

Software and Computer-Related Business-Method Inventions: Must Europe Adopt American Patent Culture?

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1 Introduction

The Member States of the European Union and the European Patent Convention have embarked on an exercise to revise the European patent regime,² particularly in respect of the protection of information technology.³ The form that this new regime takes will be quite significant for the affected industries as well as the public at large – as consumers, as investors, and in terms of low-cost access to innovative communications

¹ St Peter's College, Oxford My thanks to Prof Ian Lloyd and Dr Ian Walden for their comments on a previous draft of this paper.

² No decision was taken on the merits of amending Article 52(c) of the EPC at the Intergovernmental Conference of the Member States of the EPC in Paris on 24–25 June 1999, but it was decided to place the issue before the next Revision Conference; [1999] OJ EPO 550. It is expected that both a draft Directive from DG XV and a comparative study on examination in this field by the Trilateral Commission (the United States Patent and Trademark Office, the Japanese Patent Office, and European Patent Office) will be released soon. In addition, the USPTO is scheduled to conduct a Round Table on Computer-Implemented Business Method Patents on 27 July 2000 as part of its 'Business Method Patent Initiative', the results of which are to be published on the USPTO web-site; 65 FR 38811 (22 June 2000). The UK Patent Office has committed itself to consult interested parties after the European Commission's proposals are announced.

³ One might note that revising the EPC in respect of business method patents may have a spill-over effect in the biotechnology field as well, particularly with respect to computer-based methods of dealing with data produced through the Human Genome Project. See LM Sung and DJ Pelto, 'Bioinformatics May Get Boost from *State Street*: Software that Can Manipulate Vast Libraries of Genetic Data May Receive Protection' (19 October 1998), Nat LJ C28.

technologies. The present system is hardly in tatters, but there are said to be significant problems in under-utilization of patents, the employment of obscure doctrines to determine patentability, and Balkanization brought about by national disparities on matters of substantive law between Member States. Notwithstanding these problems, and the fact that Europe's major trading partners have liberalized their own regimes considerably in recent years, I would suggest that great care must be taken before adopting radical changes simply to avoid the supposition that not to do so will place European industry at a competitive disadvantage in the future. In this paper, I shall briefly outline the present state of the law, the road travelled to reform, and offer some thoughts on what lies ahead. The position that I advocate here is a simple one.

First, to comply with TRIPs and in the interests of greater transparency and better enforceability of patent rights, existing doctrine respecting eligibility for patent protection should be revised under the terms of the European Patent Convention and should be based on a presumption of patentability.

Second, patent rights are not intrinsic or inherent rights. They are economic devices, and one must accept that more intellectual property law does not mean more intellectual property. What is most desirable is an optimal balancing of monopolistic disturbances to the market and incentives for the creation and diffusion of new knowledge. If law-makers are to revise the present patent regime to encourage more patents to be taken out in general, and in respect of an expanding class of technologies than has hitherto been the case in particular, account must be taken of the economic considerations respecting direct patent rights in new technologies and new applications of technology. It may very well be that the classes of patentable subject-matter should expand, but it may also be the case that standard-form traditional patents are not wholly appropriate instruments as presently constituted and that greater industry utilization of patents will require adjustments to the term of patent protection and the standard of innovation required to obtain a patent.

Third, I would suggest that a new European regime should strive to construct a system of fewer patents that are of high quality rather than advocating high volume patenting to match the rate of patent applications and grants in the United States. American patent culture is not mandated by TRIPs. In particular, I doubt whether the developing electronic commerce market is ripe for the new American-styled computer-related business-method patents, which are themselves questionable as to validity and have yet to attain authoritative approval in domestic American law. I suggest that an information campaign to promote a greater acquisition and exploitation of patent rights in these industries, as has been suggested by the European Commission, should be postponed until it is clear that the introduction of new monopolistic rights are clearly in the interests of technology developers, electronic merchants, and consumers.

2 The Settled Law

Neither computer programs nor business methods are patentable as such under the European Patent Convention (EPC). As a logical consequence, one assumes that computer-related business concepts in the form of 'e-commerce patents' must necessarily be outside present doctrine as well. Before considering the developments that are poised to liberalize current practice in Europe and the UK, it is worthwhile to consider briefly the nature of the present law in broad terms.

