are thus obliged to abandon dissemination via shareware and return to a more traditional method of dissemination.

Now, dissemination in the form of "try and buy" shareware is often the preferred method of small publishers, especially European ones, to gain customers’ trust, especially in the United States, before selling them their products. Patenting, by discriminating between dissemination via shareware and retailing of software on CD-ROMs, reduces competition, to the detriment of small publishers and the consumer.

However, if the term "process" is used in the claims and not the word "program", then programs written on information supports constitute, at most, merely the means by which to infringe a patent. It would probably be logical to exclude from the scope of infringement programs written on information supports, in order to avoid discrepancies between copyright and patent rights, which would mean that programs published on paper or Internet servers located in countries not covered by the patent would be encouraged.
Patenting could also be used to forbid the publication of free software in the form of source codes, including when the latter clearly mention the necessity of acquiring a licence for any commercial use (e.g. the case of SSH with the RSA patented process). As far as we know, this has not yet occurred since patent holders only forbid publication of software in binary form (e.g. the case of Thomson Multimédia for an MP3 coder developed in Sweden), or content themselves with obliging authors to include various details in the source code or on the Website to remind users that they need to acquire patent licences in some countries. However, this is probably a temporary situation if patenting is to spread as it has in the United States. In this regard it should be noted that the source code, free publication of which in a printed work is no doubt protected by the First Amendment to the US Constitution, does not, a priori, benefit from such protection in Europe.

3.4.3 Increasing concentration, legal vulnerability of small publishers

The result of placing obstacles in the way of interoperability and discriminating against certain types of dissemination, both inevitably entailed by a software patenting system, is an economic environment disadvantaging small publishers and independent authors, and favouring concentration and vested interests. However, these are not the only enemies of free competition. The fact that all software publishers are de facto patent infringers also disadvantages small publishers vis-à-vis large ones because the latter can better defend themselves in the courts.

The competition-discouraging effects of patenting are far more severe in the cases of software, intangible services and complex intangible systems. They are much worse than the already known disincentives to competition which have been accepted by society as being the price to pay for increased innovation. They are also more severe than the effects observed in industries with tangible complex systems (e.g. the car industry or micro-electronics), since in these industries, the competition is almost exclusively between very large companies because of the considerable investments needed to industrialise an invention.

Any economist who considers that competition in a free market is an essential factor in economic growth should investigate the effects of software patenting as practised in the United States, and seek forms of protection for inventions that respect competition more. They should also seek an economic environment which would allow companies to do business in software publishing. Finally, the effects of patenting policy on employment and the effects of dependence on virtual monopolies should also be taken into account.

3.5 Other difficulties

The software patenting system gives rise to other negative effects which are described below.
3.5.1 Hasty examination procedures

The examination procedure for patent applications normally consists of checking the originality and inventiveness of an invention. However, according to one of the only statistical studies, 90% of software patents granted in the United States (probably 80% in Europe), appear to be invalid either because they are not new, or because they are not inventive. This means that rights with no real technological value are distributed at great cost. However, they impress judges and small or medium sized businesses sufficiently to allow the deployment of legal terrorist tactics. Thus the Grenoble company Getris was the defendant in an American lawsuit against its graphic software. Because it could not afford the legal fees, it was obliged to change its shareholder. Sued on the same patent, Adobe’s lawyers were able to prove that the patent was null and void because it was not new: the technique described was identical to that used in prehistoric cave paintings.

The abundance of software patents of no real value is due to a system which encourages the granting of rights without checking abuses:

- startups seek to obtain a maximum number of patents (in the United States they talk of "patents by weight" even if it means filing several patent applications for the various versions of the same invention);
- investment funds demand patents to "guarantee" that they are investing in startups that have real technological value, but they do not make proper checks on the true content of such patents;
- the Patent Offices, which earn money from each patent they grant but lose money with every refusal, increasingly economise on examinations of patents;
- it is not in the interest of examiners to slow the productivity targets set by their Patent Offices. Moreover, if they reject a patent application filed by a large company or by a reputable patent agent, they risk losing potential employers if ever they apply for jobs there.

These arguments apply to the American Patent Office but only in part to the European Patent Office. However, they do not apply in France, because the Institut National de la Propriété Industrielle (INPI, French Patent Office) only makes formal assessments of patent applications filed in France, and is not responsible for examination of the content. We shall see in Chapter 4 that the French policy of not examining the content could prove to be both pragmatic and efficient if there were a sui generis right to protect intangible inventions.

104 PATENT EXAMINATION SYSTEM IS INTELLECTUALLY CORRUPT, Greg Aharonian – http://www.bustpatents.com/corrupt.htm
105 This case was quoted by Bernard Lang, director of research at INRIA, the French National Computer Science Research Institute, in a mailing list. See http://liberte.aful.org/pipermail/membres/2000-April.txt
3.5.2 The law does not work

The French doctrine of not assessing the content of patent applications is particularly pragmatic, and usually effective. In the case of independent elementary systems, it is not possible to attack an invention of great value by means of a patent with little value. Patents with little value thus have a low nuisance value.

However, in the case of complex systems, particularly that of software, where implementation of a major innovation requires the use of many minor innovations, it is possible to attack this major invention with a patent of little value, and with no connection to it. In these cases valueless patents have high nuisance value. The French doctrine of not examining the content of patent applications, which is equivalent to the current American practice, leads to contamination of valuable patents by a large number of patents of uncertain value. Publishers are therefore placed at great risk of infringing a valid patent, of being sued in terrorist lawsuits based on a theoretically valueless patent, of owning a patent that is impossible to use in their defence should they be sued, etc. In this sense, the software patenting system becomes virtually impossible to operate since it means that all software publishers are potentially infringing patents, while inventors are not protected.

The situation calls for overhaul of the methods by which patent rights could be extended to software so that the law can truly be an operational model for society. As Professor Thurow pointed out, "Laws on intellectual property rights must be enforceable or they should not be laws".  

3.5.3 Patents on e-commerce are not in compliance with WTO rules

There is no technical difference between a "software patent" and a "patent on a digital service". Since some digital services concern e-commerce and distribution of goods, it is worthwhile examining whether an extension of patent rights to software would comply with WTO agreements. These agreements include clauses limiting the right to assign monopolies in the framework of commercial activity. Granting of an e-commerce software patent on a commercial or business method could be construed as a monopoly in the framework of commercial activity, and could therefore be in non-compliance with these agreements.

3.5.4 Conformity with some provisions of EU law

Any Directive on software patenting must follow the provisions of the Treaties of Rome, Maastricht and Amsterdam on security, consumer protection, culture, industry and competition (deal
Consumer security and protection

Any draft Directive on harmonisation must take account of the constraints provided in Article 95 of the Treaty of Rome:

"In its proposals as provided in the foregoing paragraph 1 in respect of health, security, environmental protection and consumer protection, the Commission shall take as its basis a high level of protection taking note more especially of any new development based on scientific facts. To the extent that their respective duties require, the European Parliament and the Council shall also endeavour to attain this goal".

As observed earlier (3.2), the introduction of patenting in software has resulted in increased source code secrecy. Such secrecy is regressive in terms of security, since only publication of source codes guarantees that there will be no security loopholes. This effect does not contribute to the protection of the consumer, since it also hinders software interoperability and encourages tactics such as building in programmed obsolescence of products. Furthermore, the consumer’s choice is restricted, since patenting deters competition. Finally, the internal cost of patenting causes companies to increase their prices, estimated at some 30%, to the final user\textsuperscript{108}.

Culture and Diversity

Similarly, the European Commission must ensure that its draft Directives on software patenting are in conformity with Article 151 of the Treaty of Rome:

"The purpose of EU action is to encourage co-operation between member States and, where necessary, to support and complete their action in the following fields: improved knowledge and distribution of the culture and history of European peoples; conservation and safeguarding of the cultural heritage of European significance; cultural, non-commercial exchanges; and artistic and literary creation, including in the audiovisual sector.

The EU takes account of cultural aspects in its action in conformity with other provisions in this Treaty, more especially for the purpose of respecting and promoting cultural diversity".

Patents on techniques for the dissemination of culture could first lead to changes in the conditions of access to culture (see paragraph 1.1.4) by, for instance, encouraging market control by

\textsuperscript{108} This approximate value was given by Adobe (http://lpf.ai.mit.edu/Patents/testimony/statements/adobe.testimony.html), and is deduced from information on the World Wide Web Consortium according to which litigation on patents costs approximately one lawyer for two development engineers. Furthermore, the vulnerability to viruses (e.g. I love you) or bugs (Y2K bug) of "closed" proprietary software holding virtual monopolies showed users how costly and insecure they actually are. "Open" software, whether proprietary or free, offer fewer drawbacks in this respect. Now, it was seen earlier that patenting in the software economy discouraged both competition in software publishing, and disclosure of software source codes.
large publishers, or blocking the exercise of the right to keep public records. We must therefore ensure that patenting of the technological standards for dissemination or for archiving of cultural heritage does not exclude small disseminators of content from the market. This sort of situation would be contrary to the aims of promoting cultural diversity and non-commercial cultural exchanges. It should also be ensured that patenting of these standards does not prevent us from preserving national heritage. It might, for example, be judicious to reinforce the principle according to which cultural interfaces must not be protected, as provided in the 1991 Directive on software, to avoid the raising of new obstacles to dissemination and preservation of cultural content.

Furthermore, if it is considered that software is also a form of cultural creation, the Commission should not encourage proposals which would limit the quantity of software created in Europe. This is more particularly the case of freeware and shareware which are an important source of diversity and innovation in the software industry, and which should be shielded.

**Industry and Research**

According to the Treaty of Rome, the Commission must encourage innovation and competition through its proposals for Directives. Article 157 provides that:

"The Community and member States shall ensure that the conditions necessary for competition in EU industry is fostered. For this purpose, in conformity with a system of open, competitive markets, their action shall be:

a) acceleration of industrial adaptation to structural changes;

b) encouragement of an environment conducive to initiative and development of all companies throughout the EU, more especially that of small and medium sized businesses;

c) encouragement of an environment conducive to cooperation between companies;

d) fostering enhanced use of the industrial potential of technological innovation, research and development policies."

As can be observed from sections 3.2, 3.3 and 3.4, a patenting system as practised in the United States is not in compliance with the last three of these goals.

If, as R. G. Schwartzenberg, the French Minister for Research, requests, France must become a society of innovation like the other great nations, it needs an active industrial property policy. At European level, this policy must protect employment and foster competition between companies. Transposition of the patenting system as practised in the United States for software would be an easy solution, but it does not appear that it would provide Europe with a suitable vehicle by which to promote growth of innovation and move towards a dynamic, independent information society.

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IN SHORT - A “software patent” is not a patent on innovative software but a patent on an innovative procedure for processing information. This means that a software patent may be obtained without writing a single line of a programme or being the author of any software whatever. Conversely, the holder of such a patent can sue any software author publishing software likely to reproduce the patented procedure by running it on a computer, for patent infringement. In the United States, software patents afford protection on top of that provided by copyright. Therefore, to assess the effects of a software patent is to compare a situation in which software is protected by copyright alone, with one in which the software sector is doubly protected by copyright and patenting. The software patent covers a very wide field: programming techniques, financial and business methods, corporate management methods, e-commerce methods, educational methods etc. The scope is vast because a patent can be obtained on a method of processing the information required to reproduce an intellectual method. It has been possible to patent all intellectual methods combining operations implemented by software with operations carried out by man for a number of years in the United States, and, more recently, in Europe, but to a lesser degree. The effects of patenting on dissemination of technical knowledge are on the whole negative. The fact that software patents exist has led to software source codes being kept secret, despite the fact that the source code is the very essence of practical technical knowledge in software. Moreover, there is nothing to counterbalance this negative effect: the content of the software patent data base is of very low value since the knowledge contained in the software patents is almost always nil (90% of the software patents granted in the United States are reportedly neither new nor inventive) or un-usable (due to part-secrecy tactics). The effects of patenting on innovation are also negative on the whole, as demonstrated by the model of Bessen and Maskin on sequential innovation. The statistics on software R & D in the United States also show that patenting is a counter-incentive to software innovation. This is quite simply because the freedom to integrate functions of one piece of software in another and vice-versa is the key to innovation in software. Furthermore, introducing patenting into software would statistically place all authors and publishers of software in the position of involuntarily infringing patents, with the attendant threat of lawsuits that could be fatal to smaller publishers, including innovative ones. The effects of patenting on competition are on the whole negative since they tend to block interoperability between software. It is known that interoperability is the key to competition in the software sector, as recognised by the 1991 EU Directive on software. Patenting of software also results in other potential negative effects, in contradiction with the goals set forth in EU law, viz. cultural diversity, security, consumer protection, and stimulated business creation.
What industrial protection for the information society?

There are many positive aspects to extending patent protection of inventions to software or business methods. Without it, for example, inventors of computer-implemented techniques or digital services might see them "stolen" when they approach investment funds, which might prefer to "give" the inventions to one of their start-up companies rather than working with the inventors. Extending patent protection to software could also answer the need of financial circles to have at their disposal tools enabling them to assess the intangible assets of information society companies. Finally, patenting is in general a very practical means by which to evaluate public research or to publicise an innovation.

Unfortunately, as shown in the preceding chapter, patenting software generates many harmful effects, often contrary to the original objectives: to foster the sharing of knowledge and stimulate innovation. Several independent economic studies seem to show that, when patenting was extended to software and digital services in the United States, it led to a reduction in innovation, competition, the sharing of knowledge, and free enterprise.

What position should be adopted in view of these harmful effects? Three courses of action can be envisaged:

1. not protecting intangible inventions on the grounds that they should follow a non-restrictive course, as in the case of ideas;
2. protecting intangible inventions via a limited-privilege patenting system with a view to restricting the ownership abuse observed in the United States;
3. opting for a sui generis right specific to intangible inventions, offering protection that is immediate but short-term, so as to avoid the medium-term harmful effects of patenting whilst benefiting from its short-term positive effects.

This problem is indeed a general one, due to the absence of property rights on ideas, be they technical or commercial, like many improperly filed software patents in the United States, or artistic as is the case in the entire creation industry.
In this chapter the merits of each of these approaches are studied, leaving aside the legal situation prevailing in Europe or in the United States. Needless to say, with each approach, software is also protected via copyright, and trademark and database rights, as well as the principle of unfair competition. Obviously, it is not a question of replacing software copyright by something else, but of deciding on the appropriateness of adding another form of protection to those already in existence.

4.1 Model 0: guaranteeing freedom of application via a non-restrictive course

The non-restrictive economic model was studied in chapter 3. It was the dominant model for the software industry in the United States in the 1970s and 1980s. It was also the model for most software successes in Europe in the early 1990s.

In this model, software is protected by a combination of copyright, trademark law, and secrecy, as well as via the notion of unfair competition. The primary source of innovation is software publishers, because a publisher who did not innovate would not be able to sell software "again" to someone already using that software, and would see company turnover decline to zero in the medium-term.