2.1 *The European Patent Convention*

Article 52 of the Convention provides as follows in respect of patentable inventions:

1. European patents shall be granted for any inventions which are susceptible of industrial application, which are new and which involve an inventive step.
2. The following in particular shall not be regarded as inventions within the meaning of paragraph 1:
 - (a) discoveries, scientific theories and mathematical methods;
 - (b) aesthetic creations;
 - (c) schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers;
 - (d) presentations of information.
3. The provisions of paragraph 2 shall exclude patentability of the subject-matter or activities referred to in that provision only to the extent to which a European patent application or European patent relates to such subject-matter or activities as such.

Article 52(1) of the Convention contains no explicit definition of what constitutes an 'invention'. The provision is itself based on Article 1 of the *Strasbourg Convention on the Unification of Certain Points of Substantive Patent Law*,⁴ which similarly left 'invention' to judicial interpretation. An 'invention', then, for the purposes of the European patent grant possesses these minimum characteristics: it is a product or method that possesses technical

⁴ See GD Kolle, 'The Patentable Invention in the European Patent Convention' (1974), 5 IIC 140; M van Empel, *The Granting of European Patents: Introduction to the Convention on the Grant of European Patents* (Leyden: AW Sijthoff, 1975).

features,⁵ is new, involves an inventive step, is capable of industrial exploitation, and is not barred as to subject-matter from patentability.⁶

From the outset, one can recognize that software is a most difficult subject-matter to reconcile with the terms of the Convention given not only the explicit bar on the patentability of computer programs and certain kinds of methods, but also on the traditional objection that nature of a computer program is, at its core, merely a series of automated mental acts performed by the equivalent of a non-human mind only and that the product of such a process is merely the presentation of information.⁷ Thus, in theory at any rate, the patentability of a computer program faces hurdles in respect of the Convention bar on the direct patentability of the subject matter as such, and, as it may fail to meet any of the standard criteria of patentability.

It can be fairly stated that the Convention does allow for patent rights in software at present, though indirectly and with somewhat obscure boundaries, where the subject-matter of the claim relates to the technical features of the invention rather than an abstract idea.⁸ Thus, the 1985 EPO *Guidelines for Substantive Examination*⁹ relating to computer-related inventions provide that where 'the subject-matter as claimed makes a technical contribution to the known art, patentability should not be denied merely on the ground that a computer program is involved in its implementation'.¹⁰

The leading and well noted¹¹ case, *Vicom*,¹² concerned a method for the enhancement of certain digitally processed images. Rejecting the view of the Examining Division that the application was properly not patentable as it was essentially either a computer program or a mathematical method, the Board of Appeal considered that the invention was properly patentable as something that caused a physical entity (even in the form of electrical signals creating the digital image) to change and thus made a technical contribution to the prior art. Thus, a computer-related invention which makes a technical contribution to the prior art by means of a specific

⁵ Undefined but see *IBM's Application*, T022/85 [1990] EPOR 98; Rule 29(1) of the *Implementing Regulations to the Convention on the Grant of European Patents* (IR) respecting the requirement of clarity in disclosure under Art. 84 of the Convention.

⁶ The invention must also be capable of being disclosed 'in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art'; Art. 83.

⁷ See the early criticisms presented in chapter 17 of the Banks Committee Report; *Report of the Committee to Examine the Patent System and Patent Law* (Cmnd 4407, 1970). However, the persuasiveness of objections based on the nature of the subject-matter itself are complicated somewhat given the evolving nature of programming science and information technologies; see, for example, S Davies 'Computer Program Claims: The Final Frontier For Software Inventions' [1998] 20 EIPR 429, 431.

⁸ See generally GD Kolle, 'Patentability of Software-Related Inventions in Europe: Law and Practice Under the European Convention' (1991), 22 IIC 660.

⁹ OJ EPO 177/1985; replacing the original 1978 Guidelines, OJ 1/1978.

¹⁰ Ch. IV, 2.3.

¹¹ [1987] EIPR D100-102; (1989) 62 Comp & L 27.

¹² [1987] 2 EPOR 74.

technical effect, assessing the invention as a whole¹³ is patentable provided that the effect does not fall within an area excluded by 52(2).¹⁴ The invention might be patentable notwithstanding the fact that the underlying idea in respect of the key advance lies in excluded area where a technical method is involved in its implementation and the patent right does not reside in the excluded area.¹⁵ Sometimes it would seem that the nature of the technical contribution depends on the degree to which it is manifested in some physical change to something, whilst other cases seem to proceed from the concrete application of the information produced by the software. Whatever its precise boundaries, the approach has been used in respect of a wide variety of computer-related inventions, and an EPO document estimates that some 20,000 such patents were issued as of March, 1999.¹⁶

To meet the 'inventive step' requirement¹⁷, the individual claim is assessed by the 'problem-solution-approach'¹⁸ which mandates an objective examination of the step bridging the technical problem and claimed solution.¹⁹ The method employed is to examine the most relevant prior art against the claimed solution, define the technical problem objectively, and thereafter inquire as to whether it would have been obvious to implement the differences between the claim and the state of the art to provide the solution. The point of the exercise is to assess the claim for a technical solution to a technical problem with reference to the prior art on the basis of whether a skilled person in the art would have (not could have) taken the inventive step claimed to solve the technical problem identified in the application.

This approach to determine whether subject-matter is barred under Article 52(c) complicates efforts to develop a transparent set of rules for the determination of the inventive step required for such computer-related inventions. The systematization of existing processes (or transactions for the purposes of electronic commerce applications) involving a computer are seemingly considered non-patentable, but it is equally possible to characterize rejection of the application specifically on grounds

¹³ *Koch & Sterzel* [1988] EPOR 72.

¹⁴ For example, *IBM* [1990] EPOR 98 (the effect was a method for performing a mental act); *Stockburger* [1986] EPOR 229 (mental act).

¹⁵ See discussion of this point by S Davies 'Computer Program Claims: The Final Frontier For Software Inventions' [1998] 20 EIPR 429, 430.

¹⁶ European Patent Office Memorandum, 'Revision of EPC: Article 52(1)-(3), Doc. No. CA/PL 6/99 (9 March 1999). Among the more notable: a claim by IBM for a program providing visual indications of conditions prevailing in an apparatus using a program (error messages); [1990] EPOR 117; a claim by Koch & Sterzel in respect of a program controlling X-ray equipment; [1988] EPOR 72; a claim by Sohei for a program accomplishing computerized inventory and financial control; [1996] EPOR 253. See E Liesegang, 'Software Patents in Europe' (1999), 5 CTR 48; I Muir, M Brandi-Dohrn and S Gruber, *European Patent Law* (OUP, 1999), 119-120, for brief reviews of relevant EPO decisions.

¹⁷ Article 56.

¹⁸ See *BASF* [1979] EPOR 85, B-354.

¹⁹ R.27(1)(c).

of lacking an inventive step (the invention is really the application of the ordinary creative ability expected of a person skilled in the art to which the invention pertains) or as excluded subject-matter under 52(c). It is precisely on this point where divergent national approaches become problematic,²⁰ and not even being restricted to the examination of computer-related inventions, weaken the present European regime considerably.

Even where the computer program as the subject-matter of the application does not run foul of the bar on direct patentability by virtue of its technical character and where it displays the necessary inventive step, the invention must still be 'new'. The EPO Guidelines note that:²¹

An invention is 'considered to be new if it does not form part of the state of the art'. The 'state of the art' is defined as 'everything made available to the public by means of a written or oral description, by use, or in any other way, before the date of filing of the European patent application'.

The state of the art of programming science is somewhat untidy given rapid pace of innovation and the present patent regime's complicating technical contribution approach. There is a very real concern that problems associated with both determining the prior state of the art accurately and accessing the prior art can result in the issuance of invalid patents if the range of patentable subject-matter is expanded. However, and notwithstanding that this is a real concern applicable to other new technologies as well, one can make the point that this is merely a transitional problem which is being addressed by patent authorities and industry groups²² world-wide to make prior art accessible to both examiners and applicants to minimize the risk of issuing invalid patents.