The non-restrictive economic model offers implicit protection of software-based inventions via secrecy or the difficulty of rapidly imitating a function. Depending on the level of difficulty, and taking into account development and publication structural delays, a software publisher developing a software invention could hope for automatic protection for two to four years before competitors incorporate the invention into their own software. This protection can be more significant in the case of difficult optimisation methods. Thus, for some time, the French company Ilog based industrial protection of its technological edge on secrecy, and has yet to be matched in the field of optimisation. Further, binary code encryption techniques can slow down access to industrial secrecy via decompiling. While decompiling is legally limited to interoperability, it is technically possible in all cases, including that of marked binary code encryption\(^{111}\), which guarantees, in case of absolute necessity, the possibility of discovering the industrial secret of software for which the publisher has completely disappeared.

The non-restrictive model provides a reasonable balance between protection of inventions, respect of competition, consumer protection and sharing of knowledge. Its main advantage is that it fosters free enterprise by guaranteeing freedom of commercial use of original software. Its main

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\(^{111}\) All that is needed is to execute the binary code in an emulator and to carry out on-the-fly decompiling of memory images of the code stored in a form which cannot be enciphered when the processor emulated does not have instruction enciphering equipment, which is the case in practice. Needless to say, processors in future could have code enciphering equipment to prevent the development of emulators.
drawback is that it forces information technology research workers and inventors to become software authors in order to enhance their computer science inventions. However, this drawback can be perceived as an advantage in that it tends to reward only the most enterprising inventors.

For Professors Betten and Maskin, the non-restrictive model (i.e. protection via copyright) is close to an economic ideal because it protects investment without prohibiting imitation. But lately this model has been encountering various difficulties. First, many public leaders intuitively feel that the absence of patenting in the software economy is harmful to innovation, although the facts and statistics point to the contrary in the United States. Moreover, recent changes in the manner in which software is marketed could alter the economic foundations of the non-restrictive model. Unlike the publication of software on physical supports (floppy disk, CD-ROM, etc.), the marketing of software over the Internet, in the form of Web or application rental services, ensures an ongoing revenue source without, for all that, being an obligation on the part of the publisher to continually innovate. One of the springboards of innovation in the software economy could thus disappear; there would then remain only the free play of competition to force software publishers to justify higher charges by innovative endeavours. These recent changes associated with the emergence of e-commerce over the Internet necessarily raise questions about ways of enhancing competition and stimulating innovation.

4.2 Model 1: using limited-privilege patenting

As demonstrated in chapter 3, the harmful effects of patenting software are associated with the privileges granted via this title. To reduce or modify these privileges within a software patenting system could allow these harmful effects to be reduced. For example, granting a 20-year monopoly on a computer-implemented invention could seem totally inconsistent with the very short lifetimes of information technologies or the intangible services industry. Reducing the period of patent protection to a few years could be envisaged in the case of software and intangible services. Were software patents to be granted for a 20-year period, pursuant to the TRIPs Agreement, and also to be protected by copyright, the problem would be to ensure that these patents did not lastingly curb innovation, and reduce competition, and that they were not applied for in excessive numbers ("patent by weight"). This raises several issues with respect to software and intangible services:

- ensuring that small publishers are not discouraged by the increased legal risks associated with the introduction of patents;
- ensuring that large publishers do not exploit patents to discriminate against small publishers;
- ensuring that patents do not threaten interoperability;
- ensuring that patents do not interfere with the dissemination of freeware and shareware;
Model 1: using limited-privilege patenting

- ensuring that patents do not interfere with the development of software covered by a copyright licence that allows free dissemination and free adaptation (free software);
- ensuring that socially useless patents (patents on obvious inventions or on inventions of little use) are not filed;
- ensuring that the patenting system does not encourage publishers not to publish the software source code.

In the "Software Useright"\textsuperscript{112} model, the author proposed a two-step solution to these issues:

- to guarantee the availability of any information processing method within the framework of fair and non-discriminatory licensing, like that existing in the field of "standards"\textsuperscript{113};
- to define software patent infringement as the \textit{use} of a patented information processing method, rather than as the \textit{reproduction} of software.

4.2.1 Automatic, uniform and non-discriminatory licensing

The factors stifling innovation and restricting competition could be removed by incorporating all computer-implemented inventions into norms (or effective standards) for which licences, at uniform and non-discriminatory fees, would be granted automatically\textsuperscript{114}. The technical implementation of such an approach raises no special problems, and could even lead to reorganisation of patent filing, search and licensing procedures, based on open standards and controlled by Patent Offices, with the participation of industrial property professionals. It would also be an opportunity for Europe to demonstrate its autonomy within the framework of Patent Office computerisation projects launched by the United States within the trilateral commission on industrial property\textsuperscript{115}.

The legal basis for such an approach does not present insuperable difficulties. The 1991 Directive on software can be used as the basis for a principle of "right to compatibility". In particular, the principle of non-protection of interfaces via copyright could be extended to patent law in the form of an exclusion of any device, procedure or programme necessary for software interoperability from the scope of patent infringement. Such an exclusion would have a very positive effect on competition and innovation in the software economy by curtailing exclusive interface appropriation strategies, which lead to customer appropriation and the impossibility for innovative competitors to access the market which has thus been cornered. Moreover, such an exclusion would conform to the bill introduced by the députés Le Déaut, Paul, Cohen and Bloche, who state in declaring their intent\textsuperscript{116}:

\textsuperscript{113} Brevets et Normes, Pierre Breese – http://www.grolier.fr/cyberlexnet/COM/A970801.htm
\textsuperscript{114} There is a precedent from the 1980s. IBM had to grant fixed-price licences on its patent portfolio after an anti-trust lawsuit in the United States.
\textsuperscript{115} http://www.european-patent-office.org/tws/twsindex.htm
\textsuperscript{116} http://www.osslaw.org/motifs.html
The four disputes are also aware of the threat to individual freedoms from customer appropriation strategies. They may have in mind the case of AOL, whose assimilation policy or lawsuits against any publisher likely to disseminate widely an electronic mail system compatible with AOL seems to be aimed solely at guaranteeing AOL a world monopoly over electronic mail flows, which is disquieting to say the least.

Similarly, the legal grounding for a non-discriminatory fee policy does not present insuperable difficulties. The notion of compulsory licensing in the case of software or any complex system could be interpreted as follows: "where a computer-implemented process is not available as an elementary software component for a given application system, then a licence must be automatically granted to any applicant". Finally, the notion of "uniform and non-discriminatory fees" could follow from an interpretation of the notions of "unfair competition", or "abuse of dominant position", as well as from a comparison between the licence rates and internal amortisation of the R&D costs required to develop patented inventions.

To be effective, such an approach requires that the traditional recourse to litigation be limited as much as possible. It is in fact well known that the notion of "compulsory licence" has been drained of all meaning because of the possibility of resorting to delaying tactics. In order to move towards a degree of automation, one could therefore imagine an authority for rapid conflict resolution. Such an authority could correspond to an electronic patent licence market coupled with a built-in arbitration system. The organisation of such a market could come under the responsibility of public authorities, either as operators or via a system for authorising private operators, as is the case for regulatory bodies in other fields (telecommunications, electricity, etc.). If, for example, one opts for an authorisation system, then the operator terms of reference could be defined at European level, while the implementation of the authorisation procedure could be in the hands of national authorities.

By introducing a mechanism of this sort via the Directive on Community patents or through a Directive specific to software patenting, Europe could leap forward in the field of industrial property, all the more so as this type of market does not involve any particular technical difficulty.

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However, it must be anticipated that this type of mechanism, which could lead to a considerable increase in output from the patenting system, will encounter opposition from industrial property professionals. To be convinced of this, one needs only recall that the principal opponents to the simplifications introduced by the European Commission Community patent bill were national Patent Offices and industrial property attorneys, because of the lower costs and therefore turnover that could follow from these simplifications.

4.2.2 Defining patent infringement as the unauthorised execution of a patented computer–implemented process

We saw that, when the development or reproduction of original software could constitute patent infringement, all publishers of original software were placed de facto in a position of patent infringement. This is unacceptable, for it means legally promoting a model which is impossible to implement. That is why the patentability of software should be approached in such a way that the development or reproduction of software is not legally considered as patent infringement.

At the same time, software patent holders must be able to enjoy a form of monopoly linked to their patent. This monopoly could be a right of commercial use of the patented computer–implemented process. The commercial use of a process would be considered as effective only when "the sequence of steps characterising the process" had been calculated by the computer, that is when the programme containing a description of this sequence of steps in the form of instructions has been effectively run and used in an actual industrial application. This means excluding computer programmes from patent claims and authorising as claims only new computer–implemented processes.

Such an approach requires that users be made aware of their responsibilities in order to avoid a situation where infringement would need to be formally established user by user. Thus, software publishers would be required to authorise the execution of their programmes only after the user has guaranteed that the necessary patent licences for the user’s geographical zone have been acquired. The laws on electronic signature currently allow such approaches to be envisaged without any particular technical difficulty. Publishers who did not incorporate such a mechanism into their software would be liable for prosecution for providing means of infringement. Conversely, publishers who did incorporate such a responsibility–awareness mechanism would not be liable for prosecution for providing means of patent infringement.


120 The same result can be obtained by accepting claims on a programme provided that a process reference layout is incorporated in the description of the invention, covering all programme claims and written in a reference computer language. Insofar as the reproduction of published patent applications in not an infringement, this comes to the same as authorising the free dissemination of an invention layout in the form of a computer programme. The legal argument justifying this approach is the necessity for applicants to be able to prove clearly the effective possibility of implementing their inventions.
By thus separating the right to reproduce software and the right to use a patented computer–implemented process, two markets emerge, that of programmes and that of computer–implemented inventions, in a free–market logic which is similar to that prevailing in the electrical, aviation or telecommunications economies and which rests on independence of the commercial service from the means of access to this service. Hence, in the field of air transport, airports, which are the means of access to the aeroplane ensuring the air link, are normally managed by companies independent from the airline companies. Someone in London wishing to travel to Paris has the choice of at least two airports (Heathrow and Gatwick) and at least two airlines (Air France, British Airways, etc.) for a total of at least 4 possible combinations. In the field of electricity, the situation is more restricted with respect to means of access on account of local monopolies for the distribution of electricity, but it is wide open with respect to the choice of electricity producer. In the field of telecommunications, the situation is most often open, both at the level of local loop technology (telephone operator’s copper twisted pair, cable network, local radio loop, etc.) and at the level of the various Internet access service providers. In a liberalised telecommunications market with regulated competition, the choice of local loop supplier and that of Internet access provider is normally independent.

In the software economy, a programme recorded on an information medium can be considered as a means of access to a computer technology. For example, in order to produce an MP3 sound file from a compact disc, it is possible to use many computer programmes (e.g. Quicktime, Real Juke–Box, Blade, etc.), all of which implement the same abstract computer process, but with each implementing it in a different way specific to the author of the software. Besides, this software is more or less rapid, more or less difficult to use, etc. The acquisition and use of this software results in a double payment: first, the payment of rights to the holders of the MP3 computer process (Thomson, Fraunhofer); second, the payment of royalties to the author of the software used (Apple, Real, Tord Jansson).

In the case of MP3, the conditions of access to the technology are for the present relatively open from the point of view of the economics of competition. Nevertheless, this situation is quite rare. In the field of video compression technology, there is strong dependence between the abstract computer process and the software enabling the implementation of this process. For example, Apple acquired an exclusive licence on patents relating to "Sorenson" technology. Therefore, it is not possible to view a "Sorenson"–formatted video over the Internet with Microsoft’s "Windows Media Player" or with the software "Real Player". It is therefore necessary to install the software "Quicktime", which is available only under MacOS or Windows, to view this type of video. Conversely, Microsoft refuses to grant licences on its "ASF" video technology. Hence it is not possible to view "ASF" files with "Quicktime". It is therefore necessary to install the programme "Windows Media

121 This information is likely to have evolved.
122 http://www.advogato.org/article/101.html
Player”, of which the latest version is available only under Windows. The end result is that three equivalent programmes must be installed on a Windows computer to be able to view videos over the Internet. And if one uses another operating system, there is no software compatible with all video formats. The reasons for this lack of compatibility are not technical but legal: patent holders refuse to allow their technology to be implemented by several software authors. By analogy with air transport, this would correspond to a situation in which Air France planes would have to land at Gatwick because British Airways had obtained exclusive rights for Heathrow.

Table 3. Table 1: Separating the software market and the computer invention market

<table>
<thead>
<tr>
<th>Access vector</th>
<th>Air transport</th>
<th>Electricity</th>
<th>Telecommunications</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air transport</td>
<td>Airport (e.g. Heathrow, Gatwick)</td>
<td>Grid (e.g. EDF, Grenoble Electricity Distribution)</td>
<td>Local loop (e.g. twisted pair France Telecom, local radio loop)</td>
<td>Software (e.g. Windows Media Player, Quicktime)</td>
</tr>
<tr>
<td>Service</td>
<td>Aeroplane (e.g. British Airways, Air France)</td>
<td>Power plant (e.g. EDF, Pechiney)</td>
<td>Internet access (e.g. Wanadoo, Free, LibertySurf, etc.)</td>
<td>Computer-implemented technology (e.g. MP3, Sorenson, DVX)</td>
</tr>
</tbody>
</table>

Finally, the approach whereby the software market is separated from the computer invention market, which has just been illustrated by analogy with other economic sectors (see table above), offers the advantage of greater legal consistency. A user who implements a single computer invention via several programmes will only pay the patent holder once for the right to use the invention, but will pay royalties to each programme author. This approach is consistent with the national character of patent law, as opposed to the global character of copyright. European users of a programme downloaded from the United States will only pay licence fees for the use in Europe of a United States patented process operated by means of this programme if the programme has also been patented in Europe.

4.2.3 Extending the right to decompile, or registering the source code

According to the "Software Useright" approach, the source code is not considered to be a patent infringement. But in publishing the source code, a software publisher facilitates proof of patent infringement, whereas a publisher who keeps the source code secret prevents the search for patent infringement, because it is illegal to decompile software. To resolve this inconsistency between software patent and decompiling, which, in the United States, encourages industrial secrecy, it would be desirable to authorise decompiling for patent infringement search. In that case, a publisher would no longer be able to benefit from keeping the source code secret, as it provides evidence in the event of infringement.

Furthermore, it would be desirable to create compulsory registration of the source code with an industrial property protection body, because decompiling can be complicated to implement, particularly in the case of binary code encryption. This proposal offers many advantages for user secu—
rity if this registration is associated with a right of disclosure in the event that a publisher disappears or refuses to correct programme defects. If the compulsory registration approach were not adopted for lack of an adequate European consensus, the same result could be obtained by specifying that the reproduction of a computer programme is not a patent infringement if the source code has previously been registered or disclosed. In other words, software authors who have voluntarily registered their source code could not be sued for patent infringement since, by this voluntary registration, they have shown that they are acting in good faith. The voluntary disclosure of the source code would offer the advantage of encouraging the sharing of knowledge while granting a form of privilege to companies practising a policy of transparency.

4.2.4 Likely disappearance of inconsistencies observed in the United States

The approach described above provides a practical solution to all the drawbacks of software patenting as it exists in the United States:

- not considering software reproduction as a patent infringement avoids the situation of permanent legal risk for small publishers, while guaranteeing an income source for inventors because the use of software would be conditional upon the user acquiring licences for the patented computer processes used in the execution of the software;
- not considering software reproduction as a patent infringement and opting for a uniform fee policy for non-exclusive licences avoids the discriminatory use of patents by large publishers against small publishers;
- not including any device, process or programme necessary for interoperability in the domain of patent infringement avoids constraints on interoperability;
- not considering software reproduction as a patent infringement protects the dissemination of freeware and shareware;
- opting for a uniform fee policy for non-exclusive licences allows the use of patented processes in free software, where the copyright licence permits;
- opting for a uniform fee policy for non-exclusive licences removes all constraints from the system of software patenting and makes the filing of socially useless patents (patenting obvious or not very useful inventions) economically unprofitable;
- a principle of compulsory registration of the source code, or a principle of access to the source code in return for the programme being excluded from the scope of patent infringement, avoids the patenting system being an incentive not to publish the software source code.

4.2.5 Natural disappearance of obvious patents

Another advantage of this approach is that it eliminates the hindrances, expenditure and litigation associated with the existence of obvious patents. These patents, the value of which was solely
to be able to hinder a competitor, lose all value from the moment that, in practice, bad faith must be shown for infringement to be proved (bearing in mind that bad faith is simply the ingenious use of legal loopholes relating to the supply of infringement means). It is true that, when sued for infringement of an obvious patent, a publisher can quickly alter the software and remove the instructions associated with the patented process. If the licence fee levied by the patent holder is too high, the process can easily be bypassed, without having to worry about having supplied the means of implementing this process by publishing the programme. Therefore, it is in the interest of patent holders on inventions that are easy to bypass to cut their licensing fees.

Needless to say, compared to a scenario without software patenting, the course of action that has been developed leads to a consumer price increase, corresponding to the management costs of the patenting system, but it enables inventors of computer–implemented processes to hope for reward for their inventions without having to become computer programme authors. The price increase should be less than the 30% previously estimated because of increased competition and decreased nuisance capacity for patents of little use.

4.2.6 Avoiding trade conflict with the United States at the cost of an innovative legal approach

The scenario of limited–privilege patents just presented has the advantage of avoiding economic conflict with the United States, whose official policy is to get the rest of the world to adopt its industrial property law. Indeed, this scenario amounts to granting as many patents as in the United States, which, looking at the case law of the European Patent Office, is practically already the case, while nevertheless limiting their harmful effects as regards litigation. These proposals contravene neither the TRIPs Agreement nor the European Patent Convention. The scenario does, however, require some intellectual effort in order to explain or understand the difference between a claim on a computer–implemented process and a claim on a computer programme, and to assess the impact of this difference on potential litigation. Moreover, for the introduction of compulsory licensing at a non–discriminatory fee to be operational, new litigation regulations will need to be incorporated into intellectual property law if abuses via case law and delaying tactics are to be avoided.

From an economic point of view, these new regulations are specific to the particular constraints imposed by software and intellectual methods. The introduction of new regulations concerning compulsory licensing therefore amounts to creating an exception to the general regime of intellectual property law for software and intellectual methods. This exception being a source of legal complexity, certain lawyers would initially tend to reject it. We believe, however, that such excep—
tions are just as acceptable as those which had to be introduced to protect software via copyright or to prohibit the private copying of databases protected by copyright. They can easily be justified by the fundamentally different nature of intangible inventions as compared to tangible inventions.

4.2.7 Strengthening competition

Compared to a scenario without patents, that of limited−privilege patents does not allow improved competition since it brings no progress with respect to interoperability. Now, proper interoperability is a crucial factor in guaranteeing market newcomers the capacity to compete with existing players. That is why this scenario needs to be complemented by a policy of strengthening competition.

Such a policy can be based on developing the use of free software and promoting open communication standards which can be used by all. Indeed, the Internet has shown that free software and open standards were the best way to avoid the creation of dominant market positions at the software infrastructure level. In this field, governments have at their disposal huge recommendation powers, as reiterated by three senators (Laffitte, Cabanel and Trégouët) and four députés.

Another, complementary approach would involve amending the 1991 Directive on software with a view to making the principle of interoperability more operational. In particular, two courses of action could be envisaged: one, introducing time limits and adaptation costs to prevent the use of delaying tactics; the other, making compulsory the publication of the interfaces of software marketed without its source code.

A principle of "compulsory publication" of the interfaces could appear to some as an intolerable intrusion of the State in corporate marketing policy, insofar as this publication is deemed to be a matter of free choice for the company. Unfortunately, in a system of free choice as to the publication of the interfaces, generally nobody is interested in doing so, first, because publishing programme interfaces is expensive in documentation, and, secondly, because it is in nobody’s interest to publish his own interfaces when the competition do not publish theirs. Indeed, this would amount to helping a competitor ensure one−way compatibility, thereby increasing the competitor’s ability to attract new clients. That is why leaving interface publication to a company’s free choice in fact amounts to doing without software interfaces and to accepting an economy with little software interoperability.

4.2.8 Strengthening control mechanisms for the granting of patents

The tendency for Patent Offices to extend the field of software patentability has a structural origin (see 3.5.1), made easier by the absence, in practice, of opposing forces empowered to question

125 http://www.senat.fr/grp/rdse/page/forum/textelo.html
126 http://www.osslaw.org
case law decisions made by the Offices. The means of better control of Patent Offices are outside the scope of this report as they cover all fields of patentability. Nevertheless, it is an avenue that should be investigated because the social and economic effects of decisions by Offices often exceed those of much French legislation in intensity.

Among possible courses of action that can be envisaged to strengthen this control, we would like to put forward three approaches.

A first approach would involve strengthening the current main opposing force: that of the judges. Indeed, it is the judges who today are building up patent case law, and who determine the true value of the patents granted. If the operation of justice is to be improved, it will no doubt be necessary to extend the move towards specialised courts and judges, provided with appropriate means in terms of expertise. True independence of judges as regards Patent Offices must also be assured so as to avoid a situation, similar to that in Germany, of inter−dependence between the judicial system and the Patent Office. Public authorities can implement this approach if a high priority is given to the subject of the patentability of intangible inventions. Experience in the areas of terrorism or financial offences show that such a course of action can be envisaged in practice.

A second approach would involve setting up a controlling body for national and European Patent Offices, the function of which would be to identify abusive patents or case law decisions inconsistent with the spirit of the law. Such a body could be based on the approaches used by Christian Paul in the field of Internet co−regulation, or on the principle of independent "producers" and "regulators", which was thoroughly investigated in the areas of nuclear control or industrial environment. Thus, a patent "producing" body such as the INPI (the French Patent Office) should not normally be given the responsibility to negotiate France’s position in international bodies dealing with patent "regulation", although today the INPI has at its disposal unrivalled legal know−how in the field of industrial property.

A third approach, one that is economically appealing but probably difficult to implement in France, would involve considering that the production of too many patents of little use gives rise to a form of "economic pollution". By analogy with theories developed in environmental economics, mechanisms of the "polluter−pays" type could be used to make players aware of their responsibilities by incorporating into their remuneration a negative factor corresponding to patents of little value that they produced. This would amount to handling the problem of abusive patents by using economic mechanisms rather than administrative ones. However, this type of approach is probably

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127 The European trend towards specialised tribunals does not necessarily imply geographical centralisation, contrary to what is suggested in the regulatory proposal for a Community patent adopted by the Commission in July 2000. For the non−criminal part of litigation, it is, for example, possible to imagine a system of courts located in each member State, each with its own staff coming from several member States, with appeal and coordination authorities made available at Community level.


129 Economie de la pollution transfrontière. OECD 1976.
inconsistent with legal or administrative doctrine in France.

4.3 Model 2: the creation of a *sui generis* right for the protection of intellectual methods

Inventions in the field of software or digital services are most often of the same nature as inventions of intellectual methods. To be convinced of this, it is sufficient to note that the sequence of instructions carried out by a computer when it reads a programme on a hard disk could equally be performed, though more slowly, by a person reading the same programme on paper and mentally executing the instructions while keeping the intermediate results on pieces of paper. Indeed, this analogy is not at all theoretical: the invention of the atomic bomb during the Second World War was successful only thanks to the armies of technicians, true "living computers" gathered in massive halls, who carried out the simulations with slide rules, according to a programme established by scientists.

Moreover, an invention such as "one click", which involves a Web site remembering a customer’s delivery address, is very similar in nature to the practice of a good retailer, who, when asked to send an order, starts by asking "shall I send it to the same address as last time?" As for inventions of auction techniques over the Internet, are they not too of the same nature as the invention of the auction "à la bougie" (real estate limited-time auction)?

Therefore, the solution to protecting software-based inventions on the basis of a historical logic would be to bring together:

1. the traditional industrial approach, which sees computer programmes as a simple extension of mechanical systems, and which cannot understand why computer programmes should not be patentable when mechanical systems are;

2. the scientific tradition, which sees in computer programmes a strict equivalent to mathematics\(^{130}\), and which cannot understand how computer programmes could be patentable when mathematics is not;

3. the tradition of retailers and intangible services companies, who see computer programmes as a tool to automate their practical experience, and for whom patents have no historical legitimacy.

The approach of the 1970s, which was based on copyright and which favoured only the historical logic of scientists and retailers, is the most justified from a strictly economic point of view. Protecting software via copyright guarantees software authors protection of their investment. Conversely, the absence of invention protection allows authors to incorporate functions from other

software into their own software, thereby guaranteeing that competition or innovation is unhindered. This absence of invention protection allows parasite tactics to be avoided; these include secretly appropriating a good function, which can be described as "a technical solution to a technical problem", and then waiting for someone else to invest in the development of software incorporating this function before starting a lawsuit and turning to his own benefit someone else’s investment profits. Finally, although there is no formal protection for software-based inventions in a copyright system, some informal protection is provided by the occasionally extremely long times necessary for the transmission of technical know-how from one author to another. It can therefore be considered that a software protection system based solely on copyright offers software authors protection for their inventions for about one to three years following publication of the software (i.e. about two to four years from the date of invention), a period corresponding to the technological life cycle in this field.

Nevertheless, recent events force us to review the 1970s approach. First of all, commercial and diplomatic pressure from the United States is forcing Europe to demonstrate that it does not take lightly the protection of inventions in the information society. Secondly, some financial circles are expressing the need to assess the "invention content" of the start-up companies in which they have invested. Moreover, concerned by the fact that software could challenge their dominant position in the telecommunications or electronics sector, large old-economy companies have also demanded protection for software-based inventions. Finally, and this is an ethical point, a right which denied software-based invention paternity, whether for a management method, a business method or an optimisation method, would amount to giving society a model based on the "piracy of ideas", that is, considering it fair for an investor to appropriate an inventor’s ideas in order to turn them over to one of its start-up companies, without payment, rather than investing in the business plan presented by the inventor.

We saw in the preceding chapter that simply introducing patenting, in addition to copyright protection, into the United States software economy has created numerous harmful effects, achieving the exact opposite of what patents are supposed to be for, viz. stimulating innovation and competition. Many of these pathological effects can be limited, provided significant legal and intellectual changes are introduced, as we saw in the preceding paragraph. But such novations are a source of confusion and do not clearly address the more general issue of the patentability of intellectual methods, an issue which has become inseparable from that of software patentability since the introduction of e-commerce and speech or language computer-implemented technologies.

It can therefore be asked whether the protection of software-based inventions should not rather be the object of a *sui generis* right specifically developed for the protection of intangible inventions and not a mechanical extension of a patent law historically developed to protect tangible inventions. The economics of tangible goods shows many similarities with that of collective goods, in particu—
lar zero marginal costs, and we saw earlier that the extension of a protection model designed for a tangible goods economy can hardly be applied mechanically to an intangible goods economy without serious consequences, for its workings are very different. Moreover, a \textit{sui generis} right would offer Europe a unique opportunity to avail itself of a legal system ahead of that of the United States, which would give it a considerable competitive edge in an information–based economy where the principle of "first mover takes all" is the rule. In this part, therefore, we will investigate the possibility of implementing a \textit{sui generis} right for the protection of intangible inventions, bringing together the three historical traditions in relation to the protection of intangible inventions, and guaranteeing that the protection of intangible inventions does indeed lead to the stimulation of innovation and competition in the information society.

4.3.1 "Registration": short–term patent–type protection

On the basis of the economic model of Professors Bessen and Maskin (section 3.3.2) it appears that software patents do have an obvious usefulness during the first innovation cycle, but, from the second innovation cycle, become a danger to the software economy by stifling innovation and competition. In this situation, a type of short–term patent, for example one covering a few years, would avoid most of the harmful effects of software patenting on innovation. A three–year protection in the case of intangible inventions (software, consultancy, corporate management, business methods) would typically fit in well with innovation cycles and investment cycles for most projects in the information society. Let us recall here that a three–year patent–type protection must never be called a "patent" when drafted into law, for in that case the time limits specified in the TRIPs Agreement would apply and would impose protection for at least 20 years. Therefore, from now on, we will use the word "registration" for this type of short–term patent on intangible inventions. The word "registration" should then be understood as one generally understands the word patent, with the noteworthy difference of its much shorter duration and the possibility of "registering" intangible inventions such as intellectual methods. However, taking the TRIPs Agreement into consideration, this legal device could only be implemented on the condition that at the formal level a twenty–year patent is retained, the granting of which could be subject to a relatively dissuasive procedure (for example, by restricting the scope of patentability to inventions containing software, by requiring the applicant to submit proof of the genuinely innovative character of the invention to a committee of experts, and by relying, as in section 4.2, on procedural rules to exclude software from patent infringement, etc.) Database law is in a similar situation: although there exists a possibility of protecting databases via copyright, this possibility is never used in practice and it is the \textit{sui generis} right that prevails.

If, therefore, a protection lifetime corresponding to an innovation cycle is chosen for "registration", it will no longer be necessary to set up a system of automatic licensing such as that presented
in the limited−privilege patent scenario. Taking the field of software as an example, an innovation cycle corresponds to the publication of a new major version of a computer programme, as, for example, when Microsoft went from Internet Explorer 4 to Internet Explorer 5 or, again, when Netscape went from Navigator 4 to Navigator 6 (there is no Navigator 5). A publisher who did not innovate would only market software for which the functions correspond to previous versions from innovative publishers, that is correspond to versions which are no longer on the market. On the other hand, innovative publishers could force innovative competitors to negotiate cross−licensing agreements, enabling them to incorporate into their own software many of the advanced functions developed by competitors for every minor version change (e.g. from Internet Explorer 5 to Internet Explorer 5.0.1). And in all cases, publishers have the guarantee of not having to wait for more than one new version to incorporate inventions for which their competitors had exclusive marketing rights, something that does not represent an insuperable obstacle for new competing publishers getting into the market, contrary to the case with a 20−year patent, where only publishers endowed with rich patent portfolios have sufficient negotiating power to break into the market.

As for infringement, for the most part the proposals presented in the limited−privilege patent scenario remain valid within a system of *sui generis* right. The reproduction of a programme (for a computer−implemented process), or of an ISO 9000 system of reference (for a management method) or of a business plan (for a business method) must under no circumstances be considered as an infringement of a "registered" method. Only the implementation of the computer process, management method or business method can possibly be considered as an infringement of a "registered" method. Once again, such a definition of infringement is necessary in order to avoid placing all authors of original programmes, original ISO 9000 systems of reference or original business plans in a position of infringement of "registered" methods, on statistical grounds, and in order therefore to avoid constructing an ineffectual right. It is also necessary because of the similar informational nature of a programme, an ISO 9000 system of references or a business plan, on the one hand, and the "registering" of the invention of a computer−implemented process, a corporate management method or a business method, on the other hand. The "registration" of a method being intended for publication and reproduction to ensure the sharing of knowledge, its reproduction could not logically constitute a self−referent infringement of a "registered" method.