2.2 *The Patents Act 1977*

As referred to briefly above, one problem with the present EPC regime is national disparities within the various Member States. The British *Patents Act 1977* is cast in almost the same terms as Article 52 of the Convention:

1. Patentable Inventions

(1) A patent may be granted only for an invention in respect of which the following conditions are satisfied, that is to say

- (a) the invention is new;
- (b) it involves an inventive step;
- (c) it is capable of industrial application;

²⁰ Compare the reasoning in *Vicom* with the judgment in *Fujitsu Ltd.'s Application* [1997] RPC 608.

²¹ Part C.IV.5.1.

²² Industry is placing a great deal of information on the Internet; for example, the Software Patent Institute (<http://www.spi.org>) and the IBM 'patent server' (<http://patent.womplex.ibm.com>).

- (d) the grant of a patent for it is not excluded by subsections (2) and (3) below;

and references in this Act to a patentable invention shall be construed accordingly.

(2) It is hereby declared that the following (among other things) are not inventions for the purposes of this Act, that is to say, anything which consists of

- (a) a discovery, scientific theory or mathematical method;
- (b) a literary, dramatic, musical or artistic work or any other aesthetic creation whatsoever;
- (c) scheme, rule or method for performing a mental act, playing a game or doing business, or a program for a computer;
- (d) the presentation of information;

but the foregoing provision shall prevent anything from being treated as an invention for the purposes of this Act only to the extent that a patent or application for a patent relates to that thing as such.

In *Biogen Inc. v. Medeva PLC*,²³ the patent was granted in respect of a gene sequence for a hepatitis B virus antigen. The defendant in an infringement action sought revocation of the grant on various grounds, including that it was not properly an invention under the statute. Lord Hoffmann considered whether the lack of a definition of an invention permits examination of the subject matter as capable of constituting an invention prior to assessing its compliance with the statute and said:²⁴

The Act does not define the concept of an invention. Section 1(1) was intended to reflect, 'as nearly as practicable', article 52 of the European Patent Convention ... The four conditions in section 1(1) do a great deal more than restrict the class of 'inventions' which may be patented. They probably also contain every element of the concept of an invention in ordinary speech. I say probably, because in the absence of a definition one cannot say with certainty that one might not come across something which satisfied all the conditions but could not be described as an invention. But the draftsmen of the Convention and the Act, as well as counsel at the bar, were unable to think of any examples. Just in case one should appear, section 1(5) gives the Secretary of State power to vary the list of matters excluded by paragraph (d) 'for the purposes of maintaining them in conformity with developments in science and technology'.

²³ [1997] RPC 1 (HL).

²⁴ 41-42.

Lord Mustill, whilst agreeing with the speech of Lord Hoffmann, spoke to one point and that of the capacity of the Act to protect inventions that might not fit squarely within the Act. His Lordship recognized that his remarks were *obiter dicta*, but went on to say:²⁵

Certainly, in the great majority of cases, there will be no need to complicate the enquiry by looking outside the four conditions. The traditional law of patents is, however, in the course of adapting itself to new technologies, beyond contemplation when the foundations of that law was established. This process is not without strain, and I believe in some cases a close conceptual analysis of the nature of patentability will not be a waste of time.

It is not entirely clear, then, whether the statute permits of an independent inquiry into whether subject-matter can be excluded from patentability on a basis other than disclosed in legislation or regulation. If such a discretion does exist, it would have significant implications for the patentability of controversial subject-matter such as software.

Notwithstanding that the 'technical contribution' approach has been endorsed by domestic courts in the UK,²⁶ there are differences to the approach taken by the EPO in respect of European Patent computer program claims.²⁷

Take as an example the *Pettersson*²⁸ patent claim allowed by the EPO. The claim was made in respect of a computer system to manage queuing with reference to expressed preferences by those in the queue as to which service point they would like to obtain service. Objection was taken arguing that the claim was essentially a business method. The Board of Appeal allowed the claim on the reasoning that there was indeed a technical contribution to the prior art – '[t]he claimed apparatus is clearly technical in nature, and has practical application to the service of 'customers'²⁹ – when the invention was viewed as a whole, and that it would be an error to consider merely the abstract feature by which the next customer to be served at a particular service point was derived.³⁰

Such reasoning would seem at odds with the more restrictive approach taken in the leading case in the UK, *Fujitsu's Application*. There the claim was made in respect of a program that allowed for the manipulation of

²⁵ 31.