4.3.2 *Free "registration" with no examination and immediate effect*

It can be observed today that patent protection becomes effective only after one or two innovation cycles because of the slowness of the examination procedure. This means that an inventor who has applied for a patent has to wait a few years before this patent can be used against someone who, in turn, may have needed only a few months to reproduce the patented invention without permission. Moreover, examination practice seems to be evolving increasingly towards a principle of reg−
istration disregarding true, in depth examination\(^{131}\) without this causing more than a stir among large companies, which see it as a means of obtaining a sort of "investment security"\(^{132}\). Finally, it seems that 90% of patents granted in the United States in the area of intangible inventions are of no value whatsoever for lack of novelty or inventiveness. In other words, the quality of patents applied for does not seem to be related to the existence or otherwise of an examination procedure, something that was indeed recognised long ago and with great pragmatism in France, when it promoted a patenting system "without ascertained value" based on an examination that is very largely formal.

Having observed these changes, let us go beyond them: within the framework of a *sui generis* right for intangible inventions, a system of free "registration", without examination and effective immediately, would avoid:

1. the creation of inconsistencies due to slowness of examination and rapidity of innovation cycles;
2. investors being led to believe that software patents provide a method for evaluating the technical content of a company when 90% of them are probably of no value;
3. inventors who cannot afford to having to pay the costs of an examination procedure which is known to be totally ineffective in practice.

Such "registration" would offer, as does the patent, a temporary and limited monopoly on the invention described in the "registration" form for the method, with litigation rules similar to those of patenting.

### 4.3.3 An a posteriori evaluation guaranteed by a "user pays" principle

However, the fact of holding a "registered" method does not constitute sufficient evidence to justify litigation for infringement of a "registered" method. The notion of *a posteriori* examination comes into play here. Holders of "registered" methods wishing to exercise their rights in lawsuits will, for their complaints to be heard, first need to demonstrate the validity of their "registered" methods in terms of novelty and inventiveness at the time they were "registered", and then adduce evidence of infringement. This then means that "registration" only allows the threat of litigation, but does not in itself allow a lawsuit for infringement of a "registered" method to be brought.

Let us suppose, therefore, that the holder of a "registered" method wishes to start litigation to assert his rights. The first requirement will be to have the value of the 'registered' method examined. To the extent that this examination is not automatic, it can be much more in depth than for patents. Insofar as litigation costs at least 20 000, an equivalent sum could be spent examining

\(^{131}\) "Is Rule 56/57 leading us to a registration system? Can automation help?" (Dec 1988 JPTOS)

"Is the United States automating a patent registration system for software? A critical review of information management in the USPTO" (Sep 90 JPTOS)

the value of the "registered" method without it changing the sometimes very high costs of litigation. Once the value of the "registered" method has been proved, it will then be necessary to finance an expert assessment to show that there has been an actual infringement. Only then will the complaint be heard. Such a procedure would prevent legal terrorism by means of an "entry fee", which would render any abusive complaint unprofitable. The value of this "entry fee" should, nevertheless, be carefully calculated so as not to discourage genuine inventors from defending their inventions. This is, indeed, part of a more general problem of inequality of inventors confronted with the costs, arising from defending their inventions.

While, in some countries, the examination of a "registered" method prior to litigation is in the hands of a public service, it is not essential to make the assessment of "registered" methods a public monopoly. Starting from a public base of "registrations" of methods, a wide range of services could be undertaken by the private sector, particularly certification bodies and industrial property consultants. These services could include: the certification of the "registered" method to an investor, to demonstrate that the invention really exists, searches for similar "registered" methods to prevent risks of infringement or to conclude cross-licensing agreements, etc. During the legal proceedings, rather than being carried out by the court, the examination of a "registered" method could be delegated to an approved private company, as is done in many other fields where the judiciary turns to private experts.

Other innovations with respect to defining infringement could be incorporated into a sui generis right. Thus, infringement litigation could occur only if the holder of a "registered" method, who was seeking to assert his rights, implements the "registered" intangible invention himself. This kind of approach, which would then tie the "registration" system to a system whereby unfair competition had to be proved, would avoid favouring "registered" method funds to the detriment of businessmen who implement their intangible inventions.

4.3.4 Developing an e-market for intellectual property

The Web and e-commerce could have a major impact on a protection system for intangible inventions. It should be made possible for applications, consulting applications, searches, etc. to be carried out electronically via the Web. Even better, it should be made possible for automatic licensing procedures via the Web, a true e-market for intellectual property, to be set up from the start, in partnership with a regulatory public authority.

By opting for a new right specific to the protection of intangible inventions such as information processing methods and intellectual methods, Europe could set up, right from the start, a modern protection system in conformity with general interests. By getting rid of the contingency measures and hindrances inherent in the old systems of national patents, a sui generis right would allow the immediate adoption of a radically different administrative process, the launching of the first e-
market for industrial protection in the world, and benefits accruing from increased productivity and lower costs, resulting from an automated system.

For example, the use of computer processes for semantic processing of registrations would allow automatic classification to be obtained and a search for technical similarities to be carried out, much as one can today with search engines, but taking the technical content of the document into account. It could be useful, for example, to study the possibility of using logical languages (e.g. Lojban133) as hub languages in order to reduce the formulation ambiguities in many patents and to facilitate the search for correspondences. The development of automated "registration" application processing systems would also be a way of strengthening Europe’s leadership in the field of language industries.

4.3.5 Protection which respects secrecy and transparency

The creation of a *sui generis* right should allow resolution of the dilemma between promoting transparency and protecting secrecy in the case of software, and that between seeking infringement and the violation of industrial or commercial secrecy in the case of intellectual methods. It is not morally desirable that secrecy should offer shelter from penalties for an offence.

Two approaches can be envisaged: rejecting any complaint for infringement of a "registered" method based on knowledge of facts usually protected under industrial or commercial secrecy, or offering advantageous conditions to companies that opt for transparency. The first approach amounts to rejecting, as proof of infringement of "registered" methods, any evidence based, for example, on knowledge of the source code or on knowledge of ISO 9000 procedures published within the framework of open certification of a group of companies, on the principle that such evidence might possibly have been kept secret and that it would be unfair to take into account such evidence, since it would amount to favouring players who use secrecy as a shelter from penalties for an offence.

The second approach would be to offer a "leniency bonus" to companies choosing transparency, by offering them more lenient conditions in the event of litigation (good faith, compliance deadlines, automatic licensing, etc.). We lean towards this second approach because it seems more realistic to us. Nevertheless, the notion of "leniency bonus" has yet to be defined legally. For example, this "bonus" could involve, in the case of software patent infringement, favouring publishers who have registered the source code of their products with the Patent Office to allow it to be examined in searches for infringement, by taking into consideration at the time of the lawsuit only patent infringements committed after the complaint has been lodged and, in particular, omitting infringements committed before the laying of the complaint in the calculations of profit loss. This would serve to counter strategies in which the patent holder waits for infringing software to become very

133  http://www.lojban.org
successful before suing for infringement, so as to obtain the highest possible compensation, even though the offender was acting in good faith.

4.3.6 Safeguarding Europe’s export capacity

The creation of a *sui generis* right in Europe, different from that in the United States, will not prevent large European corporations from continuing to take out patents on intangible inventions in the United States. On the other hand, small companies that did not take out patents in the United States would see their export capacity partly restricted. To preserve this capacity, the creation of public or private "patent–insurance" bodies should be envisaged as a short–term solution, in the same way that there are financial insurance companies for SME international trade. These bodies, holding substantial patent portfolios, would offer exporters comprehensive protection within the framework of an insurance policy that has yet to be devised.

In the medium–term or long–term, it would be advisable to win over the United States and Japan to the protection of intangible inventions via a *sui generis* right. In the United States, ever increasing numbers are today voicing their opposition to the current software patenting system, its excessive duration, to the poor value of patents granted by the American Patent Office, to the high processing costs, to the blatant stifling of competition, etc. Similar remarks have also been made in Japan, including in prime time television broadcasts, in which certain civil servants have made thinly veiled criticism of a system, the sole purpose of which appeared to be the preservation of American economic supremacy. Europe has already convinced its partners to adopt original courses of action in the field of databases or interoperability. There are thus grounds for hope that an original system developed by Europe could be adopted on the other side of the Atlantic, thereby becoming a world standard.

4.4 Developing the French capacity for economic analysis

In view of the importance and complexity of what is at stake for industrial property in the information society, France today seems particularly incapable of analysis. Research in industrial economics on these topics seems today to come mainly from the United States. Of course, much high quality research in this area has been carried out in France and Europe for several decades, but it deals with industrial property in the information society from a legal standpoint, which tends to leave out the economic and industrial impact of this law and which is sometimes based on assump–

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134 We would like to suggest to European corporations that, by promoting the adoption of a European *sui generis* right to register intangible inventions in place of standard patent law, they would be able to use the money they would have to spend on patent fees in Europe to take out twice as many patents in the United States and to create bonuses to encourage staff to take out patents. Intelligently managed, the absence of patents on intangible inventions in Europe could therefore enhance the competitiveness of European companies in the American market.
tions contrary to the historical foundations of industrial property, initially conceived as a social contract.

The same imbalance between "legal analysis" and "economic analysis" is found in national and European decision-making authorities. The excessive weight of the legal analysis too often leads to decisions taken on the basis of an analysis based solely on ideas of "property", and not taking into account the social or economic impact of the proposed measures. It would therefore be desirable to encourage strongly economic or sociological research in industrial property in France, in order to provide decision-makers with fuller analyses of a law which directly determines the economic and social form of the information society.

SUMMARY - No matter which approach is considered for the patentability of software, it will need not only to clarify the patentability status of computer programmes but also that of digital services, business methods, educational methods and intellectual methods, which can be partially or totally automated by a computer programme. Two scenarios are suggested. The first scenario involves extending patent law to intangible inventions, while dealing with the definition of infringement and of compulsory licensing so as to limit the harmful effects studied in chapter 3. This scenario has the advantage of favouring global harmonisation for the system of granting patents, but it requires extremely complex procedures without fully achieving a perfectly healthy situation from an economic and legal point of view. In particular, the duration of protection via patent cannot be less than 20 years, which seems inconsistent with software innovation cycles. The second approach, which we prefer, involves creating a sui generis right for intangible inventions, and adopting a protection period corresponding to software innovation cycles, typically 3 years. A new law could enshrine the changes observed in patent practice, in particular the trend, observed in the field of software, of an examination procedure evolving towards a simple registration procedure as in trademark law. Moreover, because a sui generis law would itself be innovative, it could incorporate new principles such as "the protection of secrecy or transparency" or it could, under public control, immediately set up an e-market for intangible inventions which could simultaneously offer services assisting in application, a posteriori examination, licensing, and arbitration before litigation. The French capacity for research and analysis in the economics of industrial property should be developed, so that significant political decisions will not be taken solely on the basis of legal analyses but also on the basis of economic and social analyses.
How can limits to patenting be set?

In the last chapter we examined three approaches for protection of intangible inventions in conformity with the overall objectives of industrial property: to stimulate innovation, share knowledge and heighten competition. The protection of intellectual methods and computer-implemented processes by a *sui generis* right seems the best able to meet these three overall objectives. However, we extrapolated when we examined the legal position in Europe, the United States and Japan. Thus, creation of a *sui generis* right in the United States or Japan cannot be envisaged in the short term because they have both already opted for extension of the patenting system to software and intellectual methods.

The position in Europe is somewhat different. We will see, first of all, that positive law in France and other European countries clearly lays down non-patentability of software and intangible services. However, the Patent Offices have gradually developed their case law in the direction of *de facto* patenting of computer programme and some intellectual methods. Today, these patents are of uncertain value. Thus Europe now has the opportunity to clarify an unhealthy legal position by opting, if it so wishes, to create a *sui generis* right that would be more effective economically than a mere extension of the patenting system as practised in the United States.

Should Europe decide to adopt *sui generis* protection of intangible inventions, clear limits should be fixed for the patenting system. In other words, inventions that are patentable should be distinguished from those that can be "registered" in the sense of the *sui generis* right. We will see, in the second part of this chapter, that the legal notions underpinning the European patenting system are so obscure that the patenting system has gradually become applicable to vulnerable areas of the information society such as culture, education, finance, corporate management, democracy¹³⁵, the running of the State, etc.

Therefore, new legal notions must be imagined to enable drawing of clear limits and avoid re-

¹³⁵ Internet et les mutations des démocraties. Grégoire POSTEL-VINAY.  
http://www.ensmp.fr/industrie/digitip/osi/mutations.pdf
production in Europe of the situation in America. It is an extremely complex task to create new rules. The last part of this chapter offers some lines of thought.

5.1 In Europe, software is not patentable, but there are software patents

The contradictions\textsuperscript{136} between positive law, case law and even government policy are not solely to be found in the software sector. The introduction of patenting for living organisms, stemming from decisions handed down by the European Patent Office, also contradicts the spirit of the French Code of Industrial Property. Thus, there is considerable difficulty in transposing the European Directive on this subject, adopted by the Council of Ministers in Brussels, into national law, because the text is ambiguous and poses ethical, even legal problems\textsuperscript{137}. Given that this Directive was itself an attempt to re–focus the wayward case law handed down by the EPO, it would have been better if France had protested at an earlier date against these deviant decisions, as the European Patent Convention provides the right to do\textsuperscript{138}.

5.1.1 In French positive law, programme are not patentable

The method by which computer programmes could be protected has always been hotly debated. Historically, the first form of protection envisaged was the patent\textsuperscript{139}. However, in the seventies, it was admitted that copyright was the most suitable protection for computer programmes because they could be considered as creations marked by the hand of their authors. Furthermore, most of the programmes at that time were based either on applied mathematical methods such as scientific calculation software, or on intellectual methods used for corporate management (management software). It would therefore have been illogical to allow software to be patented while making an exception for mathematics and intellectual methods.

It was on the basis of this doctrine that, in 1973, the European Patent Convention laid down an explicit exception for "computer programmes" and for scientific discoveries or theories, mathematical methods, plans, and intellectual methods in the field of economic activity. Article 52 is perfectly clear:

\begin{center}
\textbf{Article 52 Patentable Inventions}
\end{center}

\begin{footnotesize}
\textsuperscript{136} This section contains many paraphrased extracts from the legal textbook "Lamy Informatique" 1998
\textsuperscript{137} French patent law is dependent on both EU law and the European Patent Convention, although no clear hierarchy has yet been defined between these two sources of law.
\textsuperscript{138} Articles 172 and 173 of the European Patent Convention allow partner States to contest the practices of another State or the administration f the EPO.
\end{footnotesize}
(1) European patents shall be delivered for new inventions entailing inventive activity capable of industrial application.