²⁶ *Merrill Lynch's Application* [1989] RPC 56. For a general review under the UK regime, see M Molyneaux, 'A History of Software-Related Patent Inventions in the United Kingdom' (1996), 2 CTLR 11, cont'd 2 CTLR 56.

²⁷ Davis recently characterized the differences as not so much in approach 'but a difference of opinion as to where to draw the dividing line between patentable computer programs and non-patentable computer programs (or technical or non-technical contribution) should be drawn;' R Davis 'Patentability of Computer Software' (1999), 149 NLJ 1872; cont'd (2000), 149 NLJ 65.

²⁸ *Pettersson/Queueing system* [1996] EPOR 1. See Newman, 45; Muir et al, 120.

²⁹ 8.

³⁰ 9.

images representing known crystal structures to display the model of a combined structure on a computer monitor. The claim failed examination in the Patent Office, and appeals to the Patent Court³¹ and the Court of Appeal³² were not allowed. Whether one is more impressed by the reasoning on first or second appeal, that the most salient feature by which to determine the patentability of the subject-matter was in respect of its substantive operation³³ or whether the program made a technical contribution to the prior art,³⁴ one is inevitably drawn to the conclusion that important differences existed between the EPO and the British Patent Office on such issues.

The point is not a new one or restricted to isolated examples in computer program claims, but highlights the danger of Balkanization even where subtle differences emerge between different courts on approach to barred subject-matter.

3 The Road to Reform: Recent Developments

Clearly there is a need to protect intellectual property in the form of computer programs. Over the last twenty years, there has been a cross-jurisdictional experimentation with confidence, copyright and patent doctrines to create an adequate model through which to protect computer technology. Partly arising on the back of recognized complications associated with a primary reliance on copyright to protect computer programs – regardless of whether issues are raised as questions of substantive law (whether particular aspects of a computer program might properly sustain copyright at all)³⁵ or as questions of fact (whether that which was taken from the original work is sufficient to constitute infringement)³⁶ – there has been increasing pressure to liberalize the availability of patent protection for software inventions in recent years in part to provide for stronger protection and in part to bring a greater degree of certainty to a complex area.

The European Commission has taken the position that the public policy

³¹ [1996] RPC 511.

³² [1997] RPC 608.

³³ The approach taken by Laddie J, equating the functioning of the program with the performance of a mental act.

³⁴ The approach taken by Aldous LJ, holding that the program was essentially computerized automation of existing methods. This has been subject to criticism as engendering unnecessary complexity and uncertainty to the examination of computer-related inventions; P Grubb, *Patents for Chemicals, Pharmaceuticals, and Biotechnology* (OUP, 1999), 267; I Lloyd, *Information Technology Law* (Butterworths, 1997), 285.

³⁵ As in the USA, where a complex jurisprudence has developed to separate protectable expression from non-protectable expression in software.

³⁶ As in the UK. Consider *Cantor Fitzgerald International v. Tradition (UK) Ltd* [2000] RPC 95 in this regard, where Pumfrey J's detailed reasons represented a cross between a standard legal judgment and a monograph on the science of computer programming, so extensive and complex were the technical issues surrounding the determination of *substantiality* as a matter of fact.

interest in the explicit bar on the direct patentability of computer programs is no longer justified in all cases. The Appeal Board of the EPO has taken the position that the substantive bar is a matter of policy only, and that there is no fundamental impediment in doctrine that prevents the development of a more liberal regime. This has occurred against the background of fundamental shifts in patent policy and doctrine in American law. All of these developments are worthy of closer examination.

3.1 *Developments in Europe*

3.1.1 *Policy: The European Commission's Community Patent Project*

The European Commission favours an over-haul of the current patent system towards realization of the long-fostered goal of a unitary system in Europe.³⁷ A number of significant points emerge from the 1997 *Green Paper on the Community Patent and the Patent System in Europe*³⁸ and the 1998 follow-up Communication³⁹ for software patents.