(2) The following shall not be considered as inventions under the foregoing paragraph 1:
   a) discoveries, scientific theories and mathematical methods;
   b) aesthetic creations;
   c) plans, principles and methods in the exercise of intellectual activities, in the fields of games or economic activities, and computer programmes;
   d) presentations of information.

(3) The provisions of paragraph 2 shall exclude the patentability of the items listed in the said provisions only insofar as the European patent application or the European patent concerns just one of these items, considered as such.

Initially, the examiners and judges deemed that any patent application containing the words "programme" or "software" should be rejected. Furthermore, the criterion of "industrial application" provided in Article 52.1 was construed in the strict, French meaning of manufacturing, and not industrial, activity in intangible goods. This excluded any type of patent on consulting services, commercial methods, business methods or educational methods.

The Mobil Oil case is an example of a precedent offering this view of patentability. The patent application was entitled "Process and apparatus for choosing pigments". The Director of the French Institut National de la Propriété Industrielle (INPI, French Patent Office) judged that in fact the description was of software and rejected the application. The Paris Court of Appeal upheld the decision.

Held, that during the parliamentary debates it was said that some programmes or series of instructions could control the development of industrial processes and also have industrial effects; that, nevertheless, when the bill was passed in its present form, the legislator clearly expressed its wish, by deciding that no programme, whether producing industrial effects or not, should be taken as an industrial invention.

On appeal, the French Cour de Cassation also upheld this opinion.

The Court of Appeal, which referred to the grounds given by the Director of the Institut National de la Propriété Industrielle, deemed, without deforming its nature, that the patent application filed by the company Mobil Oil, which described neither a technical process nor apparatus in its claims, manifestly concerned nothing other than a programme or a series of instructions for running a series of operations in a calculating machine, which was not capable of patenting under Article 7.3 of the law dated January 1 1968, and the Director of the Institut National de la Propriété Industrielle, applying Article
114 In Europe, software is not patentable, but there are software patents

16.5 of the foregoing law, had the power to reject it.

5.1.2 The European Patent Office nevertheless deems programmes and digital services to be patentable

Invention containing a computer programme

The gradual development of the rules of Patent Offices or of case law has been in successive stages. The first, with the Schlumberger case, was that patents on "inventions containing computer programmes", were recognised on the grounds that if such inventions were not patentable, nothing would ever be patentable ultimately. The legal grounds for this decision are the interpretation of Article 52.3 of the European Patent Convention, which provides for patenting of an invention even if it contains one item which is excluded from patentability.

(3) The provisions of paragraph 2 shall exclude patentability of the items listed in the said provisions only insofar as a European patent application or the European patent concerns just one of these items, considered as such.

Although the invention could contain a computer programme, if the innovation resided solely in that computer programme, it would not, in theory, be patentable. Furthermore, the "industrial application" criterion was still construed in its strict Latin meaning. Thus, in the Schlumberger case, the claims described a "process for indirect data collection for the purpose of re-constituting the physical characteristics of geological formation, presented in the form of graphic recordings of measurement signals, in order to determine the existence and dimensions of oil fields in the ground".

This case does not prove that programmes are patentable. That can be confirmed by reading the decision handed down by the Paris court (see appendix 6.3– Lamy Informatique). The most that can be suggested is that the judges chose to see a combined invention where, in fact, only software was claimed. Moreover, judges’ interpretations may vary. A Canadian case heard on the same day, for the same company and the same process, was judged differently. The Canadian court held that only "the calculation of the mathematical formula" and "the application of the mathematical formula" were new, and that, because they were scientific principles, they could not be patented.

Machine containing an innovative programme

The second stage was that many patent applications for inventions such as "process containing an innovative programme" or "machine containing an innovative computer programme" began to be granted. Such machines might, for example, be generic programmable controllers containing a programme. Most patents qualified as software patents today are, in fact, of this type, and touch upon software but do not actually patent software. They were obtained by ingenious drafting: the
terms information and software are carefully avoided, software is presented as merely one stage in a process, and where the patent is for a machine it emphasises the "hard" ware, tangible, physical connections etc. If the claims correspond and are accepted, the patent is granted without difficulty.

Algorithmic processes for information processing having technical effects

Once it is agreed that software can be included in a patentable process, there is a strong temptation to extend the notion not only of process, but also of technical process. The difference between a mathematical method and a technical process was defined in a decision handed down by the EPO appeals board dated July 15 1986 in the case of a patent for Vicom.

"The fundamental difference between a mathematical method and a technical process can be seen in the fact that a mathematical method or algorithm applies to numbers (whatever such numbers might represent), and also produces a result in digital form, the mathematical method or the algorithm merely being an abstract concept dictating the way of processing these numbers. No technical result is obtained by the method as such. On the other hand, if a mathematical method is used in a technical process, this process applies to a physical entity (which may be a tangible object but also an image memorised in the form of an electrical signal) by some technical means implementing this method, and the result is a certain change in this entity".

Widening the concept of industrial application

The third stage was the interpretation of the criterion "industrial application" in the German or English meaning, where the word "industrial" has a meaning similar to "commercial" in French. This means that, in practice, the criterion is no longer considered. On the basis of this interpretation, a theory of inventivity was developed by Patent Offices which arrived at a definition of inventivity as "the technical solution to a technical problem", and of invention as "a new technical solution to a technical problem". This definition, which is not that of French industrial property law, was nevertheless adopted in many official French reports. Although previously inventions were described as "machines or processes containing a computer programme", the definition of inventivity as "a technical solution to a technical problem" allowed patents on "procedures for information processing comprising a technical aspect" to be granted.

"This court holds that a claim describing a technical process controlled by a programme (whether the

\footnote{The word "industrial" has evolved in meaning. The construction since the fifties, as manifested in the French institute of statistics (INSEE) categories of economic activities, covers only production of tangible goods. An older, broader construction also exists. The Encyclopaedia (1751 – 1777) indicates that "the word industry means two things. Either merely manual work, or else inventions of the mind in useful machines relative to arts and crafts. Industry includes all, revives all, and animates all in nature. It contributes to culture, it creates for factories, and it encourages trade". This definition is repeated, not least in the the Economic Analysis Council's report "Industrial Policies for Europe". In today's meaning, it covers "all activities allowing transformation of research results into new consumer products and services, thus acting as a key connection between science and consumption".}

\footnote{Le Brevet pour l'innovation – Summary of Lombard Report – – http://www2.evariste.org/inpi/pi980121.html}
latter be implemented by hard or software) cannot be considered as concerning a computer programme as such under Article 52(3) EPC since protection is sought for the application of the programme which determines the succession of stages in the process", and that "therefore this type of claim is admissible under Article 52(2) and (3) EPC".

This decision goes further than mere patenting of "inventions containing a computer programme" because in practice it leads to a simple data base system being considered as having a technical effect similar to that of an operating system. The notions of "technique" and of "technology" go far beyond the simple field of manufactured products and encroach upon that of intangible goods. Furthermore, the notion of "technique" is somewhat vague, not to say badly understood, thus leading the way to discrepancies between decisions. As an example, contrary to a data base, a document-searching system is deemed to have no technical effect because it only deals with information.

The theory of the virtual machine

The theory of the "virtual machine" was the fourth stage by which the possibility of patenting software was insidiously enlarged. This theory, developed in the Netherlands, was that equipment "activated" by certain software constituted a machine of a certain type, and that this same equipment "activated" by other software constituted a machine of another type, the two machines being assimilated to two different, therefore fully patentable mechanical inventions. The Koch decision of May 21 1987 thus, in the course of the judgement, let fall that if "the computer programme combined with a universal calculator known to the literature makes the latter operate differently, the combination is patentable as an invention".

This expression "operate differently" gave rise to much puzzling on the part of the authors of "Lamy Informatique":

As in the notion of technique, anything can be read into this expression. Does it mean an unusual use of components insofar as functional relationships have been established between them, which are different from those known? This was IBM’s argument in the case which was decided on October 5 1988, quoted above. According to the EPO, this was not enough. The the hard-soft ware combination must lead to "a technically new operating mode of the computer". There remained to be discovered what a technically new mode could be. This cannot easily be defined, especially in view of the fact that the notion of technique is vague, even in the decisions of the EPO itself.

Product programmes

The fifth stage was that patentability of "product programmes" defined as "programmes with
technical effects” was admitted. The EPO appeals board judgement T 0935/97 – 3.5.1 dated February 4 1999 thus allows a programme to be accepted as part of the claims in a European patent application. This decision was based on a subtle semantic shift in which Articles 52.2 and 52.3 EPC were taken to mean "programmes as such are not patentable". This therefore leads to the supposition that there could exist programmes which were not "as such" and that, therefore, patents could be granted on such computer programmes.

In order to establish the scope of the exclusion from patentability of programmes for computers, it is necessary to determine the exact meaning of the expression "as such". This may result in the identification of those programmes for computers which, as a result of not being considered programmes for computers as such, are open to patentability. (...) Within the context of the application of the EPC the technical character of an invention is generally accepted as an essential requirement for its patentability. This is illustrated, for instance, by Rules 27 and 29 EPC. The exclusion from patentability of programmes for computers as such (Article 52(2) and (3) EPC) may be construed to mean that such programmes are considered to be mere abstract creations, lacking in technical character. The use of the expression "shall not be regarded as inventions" seems to confirm this interpretation. This means that programmes for computers must be considered as patentable inventions when they have a technical character. This conclusion seems to be consistent with the three different provisions concerned: (a) the exclusion from patentability provided for in Article 52(2) EPC; (b) the general provision of Article 52(1) EPC, according to which European patents shall be granted for any inventions (therefore having technical features) which are susceptible of industrial application, which are new and which involve an inventive step; (c) the provision of Article 52(3) EPC, which does not allow a broad interpretation of the scope of the exclusion.

Computer-implemented corporate management processes and intellectual methods

Finally, the last stage saw the appearance of patents on "corporate management methods comprising a technical effect" in which the only technical effect was to introduce an Internet Protocol (IP) address in the formulation of the corporate management method, and to consider that the flow of information required to implement this method needed an IT network or a relational data base.

EP756731: INTERACTIVE INFORMATION SELECTION APPARATUS

The invention is aimed at stores such as supermarkets where diverse types of food products are sold. The object of the invention is to provide an apparatus containing information relating to products, wares and articles available in the store in addition to information relating to dishes which can be prepared with such wares, products and articles. Such an apparatus must be adapted according to the invention to enable each consumer to make his own choice with simple operation such that at the end of a selection procedure all relevant data is available. (...) In order to encourage use of the apparatus according to the invention by the consumer an economic stimulus can be incorporated into the apparatus. Such an apparatus has the special feature that the printer can print a discount
card for discounting when payment is made for the purchased products and/or articles. During the purchase of products, ware or articles which can be acquired by the consumer as part of his selections, an adjustment with the printed discount card takes place when payment is made at cash-point such that the purchased products can be paid for by the buyer at a reduced process (sic).

This is why today it can be thought that the case law of the EPO is being built up on the same lines as those of the USPTO. They are also delivering patents on software, Internet (eg. Amazon one-click), business methods (e.g. reverse bidding), education (e.g. distance learning via the Internet) etc. Indeed, a note on this topic was sent by the Munich patent agents Betten & Resch:

The Technical Board of Appeal 3.5.1 of the European Patent Office (EPO) has decided that, in principle, media claims (covering the computer programme on a storage medium...) and Internet claims (covering the transmission or electronic distribution of the computer programme) are admissible...

According to the US-CACF ("In re Lowry") and the Guidelines of the Japanese and the Korean Patent Offices, are protectable by a patent claim. This question has not yet been decided by the Technical Boards of Appeal of the EPO. In view of the EPO decision "BBC / Colour Television Signal" we are, however, quite confident that the EPO will grant, in the long run, such claims as well.

In view of the practice of the last two to five years it can be said that, in principle, a patent will be granted for (including business methods) which are new and inventive. This is at least valid for the EPO and the German Patent and Trademark Office, but not yet for the UK Patent Office. In connection with this we refer to the "SOHEI" case (EP 209907 for a computer management system), and EP patents for a trade warrant system (EP 762304), a stateless shopping cart for the web (EP 784279), and an interactive information selection apparatus (for selecting the items for a meal) (EP 756731). Thus the practice of the EPO seems to be quite similar to that of the USPTO, even if the wording of the claims differs somewhat.

In this connection it may be interesting to know that in 1997 the number of European patent applications in the field of data processing, most of them relating to computer programmes, had the highest growth of 28% compared with 1996, and that the EPO has started to establish a second division of examiners dealing with software applications.

In General the practise of the German PTO is quite similar to that of the EPO. The UNION Round Table Conference on "Patenting of Computer Software" in December 1997 obviously had a good impact not only on the European, but also on the German situation. In 1998 the 17th Senate of the German Patents Court, who had a rather restrictive practice as to patenting of computer programmes in the past, surprisingly admitted in 1998 in two cases the appeal on points of law to the German Federal Supreme Court (BGH). Such an admission had been denied all the years before. This will give the BGH the possibility to consider the discussion of the last years and to bring its case law of 1991/1992 in line with that of the Technical Boards of Appeal of the EPO.

One judge of the FSC, who is the expert in the FSC for computer programmes, has just published an article showing his "personal opinion", according to which, in principle, computer programmes should
be considered technical. However only the conversion of the logical concept into the operation of the computer or the realization of the logical concept (programme) by the computer, but not the logical concept itself should be protected by patents. This approach seems to be quite similar to what is known as "technical application" of the computer programme in the USA.

The latest state of the discussion on the amendment of the European Patent Convention (EPC) is that there seems to be a great consensus within the deciding bodies of the EPO and the European Commission that Art 52(2) and (3) EPC (including the exclusion of computer programmes as such) should be cancelled and that Art. 52(1) EPC should be brought in line with Art 27(1) TRIPS Agreement. Although such an amendment could take years, the efforts towards such an amendment may have an impact on the general practice of the EPO so that the exclusion of computer programmes as such from patentability in Art. 52(2) EPC will be interpreted in a very narrow way.

Although intellectual methods are not yet "officially" patentable, that is to say, when they are not explicitly implemented by a technical apparatus such as a computer, the EPO’s tactic of a gradual shift towards granting of patents on computer programmes despite the fact that they are excluded from patentability, could also extend in the next ten years to every intellectual method susceptible of automated implementation by a computer programme, without the need to make explicit mention of this technical implementation.

5.1.3 Tacit agreement from the States party to the European Patent Convention

Each of these stages, or gradual changes, in interpretation by the EPO could have been criticised or opposed by the States party to the EPC. They were, indeed, the subject of vigorous protest from French deputies who saw in the decisions the manifest wish to deviate from the spirit of the law. In a letter addressed to the French government in July 2000, Jean-Yves Le Déaut (Député for the Meurthe-et-Moselle département in France) asserted that:

The patenting system has strayed far beyond its historically, economically, and ethically legitimate ambit over the past few years. This extension is due to the decisions handed down by the EPO, which are sometimes in contradiction with the spirit of the law as enacted by the legislator ()

And, further on,

(...)It would also seem the ideal time to commission an audit from the EPO so that the means for better supervision of the decisions taken by this body can be determined, and thus ensure that they are in conformity with the general interest and the fundamental principle of impartial justice.

However, the subject of patentability is highly complex and the decisions are often so incomprehensible that only the national authorities responsible for ensuring the application of the EPC have studied them. As these authorities (In France, the international division of the INPI) are closely involved with national Patent Offices and as the interest of these Offices is to promote a wider scope of patentability, State supervision of this case law has probably not been as strict as it should have
been and has not always taken into account the general interest for States when extending patent-ability. Furthermore, it is difficult to oppose an extension of the scope of patentability when it is in some cases vociferously demanded by large national industries.

5.1.4 The proposal of the European Commission: to transpose EPO case law into positive law.

The European Commission, which was charged with the preparation of a Directive on the Community patent for the purpose of simplifying and harmonising the formalities for patent applications in Europe, as well as reducing their cost, observed manifest inconsistency between positive law and EPO practice in the field of software. Following a survey which was almost exclusively directed at industrial property professionals from national Patent Offices, private agencies and the legal departments of large industrial groups, the Commission announced that there was a consensus in favour of software patentability and that the removal of the exception for computer programmes provided in the EPC should be envisaged.

Backed up in this by the explosion of e-commerce and by its unshakeable belief in the fact that "more industrial property brings more innovation", the European Commission is preparing to publish a draft Directive on the Community patent which, re-iterating the approach it took for its proposal on utility models, will open software and digital services to patentability.\textsuperscript{146}

Although it is relatively easy to put over the idea of patenting software on the grounds of historical continuity of industrial tradition, the patentability of business, educational and intellectual methods gives rise to extremely hostile reactions from citizens and industry, including those who are favourable to software patenting. However, as seen earlier, there is no technical difference between a software patent and a patent on a digital service. As Mr. Betten, the reputed German expert in industrial property in software we cited in 5.1.2, points out, the EPO already grants patents on business methods. The Commission’s position, which is to restrict the scope of software patentability to "programmes having technical effects" alone, thus emerges as being unrealistic and is a smokescreen for the case law being handed down. Whatever the approach envisaged for software patentability, the current position with regard to computer programme patentability as well as patentability for all digital services, and business, educational and intellectual methods susceptible of partial or total automation via computer programmes, must be clarified.

Clarification would have considerable economic and ethical repercussions since it could bring patenting into areas where it has no place, such as culture, education and fundamental research. Given the importance of the challenge, it is for States to make explicit decisions and not for the Commission and the EPO to draft ambiguous documents of their own devising, the interpretation of

\textsuperscript{146} This Directive could be divided into two: one part on the Community patent, and the other on software patents. If they are treated separately there is a risk that the Community patent would implicitly confirm EPO case law, and this would come to the same as adopting \textit{de facto} a patent right in Europe that was equivalent to the situation in the US.
which is out of the States’ remit.

5.1.5 Using the TRIPs Agreement to justify the software patent

In addition to wanting to transpose EPO case law into positive law, the European Commission explains its position frequently by indicating that it is bound by the TRIPs Agreement signed in the 1994 Uruguay Round. These reportedly oblige States to patent software\(^\text{147}\). It is, indeed, what Paul Hartnack, Comptroller General of the British Patent Office, noted during the London Conference in 1998:

> Powerful arguments have been advanced in favour of a change in the law which would allow software to be patented. Most of you will be familiar with the Agreement on Trade–Related Aspects of Intellectual Property Rights – commonly known as TRIPs – which was signed in the Uruguay round of the GATT negotiations.

> Some have argued that the TRIPs agreement requires us to grant patents for software because it says “patents shall be available for any inventions (...) in all fields of technology, provided they are (...) capable of industrial application”. However, it depends on how you interpret these words.

> Is a piece of pure software an invention? European law says it isn’t. Is pure software technology? Many would say no. Is it capable of “industrial” application? Again, for much software many would say no.

> TRIPS is an argument for wider protection for software. But the decision to do so should be based on sound economic reasons. Would it be in the interests of European industry, and European consumers, to take this step?

The European Commission itself is, indeed, fully aware of the possible weaknesses of an argument based on the TRIPs Agreement. Thus, Mr. Leardini, the representative of the Directorate General for the Internal Market, noted, during the Conference of the Union of European industrial property experts in Munich in 1997, that

> As we know as lawyer, we can perfectly defend that the current situation is compatible with the Art. 27 of TRIPs (ADPIC) because computer software are not considered to be an invention. But there’s a fiction there, of course, to satisfy the requirements of TRIPs which for many people does not work any longer, and we should go for a general system of non-discrimination and give patent protection for all inventions which, of course, deserve the protection, which meet the criteria, of course. (sic)

Thus, Europe is indeed free to extend the patenting system or to opt for sui generis protection of software and intellectual methods.

\(^{147}\) The Importance of Software Patents to the European Community, John Mogg Director General (DG XV), European Commission – [http://www.patent.gov.uk/softpat/en/1030.html](http://www.patent.gov.uk/softpat/en/1030.html) – see also IBM case on the “product programme” in which it was observed that the EPO board based its judgement on an extrapolation of the TRIPs agreements.
5.2 From software to intellectual methods and then ideas

EPO case law on computer programme patenting also concerns patent applications for "intellectual methods". Following a report on the patentability of "business methods" in the framework of the trilateral studies by the European, American and Japanese Patent Offices, it emerged that the legal principles according to which the EPO analysed the patentability of intellectual methods were the same as those used for computer programmes. Thus, although intellectual methods are not patentable in the meaning of Article 52.2 of the EPC, there is now a form of patentability of intellectual methods in Europe as long as they are not claimed "as such" and meet the criteria for technical character laid down by the EPO. However, this analysis has not yet shown the possible existence of a "product of an intellectual method", by analogy with the notion of a "product of a computer programme" which the EPO now uses to justify its granting of ordinary computer programmes. More precisely, the EPO distinguishes three types of "business methods":

Claims for business methods can be divided into three groups: (1) claims for a method of doing business in abstract, i.e. not specifying any apparatus used in carrying out the method; (2) claims which specify computers, computer networks or other conventional programmable digital apparatus for carrying out at least some of the steps of the business method ("computer-implemented business methods"); (3) claims which specify other apparatus (perhaps in addition to computers) e.g. mobile telephones.

In the great majority of applications currently pending what is described would fall in the second of these groups. Thus while initial claims may sometimes fall in the first category, the applicant nearly always has the possibility to amend them to specify computer means for carrying out at least part of the method. Claims which fall in the third group are rare but by no means unheard of. The following approaches to examination are to be applied in each of these cases:

(1) Claims to abstract business methods should be rejected on the grounds that they are excluded by Articles 52(2) and (3) EPC, since they are methods of doing business "as such".

(2) Claims for computer-implemented business methods should be treated in exactly the same way as any other computer-implemented invention (see below).

(3) Claims for other implementations of business methods should be treated using the same scheme for examination as for computer implementations.

These official positions of the EPO help explain the risks that would arise from abolishing the exception to patentability for computer programmes and transposing the notions of "as such" and "technical nature" as construed by the EPO, into positive law. First of all, the patenting of computer programmes would lead to granting of patents on all inventive computer-implemented intellectual
methods, because the claims would concern the programme and not the intellectual method. Secondly the criterion of "technical" use would allow patents on intellectual methods based on the use of a technical device or procedure of some sort, not least a computer programme, to be envisaged.

Now, all intellectual methods arising from social, commercial, educational, cultural, business, or governmental practices are implemented by computer programmes in the information society today. Therefore, although it might seem that, by removing the exception for computer programmes, we are extending patentability to them alone, we will in fact be extending it to intellectual methods, and from there, rapidly gaining ground in a direction that we dare not even contemplate: patentability of ideas. All the more so as EPO or German court decisions on patent applications or patent infringement cases can evolve unilaterally and gradually move boundaries that were thought to be fixed. Moreover, patentability of intellectual methods has become a fashionable subject in the patent community, as shown by the declarations of Mr. Idris, the Director of the World Intellectual Property Organisation (WIPO), quoted in the introduction to Chapter 3, or the conference organised in London by the British group IBC in October 2000. History therefore seems to be about to repeat itself.

5.2.1 Examples of patents on intellectual methods

In practice, the main difference between patents on intellectual methods in Europe, the United States and Japan is that for the moment, it is still necessary to justify the "technical" nature of an invention in Europe. This generally causes no difficulty when the intellectual method can be carried out by means of a computer programme, particularly by a data base manager. It would therefore be unrealistic to imagine that American patents on intellectual methods could not be granted in Europe on the grounds of the exceptions provided in the EPC. Some intellectual method patents have, indeed, already been granted by the EPO.

Educational methods

Our first example shows that patents can be deployed in unexpected fields. It is the invention of a method for teaching a cat how to exercise. The method is based on the use of a technical device (a laser pointer) which creates a spot of light on the wall or the floor, encouraging the cat to make complex movements. Even supposing that the criteria of newness and inventiveness were met, it would be difficult to say whether this type of patent would be granted in Europe. Perhaps the description would have to emphasise the technical side of the method, or the fact that the apparatus is used in a new way. Perhaps an appeals board would consider that this type of patent cannot be granted, because there is no industrial application, for instance, although this criterion is only exceptionally applied during the examination procedure today, as we saw in section 2.2.1.

US5443036: Method of exercising a cat
A method for inducing cats to exercise consists of directing a beam of invisible light produced by a hand-held laser apparatus onto the floor or wall or other opaque surface in the vicinity of the cat, then moving the laser so as to cause the bright pattern of light to move in an irregular way fascinating to cats, and to any other animal with a chase instinct.

What is claimed is:

1. A method of inducing aerobic exercise in an unrestrained cat comprising the steps of:

(a) directing an intense coherent beam of invisible light produced by a hand-held laser apparatus to produce a bright highly-focused pattern of light at the intersection of the beam and an opaque surface, said pattern being of visual interest to a cat; and

(b) selectively redirecting said beam out of the cat’s immediate reach to induce said cat to run and chase said beam and pattern of light around an exercise area.
The second example is an American patent for a purely educational method. This patent application would probably be rejected by the EPO on the grounds that it is an intellectual method "as such". On the other hand, clever drafting which emphasised the use of a computer programme and the graphic display of the two-line musical staff, would no doubt lead to granting of the patent in Europe. However, there is room for doubt as to the logic of saying that a music programme, which is a series of instructions given to a computer (or a man) to produce sound, has technical effects, but that an educational method, which is also a series of instructions given to a pupil to produce sound, does not.

**US6015947: Method of teaching music**

A method of teaching students to understand, read, and play sheet music. The method includes first teaching students rote understanding of musical notes and progressing to a structural understanding of notes on a musical staff. The teaching method is conducted in a series of five teaching steps and may apply to the teaching of sheet music for any musical instrument or voice instruction. The method is particularly useful for teaching groups of students to read music. The method focuses on building a student’s understanding of the scale system of music by teaching the student to play a small portion of notes on a scale through repetition, implementation of a specialized two-line scale, and hand signals. After the student has learned small portions of a scale, the student learns other small sections of the scale until all notes on the musical scale have been learned. The portions are then combined to reinforce the students understanding of the scale as a whole.

The third example is a technical educational method (US6024577: Network-based education system with capability to provide review material according to individual students’ understanding levels) already cited in section 3.1.2.
Business methods

The European Patent Office already grants patents on business methods with technical effects. One famous precedent concerns an invention that claims a single writing format capable of corresponding to every task in corporate management (accounting, inventory etc.) so that the corporate information system architecture will be in a uniform format. The only truly inventive part of the invention is the intellectual method formally unifying the management formats for a company.

EP0209907 General-purpose management system, method for operating said system and transfer slip.

A general-purpose management system displays a single general format on a display unit so that items redundant in plural types of management to be performed independently, as well as items peculiar to each type of management, can be inputted successively, and includes a first file for collectively storing data relating to each of the items inputted in accordance with the display, a plurality of second files for storing data necessary for each type of management on a type-by-type basis, a data extractor which, in dependence upon the type of management to be performed independently, is adapted to extract data necessary for this management from the first file and transfer the data to a corresponding second file, and a data preparer for preparing data necessary for a specific type of management and outputting these data in accordance with a predetermined format on the basis of the data in the first file and the data transferred to the corresponding second file.

Arthur Andersen Consultants obtained an American patent on a management method which could, in theory, be implemented without a computer, but in practice, needs computer programmes. The invention creates a virtual resource centre using a list of skills managed by the computer. Thus it is possible to access any resource as if it were present, by consulting the list and then contacting the relevant person via telecommunication means. It is quite easy to imagine how claims would have to be drafted in order to meet current EPO criteria, emphasising the technical aspects associated with use of a computer programme. Should the exception on computer programmes be abolished in Europe, there is likely to be an explosion in this type of application.

US6070142: Virtual customer sales and service center and method

A virtual customer sales and service center is disclosed that connects a customer to a customer access resource through any access method at any time from any customer location. The virtual customer sales and service center includes customer access resources which can both meet customer needs and also acquire and retrieve customer information during a contact, a computer telephony system for gathering interaction data associated with the contact, a rule based routing system for identifying a resource best suited to handle the call and a switch for routing the contact to the identified employee. A customer information database and an employee profile database are included, wherein the best suited resource is identified as having a skill corresponding to the type of customer ascertained from the customer information database and to the retrieved customer information. A context manager and a plurality of service providers are provided. The context manager coordinates access to an appropriate service provider and provides the service provider the context to complete
the transaction and interfaces to the rule based routing system. A quality center is included for integrating and aiding in management of a plurality of physical resource locations as a single virtual resource center.

E-commerce methods

Some examples have already been given in section 3.1.2. (US6029141: Internet-based customer referral system and US5724424: Digital active advertising)

Consultancy methods

An American patent was granted to the Gartner group, on a procurement decision method, in other words, a consultancy method. This example shows the infinitesimal difference between computer programmes (a series of information-processing instructions understandable by a computer) and an intellectual method (a series of information-processing instructions understandable by a human consultant).

US5734890: System and method for analyzing procurement decisions and customer satisfaction

A decision tool and method are provided for analyzing a decision among at least two alternatives based upon a plurality of criteria. The decision tool and method allow decision table data collected from a plurality of decision makers to be accurately aggregated, compared, and disaggregated. The decision tool and method also allow for generation of a prioritized list of areas where action can have maximum impact in the mind of decision makers. This may provide a guide for optimal allocation of resources to influence the outcome of a decision. An evaluation tool and method may be used to evaluate and improve customer satisfaction based upon a similar prioritized list.

Financial methods

A banking institution obtained an American patent on a financial method. This patent was also applied for in Europe (EP0278132). This type of patent is increasingly being applied for by the financial institutions, which appear to think that financial methods belong to the technological field insofar as they comprise mathematical and financial techniques, and these are often the fruit of sophisticated internal R & D.

US4752877: Method and apparatus for funding a future liability of uncertain cost

A method and apparatus are provided to fund a certain future liability of uncertain value and thereby defease fully its future cost. The method is an insurance investment plan which can be implemented using a floating rate zero coupon note obligation the interest rate on which varies automatically with the rate of inflation or the cost of some specified service or commodity which gives rise to the future liability, and the interest payments on which are automatically reinvested. The system projects the expected future cost of the liability based on a projected escalation rate associated with a certain specified index and based also on when the liability is expected to come due. It then calculates the
present value sale price on the floating rate zero coupon note by discounting the expected cost at maturity at a rate that represents the insurer’s projected reinvestment yield net of an insurance risk premium.

Social methods

A patent on a fundamental social practice – voting – was granted to NEC in 2000. NEC’s invention is based on fundamental properties of the mathematical theory of numbers and is very close to the demonstration of the theorem. Because the patent is easily presentable as a "technical" computer programme, the chances are high that it will be granted in Europe, given current case law.


A number-theoretic based algorithm provides for secure receipt-free voting. A vote generating center generates a choice of votes for each voter or vote chooser. The votes are encrypted, shuffled, and conveyed to a vote chooser along with information regarding how the votes were shuffled without being intercepted en route. The information is preferably sent along untappable secure channels. The method can incorporate validation of generation and shuffling of the votes using chameleon commitment and interactive proofs. The invention can be realized by current-generation personal computers with untappable channels and access to an electronic bulletin board.

5.3 The new trilateral practices

The new practices in patenting intellectual methods have been analysed and compared within the framework of trilateral projects, using two hypothetical cases. As a result of these comparisons it is possible to say that EPO practices are currently more restrictive than those in the American and Japanese Offices as regards the object of inventions (there are no patents on purely intellectual methods). However, the EPO’s examination procedure means that there is less selection on grounds of inventiveness, although it is more formal. Thus, in the area of computer-implemented intellectual methods, claims deemed obvious in the United States will often be considered as "inventive" by the OPA. However, the reverse is not true.

More generally, the European and Japanese Patent Offices pay lip service to the notion of patentability of intellectual methods, saying "A technical aspect is necessary for a computer-implemented business method to be eligible for patenting. To merely automate a known human transaction process using well known automation techniques is not patentable."

Nevertheless, this consensus is already being interpreted in different ways, especially with regard to technical character, a notion which has no precise common definition and opens the way to uncontrolled patenting of intellectual methods. Nor does the consensus clarify how they judge...
automation of an innovative intellectual process by a known automation method (*to merely automate an inventive human transaction process using well known automation techniques*), which is the case of the patents described earlier (EP0209907 and EP756731).

5.3.1 The ambiguities of European law

The extension of patenting to computer programmes, as conceived of by the EPO, is based on the necessary presence of a "technical effect" on the one hand, and limitation of non-patentability to the exceptions deemed "as such", on the other. As seen above, the two notions can also be construed in such a way that patents are granted to inventions with intellectual methods. However, two ambiguities arise when these notions are examined:

- the notion of "technical effect" or again, "field of technology"\(^{150}\) is poorly defined;
- the limitation of non-patentability to the exceptions deemed "as such" can be construed independently, or correlated to the presence of a "technical effect", which thus radically changes the scope of the exception.

The fact that the notion of "technical effect" is ambiguous is well-known. As seen earlier, in section 5.1.2, including a relational database in the description of the invention gives a "technical effect" and in some cases, seems sufficient for the object of the invention to become patentable. On the other hand, use of a document searching system is not deemed to be "technical" even though it is at least as complex in technical character as a relational database. It may also be wondered whether "financial technique" has any connection with technical effects. For that matter, what can be said of narrative or artistic "technique"? The term "technique", which the Japanese Patent Office and German case law have attempted to define by reference to the laws of nature, seems potentially very flexible and unlikely to draw strict limits to the scope of patentability.

The application of non-patentability exclusively to the exceptions taken "as such" can be understood as standing alone or as correlated to the presence of a "technical effect". In the first view (as standing alone), an invention the "inventive kernel" of which had no technical effect could be patentable, if the invention as a whole had technical effects. In the second view, an invention the "inventive kernel" of which had no technical effects could not be patented. The notion of "kernel" which, in Germany, defines patentability theory ("kerntheorie"), has in fact changed recently. In a judgement handed down in July 2000, the German supreme court held that the analysis of the technical effect and identification of the inventive kernel must be studied separately.

One instance is the case of Siemens, which applied for a patent on word processing and printing software for Chinese characters. In a 1992 judgement the Office held, on the basis of case law, that the fact that the system comprised a technical effect (printing with ink) was not enough to make the invention patentable, and that in this case, because the "inventive kernel" was software alone, the

\(^{150}\) Basic proposal for the revision of the European Patent Convention – CA/PL 25/00 Orig.: d,e,f Munich, 16.06.2000
application should be rejected. With the development of kernel theory, this kind of judgement would probably not be handed down in Germany today, since the analyses of the "inventive kernel" and technical nature have become separate.

If this dual interpretation is applied to judgements in respect of intellectual methods, the issue will be whether the presence of a technical computer programme is enough for an invention containing it to be patentable, or whether, on the contrary, the inventive kernel itself must comprise a technical effect. This has not been addressed by the trilateral so-called consensus, and EPO case law already shows that innovative intellectual methods implemented in technical fashion by known processes can be patented. It can therefore be said that most innovative intellectual methods will soon become patentable in Europe, if computer programmes are considered to be part of technology, which will no doubt be the case if it is decided that computer programmes are to be removed from the list of exceptions to patentability. As is already the case for software, nearly all these patents will probably be applied for by American companies extending patents granted in the USA. American attorneys, who have already become accustomed to adapting their software patents for the EPO so that they do not appear to concern "programmes as such", will without doubt know how to draft patents on intellectual methods so that they do not describe merely "an intellectual method as such".

5.3.2 Towards privatisation of ideas

The risk, in patenting innovative intellectual methods automatable by computer programmes, is that of encouraging tacit privatisation of ideas. "Inducing customers to buy more by giving out cookery recipes in supermarkets" is clearly a good idea. The intellectual method imagined for doing so is also clearly innovative, since it corresponds to a series of data processing steps which is different and new compared to the traditional methods for distributing cookery recipes in magazines. Automated by a computer programme and a printer, the method has technical effects. It was therefore granted a patent by the EPO (EP756731). From now on, retailers who sell cookery recipes printed out by a computer via a different method could be sued for infringement, since the invention concerns a process and it is up to the retailer to prove that he has not infringed the patent and that he uses a different method. Since expert opinion in lawsuits is particularly costly, it is probable that in the event of litigation, the retailer will prefer to settle out of court, even if he is in the right. This type of case is common in the United States today. It is why patenting of intellectual methods is tantamount to privatising ideas, although it is not so in theory.

Patents on intellectual methods are usually worrying when they concern the areas of culture and education, for which use of multimedia or distance learning via a computer are sufficient to prove a technical effect. It is beyond the scope of this analysis to forecast the effect of patenting in such sensitive areas, apart from the effects of concentration in the cultural dissemination circuits de—
5.3.3 Can patents on intellectual methods be avoided?

The economic effects of patenting intellectual methods are probably as harmful as those of patenting software, since the models described in Chapter 3 would also apply. However, patenting of intellectual methods has an ethical aspect which goes beyond mere economics and involves culture, education, society and the workings of the State. It is unlikely that a hard-and-fast position in favour of patenting for intellectual methods could be taken in Europe today, for political reasons.

And yet it is very much towards this type of patent that we are heading today, by preparing to make patenting of computer programmes legal. The interpretations of "technical effect" or "as such" as handed down by Patent Offices do not, it is clear, allow the distinction between a set of instructions given to a computer and a set of instructions given to a person. The recent opinions of WIPO\textsuperscript{151} or the International Federation of Patent Attorneys\textsuperscript{152} are quite clear: the world patenting system is today moving towards generalised protection of intellectual methods:

> Having taken account of:

> a. the significant differences between the provisions of the patenting system in the United States and the maintenance of the exclusion of business techniques from patentability in European patent law, and the distortion in global trade that can be caused by such differences;

> b. the development of patenting in Europe and Japan leading to the granting of patents on business techniques implemented by computers and software; and

> c. the American approach including the plan of action on patenting of business methods, published by the USPTO,

Has decided that to ensure adequate protection in the field of Industrial Property for innovations of high commercial value in information technology applied to any sector of business, including financial and e-commerce business, harmonisation of the conditions of patent protection is urgently required and

Encourages the relevant world, regional and national authorities, including WIPO, WTO, the European Commission, the Council of the EPO, and the Patent Offices of the United States and Japan, to undertake to promote this harmonisation.

A number of government bodies are not yet conscious of the fact that removal of the computer programme exception will automatically lead to legalisation of patents on intellectual methods in the information society. We also believe that most government bodies or large companies in Europe are opposed to patentability of intellectual methods. We therefore recommend that clearer notions

\textsuperscript{151} op. cit. http://www.wipo.org/fre/dg_idris.htm
\textsuperscript{152} http://www.ficpi.org/ficpi/newsletters/45/resolfren.html
than "presence of technical effects", "technological field" or methods "as such" be developed by intellectual property case law. In the absence of such clarification, it would be hazardous to remove the exception on programmes from the European Patent Convention, since in fact this would be tantamount to making patents on intellectual methods legal. It would be more judicious to keep the wording of the EPC as it stands, amending Article 52.3 to limit the abusive use of the term "as such", and set limits to computer programme patentability in the form of rules, so as to allow patents on industrial inventions involving computer programmes, but avoiding the spread of patenting to the entire new economy and the information society without thorough prior examination.

5.4 Clear rules for drawing the limits to the boundaries of the patenting system

Here, we are supposing that Europe wishes to opt for a system to protect intangible inventions by a *sui generis* law rather than by a mechanical extension of the patent. We have seen that this entails keeping the computer programme exception in the European Patent Convention, since patentability of computer programmes automatically leads to patentability of all intellectual methods in the information society.

The patentability exception for computer programmes does not, however, entail the prohibition of patents on tangible inventions containing a computer programme. The EPO has indeed granted between 10 000 and 20 000 patents on tangible inventions containing a computer programme. Some of these patents have been granted quite properly. Others have, perhaps, been granted on the basis of over-interpretation of the EPC, insofar as some of its provisions have been deprived of their meaning.

Clear rules must therefore be laid down to determine which patentable inventions are based on a computer programme, and which should be governed by a *sui generis* law on intangible inventions. This is a highly complex question of law, since many cases are borderline ones. We will therefore only offer avenues which might be explored in the search for a solution. We are aware that our suggestions are based upon scientific reasoning which may not always correspond to current doctrine or legal practice.

5.4.1 Definition of patentable inventions

Today, there are two constructive definitions of inventions. In Japan, they are "highly advanced intellectual creations, based on technical ideas and using the laws of nature". In Europe, the usual definition is that they are "technical solutions to technical problems", meeting criteria of newness and industrial application. The notion of "technique" can then be defined as "use of the controllable forces of nature without the intervention of Man", as is the case in Germany. The idea of "control–
lable" force of nature was used to avoid patent applications based, for example on the use of light−ning, or again, probabilistic violations of physical laws. The absence of "human intervention" cor−responds to the idea that the invention must, in its principle, be automatable.

Starting from these definitions, we propose to re−define a patentable invention as "a new tangible good or new tangible process for resolving a major problem in producing tangible goods, making use of the controllable forces of nature and without human intervention". This definition allows, amongst other things, new processes for production of tangible goods (e.g. chemical, mechanical etc.), entailing the use of computer programmes but not processes in which a computer is used merely for an existing process, to be considered as patentable inventions.

5.4.2 Exceptions to patentability

A list of exceptions must be supplied to clarify the foregoing definition. This list must comprise the current exceptions in the European Patent Convention, including that for computer pro−grammes. The formula "as such" could then be clarified, for instance by specifying that "patentable inventions comprising a sub−element the object of which is included in the exceptions to patentability may be patented when their innovative characteristic is not merely the combination of this sub−element with a known tangible good or process".

5.4.3 The claim in the patentable invention: the solution

Inventiveness in Europe is often studied through analysis of the invention in two parts: the problem posed and the solution provided for this problem. We will see later that a third part should be added to the analysis where tangible inventions containing a computer programme are concerned: the model used to represent the real world. To define the object of a patentable invention is to de−cide if the invention of a model, problem or solution are patentable.

In our view, the claim of a patentable invention can be neither the problem posed nor the model used to describe the real world. Problems, it seems to us, are posed by the market or by customers. For instance, the problem of "producing cars the wheels of which do not block when the brakes are applied" is one that many drivers who have skidded on wet roads have posed. Models representing the real world belong to scientific knowledge, which is not patentable because collaboration be−tween teams of scientific researchers should be sought. We think, therefore, that it is neither just nor judicious to give a personal monopoly on a problem or a model. On the other hand, we think it is just to authorise a claim describing a specific solution to a problem that has been fully specified on the basis of a precise model, it being understood that other solutions to the same problem are not covered by this patent.
5.4.4 Borderline cases: technical processes controlled by a computer programme

Our definition leaves one area of confusion: that of inventions on production of tangible goods, the "inventive kernel" of which is a computer programme. French case law and the German doctrine of inventive kernel do not allow a satisfactory solution for these borderline cases, in our opinion – except by prohibiting everything or accepting everything.

Let us take two examples. The first is the software for processing and printing Chinese characters (see 5.2.3). The second is the "ABS" computer-assisted braking process, which allows a vehicle to maintain its trajectory and prevents the wheels from blocking. One French decision repeated what had been said during parliamentary debates: "The legislator has clearly expressed his will in deciding that no computer programme, regardless of whether they produced or did not produce industrial results, was an industrial invention" Logically, if this decision is followed, the printing of Chinese characters or the ABS process should not be patentable since they are inventions of programmes producing an industrial result. If the original German doctrine of inventive kernel is applied to these two inventions, it can be seen that their kernel is a simple computer programme, which by definition has no effect on the forces of nature, and logically should not be patented. On the other hand, in the modern version of the German doctrine of inventive kernel, the technical effect and the inventive kernel must be studied separately. In this case, the printing of Chinese characters or the ABS process should, logically, be patentable, since their inventive kernel is new and the process as a whole has a technical effect.

This is why we believe that a doctrine should be proposed that is capable of making a clear distinction between inventions such as the ABS process, for which patent protection seems desirable, and those like the "Chinese character printing", for which a sui generis law would be more adapted.

5.4.5 Use of a a known multimedia interface is not technical

The first approach to defining clear limits might be to add a rule for examination of technical effects, which provides that "inventions the sole technical effect of which is the use of a generic computer, a known user interface or multimedia presentation of information, shall not be deemed to have technical effects". This sort of rule would allow inventions – the technical effect of which is artificially to "dress up" an innovative programme with various tangible devices such as microprocessors, printers, screens, keyboards, mobile telephones etc. – to be excluded from patentability. It would also avoid patents on business methods which describe the use of a technical device enabling purchases to be made.

5.4.6 Analysing the invention as a model, problem and solution

The second approach could be to introduce a third parameter into the analysis of the invention: the model used to represent the real world. The invention of a technical process controlled by com−
puter programme could then be analysed under three headings:

1. the model used to represent the real world in digital form;
2. the problem to be resolved, formulated in digital terms according to the model;
3. the proposed solution to the problem in the framework of the model, in the form of a programme.

Let us take the case of the "MP3" process. The model is the result of combining a model of sound representation by sampling, and a model of human sound perception, based on frequential and temporal masking. The problem that must be solved is to divide a sound file at maximum perceptive quality by ten in real time. The solution is a computer programme.

Once the "model, problem, solution" analysis has been completed, we propose that the novelty of the model, the problem and the solution be analysed. There are eight possible resulting cases. In our opinion, only cases where the model and the problem are new are patentable. Where the model is known, or where the problem is known, the patent application is in our view ungrantable because it is not inventive, or the object of the invention makes it non-patentable.

Where the model is known and the problem is known, in our view there is no inventive activity because it is not possible to demonstrate that the solution arrived at was not the result of an optimisation calculation obtained without human intervention. Where the model is known and the problem is new, the invention is not patentable from our viewpoint, because it would be tantamount to actually patenting a problem: it is possible automatically to determine all the possible solutions for this new problem, using known models. Where the model is new and the problem is known, the invention is not patentable in our system because in this case it would be patenting a model: it is possible automatically to determine all the solutions to known problems using this new model. Where the model is new and the problem is new, the invention, using our system, is patentable, including where the solution is not new, because the inventiveness in our case lies in the combination of a model and a problem, and not in the solution, which can be the result of a calculation without human intervention.

Let us go back to the example of the "MP3" process with this approach. The process is patentable on condition that the model of human sound perception by masking, and the problem, which is to compress by a factor of 10 a sound file, are both new. In the case of the "ABS" process, patenting is possible if the problem and the model are both new.

More generally speaking, the "model, problem, solution" approach presented above allows ex-

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135 There is, it is true, a finite number of programmes the size of which is smaller than a certain number of lines. It is therefore possible in theory automatically to determine, by an optimisation process, without human intervention and in a finite time, a programme to resolve a problem formulated in mathematical terms by using a digital model of the real world. In practice, the techniques for automatic programme generation by optimisation are increasingly successful in fields as varied as the production of printed circuit boards or simulated sailing. These techniques are based on mutation-selection technology (artificial life) or adaptative programming technology (neurone networks). They often lead to generation of programmes that solve a problem without us really knowing how.
Clear rules for drawing the limits to the boundaries of the patenting system

ceptional treatment of more cases where the technical effect is deemed to be absent. This is more particularly the case of the first approach presented, since the model representing the real world in a known multimedia interface is indeed a known model.

Table 4. Analysis of patentability by model, problem and solution

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5.4.7 What is to be done with the 10 000 to 20 000 EPO patents?

One major question arising today for politicians convinced of the value of a *sui generis* right for protection of intangible inventions is what position to take with regard to the patents granted by the EPO, and to the precedents that have made part nonsense of the European Patent Convention. We propose to deal with this question on the basis of two approaches: EPO rules, and patents already granted.

As regards the EPO rules, the fact that the decisions on patentability of "product programmes" are relatively recent means that national governments can choose not to abide by them without contradicting themselves, and draw up new rules. National governments do in fact have the power to oversee the EPO, a power specifically designed to avoid the EPO overstepping the mark. If this power were to be exercised it would give great satisfaction to a public which is showing concern at current trends in patenting, and would show Europe’s independence.

As regards patents already granted, it is politically impossible to have them cancelled without antagonising industry. Nevertheless, many of these patents are of little value, and are easily set aside when it comes to litigation. Heads of industry are becoming more and more aware of this. We therefore suggest that the holders of such patents be offered the possibility of changing them into "registered" intellectual methods in the sense of a *sui generis* right on intangible inventions, if they wish. It would then be in the interest of holders of patents that are clearly not technical to accept this conversion. Holders of patents that are clearly technical would see the value of their title confirmed by the adoption of clear rules.
IN SHORT - The judicial interpretations of “technical effect” and “as such” as set forth in the European Patent Convention have resulted in the granting of patents on computer programmes in Europe. The same interpretations are today being applied to patenting of intellectual methods in Europe. It seems difficult to set limits to the patenting system using these interpretations. The fields of education, culture, trade, corporate management, government and political life are already infected in the United States and, to a lesser degree, in Europe. EPO case law may be considered as excessive if the European Patent Convention is interpreted in its strictest sense. However, nearly all the patents on intellectual methods are granted on the basis of the precedents handed down on computer programme patenting, or of de facto suppression of the exception provided for computer programmes in the European Patent Convention. European governments are therefore confronted with a difficult choice: either they transpose the EPO case law into positive law, thus encouraging patenting of intellectual methods, without knowing where this will lead; or they contradict EPO case law by refusing to remove the exception for computer programmes, thereby showing their wish to set clear limits to patenting in Europe. We believe that a sui generis right by which to protect intangible inventions is the best possible solution for Europe. Therefore, we recommend that the exception for computer programmes be kept, and that clear limits to the current patenting system be set. More especially, we propose to make a constructive definition of the terms “invention” and “technical effect”. We suggest that use of a generic computer should not be deemed “technical”, and that analysis of inventions of processes controlled by programmes should be separated into “model, problem and solution”. As regards the software patents granted by the EPO, which are often of uncertain worth, we suggest that their holders be offered the possibility of converting them into “registrations” of intellectual methods in the meaning of the sui generis right.
The United States has extended patent protection, as designed for tangible goods, to innovation in the information society. However, this has not proved to be the ideal solution. At the present time, there exists no serious economic study demonstrating the social usefulness of the software patent, but there are already at least two serious and independent economic studies that appear to show the negative effects of software patents on innovation. Furthermore, it appears that any form of ownership of computer-implemented inventions necessarily leads to the extension of the patenting system to intellectual methods which can be partly or totally automated using software: business methods, corporate management methods, educational methods, etc. Now, even if the economic appropriateness of patenting software in Europe is widely debated, there already exists a broad consensus that business and intellectual methods are not patentable.

The protection of intangible inventions by patent, as practised in the United States, has several advantages. First, it answers a need, expressed by the financial world, to be able to evaluate the intangible assets of innovative companies in the new economy. Then, research workers are encouraged to look for commercial applications of their work because the number of patents they have filed is taken into account by mechanisms evaluating information research.

Unfortunately, the software patenting system as it exists in the United States also has many perverse effects: hampering innovation, blocking competition, delaying the dissemination of technical knowledge, discriminating between different ways of disseminating software, discriminating between big and small software publishers, inadequate or even irrational examining of patent applications, etc. These undesirable effects arise primarily from the fact that the term "software patent" is used for what in reality is only a patent for a simple "information processing method". Considering, in particular, that there is patent infringement when a software work entered on an IT medium describes the steps of a patented information processing method, all software publishers are placed in a position of patent infringement, and therefore find themselves vulnerable from an economic point of view. Indeed, the number of patented or patentable methods is such that it has become statistically impossible to write a programme without involuntarily using them. In other words, the author of an original programme, who is the owner of that programme in copyright law, is almost always unable, under patent law, to capitalise legally on the programme. It is not surprising, therefore, that several independent economic studies have all concluded that the American software patenting sys-
tem is economically harmful.

To remedy these perverse effects, the protection of intangible inventions should be adapted to the specific nature of software, in order legally to integrate the competitors’ innovations into one’s own, both when writing and when commercially using the software. To this end, two approaches can be envisaged: one based on an adaptation of patent law, the other based on the creation of a *sui generis* right for intangible inventions. We have dismissed the option of leaving intangible inventions in the realm of *laissez-faire* (i.e. without protection) because of the strong pressure against such an approach.

The "adaptation of patent law" approach involves proposing an appropriate definition of infringement and reducing the extent of the privileges associated with the patent, in particular through a principle of automatic, non-discriminatory licence. To be more precise, this approach involves distinguishing a "useright" for computer-implemented inventions (patent law) from the "right to reproduce computer programmes" (copyright). Once this is clarified, anyone can legally make use of a patented computer-implemented invention with the programme of his choice. Moreover, any software author can offer users the means of using the computer-implemented invention of his choice. A licence system, coupled with an automated electronic market, would ensure arbitration between software authors, users and inventors, without affecting competition among software producers and also ensure an income source for inventors with which innovation could be financed.

The "*sui generis* right" approach involves adopting an appropriate definition for the pirating of intangible inventions, and reducing the period of protection of intangible inventions to one reflecting innovation cycles in software and digital services. The creation of a *sui generis* right would ensure that the protection of intangible inventions did not induce effects adverse to industrial or commercial secrecy, and did not result in lack of industrial and commercial transparency. This approach would also allow for the conception of a mode of protection that would, from the start, include automatic, Web-based, management methods, which would then be faster, more productive, and in keeping with information society time scales.

The protection of intangible inventions concerns the entire commercial and education services sector. The case law built up by the EPO does not yet allow clear limits to the area of patentability to be defined because it entails the risk of a *de facto* privatisation of ideas. Now, selecting a means of protection today involves choosing the economic and political model for the information society of tomorrow. Between the refusal of any form of protection for intangible inventions and the extension of the patenting system designed for tangible inventions, in its present form, to intangible innovations, there are many scenarios and approaches, pursuant to the general principles of the Treaty of Rome, to protect the interests of consumers, software publishers, inventors and society at large. Before choosing a strategy for France, a detailed and impartial review of the various possible scenarios should be carried out, this involving players from the information society as well as its
legal and economic experts. There is a great danger that giving a predominant role to patent profes-
sionals, whose economic interests in this field are obvious, will render the choice a subjective one. To find a position consistent with general rather than specific interests, businesses, in particular the many small and medium-sized European software companies, as well as innovation and competi-
tion economists, should be involved.
6.1 Economics

Sequential Innovation, Patents, and Imitation, James Bessen and Eric Maskin (MIT)

This article shows that the introduction of patenting into sequential innovation systems tends to reduce investment in R&D and innovation. The case of software is studied. A correlation between the extension of patentability and the reduction of innovation is noted on statistical evidence.

Non obviousness and the incentive to innovate: an economic analysis of intellectual property reform, Robert Hunt (Federal Reserve Bank of Philadelphia)

This article shows that extending patentability to inventions of slight inventiveness tends to reduce investment in R&D and innovation in comparison with a more selective system.

Patenting system is Intellectually Corrupt, Gregory Aharonian

This article shows that software patenting has become a registration system (i.e. without genuine examination of the level of inventiveness). 90% of software patents filed in the United States are therefore of no value because of a lack of novelty or inventiveness. Similar proportions are observed in Europe.

Brevets et normes, Pierre Breese

This article, written by one of the most active defenders of software patenting, shows that patenting can have negative effects on small and medium-sized businesses as soon as it affects standards. This analysis is very important because computing is an economy of actual standards. Some solutions are proposed based on a limitation of patent privileges.

Software Useright: Solving Inconsistencies of Software Patents, Jean-Paul Smets-Solanes

This article shows that software patenting, on account of the complex interplay of the actors involved, leads to financing innovation at cost price because of integration phenomena investment in R&D as well as innovation then tends to decrease.
Patents and innovation in the international context (OECD)

This report compares patenting systems in the world, studies their effect on innovation and analyses a few patent abuse strategies that lead to blockages.

Why software shouldn’t be covered by patents (Tord Jansson)

Tord Jansson is the author of original software for MP3 compression. Following threats from Thomson Multimedia, he had to withdraw his software from the Internet, although these threats appeared highly abusive to him because they were contrary to European positive law. He wrote an article in which he explains the economic reasons which, according to him, should lead to non-patentability of software being strengthened in Europe.

6.2 Law

1991 European Directive on software

Today this Directive lays down the legal framework for protection of software in Europe. The principle of interoperability, as well as a definition of what an ‘interface’ is, is given.

Extracts from "Lamy Informatique" 1998

A compact legal analysis of French patent law, case law and the EPO’s excesses in the field of software.

Extracts from the European Patent Convention

Article 52: definition of the field of patentability and its exceptions. Article 173: litigation between States.

Extracts from the TRIPs Agreements

Articles 7 and 8: objectives and principles (sharing of knowledge, competition, innovation). Article 27: definition of the field of patentability.

Decision of the EPO on the patentability of a "programme–product"

Decision in which the EPO explains that a ‘programme product’ is not a ‘programme as such’ and thereby creates case law contrary to positive law. Numerous references to the TRIPs Agreement were made to justify this position, although this agreement, as actually mentioned there, does not concern the EPO and does not cover software.

Proposal from the EPO for revision of the European Patent Convention

One notes the transfer of exceptions (52.2 and 52.3) into the statutory part and a definition of invention (52.1) as used in the TRIPs Agreement.
Muddy Rules for Cyberspace, Dan L. Burk
This article offers a multidimensional legal analysis of intellectual property in order to determine the vectors according to which greater flexibility in ownership can lead to greater social effectiveness.

6.3 Public policy

A Framework For Global Electronic Commerce, President William J. Clinton, Vice President Albert Gore, Jr
This article shows that the policy of the United States is to extend its intellectual property law to the rest of the world.

Green paper on Community patent – appropriate follow up to the white paper
This report shows that the European Commission wishes to bring European law into alignment with American law, and cites Microsoft as an example of the benefits of software patenting for innovation.

Conference organised by the German Minister of Finance with German small and medium–sized businesses
In Germany, the question of patents is handled by the Minister of Justice, although the Minister of Finance is generally very sensitive to advice from small and medium–sized businesses This resulted in the Minister of Finance organising a conference with German small and medium–sized businesses, as well as large companies (Siemens, IBM, etc.). The point of view of the small and medium–sized businesses is clear: the patent is dangerous for them.

Press release from the European Commission
Even before having drafted a readable Directive proposal or having clarified its position on the question of software, the European Commission issued a press release to announce the adoption of the Community patent.

Trilateral studies on patents for intellectual methods
These documents compare Patent Office practices with respect to patents on intellectual methods. At the EPO, prior searches appear more extensive and the field of patentability formally more restricted but the required level of inventiveness is lower.

6.4 Press articles

Patent Wars (The Economist)
A good introductory article to software patent games and their pathologies. In particular, it contains
quotes from patent examiners explaining that there is no incentive for them to refuse obvious patents.

Software Patents Tangle the Web (MIT Techreview)

This article is an in depth investigation of the effects of patents in the area of the new economy and of their pathologies.

6.5 Conferences

Extracts from the proceedings of the UNION conference (1997)

Industrial property attorneys started gathering in 1997 to celebrate the development of EPO case law in favour of software patentability. A Commission representative participating in this gathering confirmed that nothing in the law was forcing Europe to patent software, but that the Commission wished to interpret the TRIPs Agreements in a manner that would oblige Europe to patent software.


This conference, jointly organised by the European Commission and the British government, resumed work on the issues of the UNION conference 1997. Only sour note: the representative of British computer scientists recalled the economic dangers of software patenting and opposed this. It is on the basis of this conference, in particular, that the internal market department of the European Commission claimed that there is a consensus. Perhaps it would be better to claim that there is a consensus, but only within the community of industrial property professionals (attorneys, Patent Offices, industrial property directors, etc.).

6.6 Petition for a Europe without software patents

Press releases

EuroLinux is an alliance of software companies and non-profit associations. Contrary to what the name suggests, numerous companies within the alliance are publishers of proprietary software or software for implementation systems other than Linux (Windows, MacOS). EuroLinux has launched a petition asking that positive law be applied and that the extension of patenting to software not be considered without a prior impact study. More than 20 000 citizens, 50 companies and 300 company directors support the EuroLinux petition.

EuroLinux file on software patents

EuroLinux has published a brief text, readable in 15 minutes, which analyses aspects of patentability. Besides the traditional arguments, the file comprises original and little known legal analyses on the inconsistencies between patent law and advanced computing applications (artificial life, interaction between vending sites etc.).
6.7 Examples of software patents