First, *prima facie*, the Commission recognizes that Article 52 of the EPC is at odds with Article 27 of the TRIPs Agreement which establishes a general principle of patentability for all inventions 'whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application'. Compliance with TRIPs would seem to indicate that the express bar on computer programs must be eliminated; I will return to this point below.

Second, the current technical contribution approach is largely a fiction. The fact is that computer programs are patentable in all but name, as the numbers indicate, but with significant exceptions and national disparities. However, whether individual applications ought to be successful is a difficult matter to predict given the uncertainties in assessing what constitutes the necessary technical contribution⁴⁰ (though in practice the EPO generally takes a lenient approach to computer-related product claims and one would not expect such claims to be refused where an inventive step can be shown).⁴¹ Moreover, and this is important in the Commission's view, such an approach excludes certain types of programs that seemingly make no technical contribution to the prior art⁴² and which

³⁷ Indeed, Reid characterizes harmonization as 'an end to be devoutly hoped for'; B Reid, *A Practical Guide to Patent Law* (3rd Ed) (Sweet & Maxwell, 1999), 9.

³⁸ COM (97) 314.

³⁹ COM (99) 42.

⁴⁰ The European Commission Communication (follow-up to the Green Paper on the Community Patent and the Patent System in Europe) characterizes the problem as 'insufficient transparency'; COM (1999) 42, para. 3.2.1.

⁴¹ Grubb, 288.

⁴² Such as accounting programs; see the European Commission Communication (follow-up to the Green Paper on the Community Patent and the Patent System in Europe); COM (1999) 42, para. 3.2.1.

are patentable subject-matter in other jurisdictions; for example, accounting programs. It is said that Europeans are placed at a competitive disadvantage at home and abroad in the global market as a result.

Third, even where the subject matter at issue might be patentable indirectly on the 'technical contribution' approach within EPC Member States, patent holders in respect of similar subject matter in jurisdictions that offer direct patents are better situated in enforcing their rights. Direct patent holders can avail themselves of a greater range of more robust remedies against direct infringement where the program is replicated on a disc or other medium. European patent holders, however, must make do with lesser 'contributory infringement' remedies as might be available in individual jurisdictions in similar circumstances.

Fourth, and related to all the above, European industry under-utilizes patents compared to similar industries in the United States and Japan. In the Commission's view the solution to these problems is to revise the substantive law respecting software patents to expand the class of patentable inventions and then to mount an 'information campaign' to promote greater utilization of patents by European industry.

What the Commission calls for, then, is a complete change in patent culture, with more transparent and liberalized rules of substantive patentability to support a growth in the issuance of computer program and associated patents in particular.

3.1.2 *Doctrine: Liberalization of 'Computer Program Product' Claims in the EPO*

In the recent case of *IBM's Application*,⁴³ the Board of Appeal of the EPO allowed appeals by IBM Corp. in respect of two claims made for computer-related inventions. The first claim concerned a method for displaying information on a computer monitor where two display windows overlapped, the second claim concerned the management of a computer's resources where a program being run made requests for allocation of resources. I do not intend to comment on the substance of the applications, but on the position taken by the Appeal Board that would seem to allow a 'carrier' or 'disc' claim for a computer program where the program has the potential to produce a technical effect that it itself patentable. As remarked on elsewhere,⁴⁴ this is a notable development.

The EPO decision made a number of very significant points of general application in respect of patents for computer program inventions.

First, it was held that whilst the TRIPs Agreement was not binding on the EPO (on the basis that the EPO does not constitute a Member State under

⁴³ [1999] RPC 861.

⁴⁴ C Tapper, [1999] *Masons CLR* 280; Laakkonen and Waite, [1999] *IPQ* 487; N Dagg (1999), *Patent World* 25; Cohen [199] *EIPR* 607; Davis, (1999) 149 *NLJ* 1872; Bristows, [1999] *In-House Lawyer* 79.

its terms), its existence and terms are relevant matters to be taken into consideration in respect of 'current trends'.⁴⁵ As noted above, TRIPs establishes a general principle of patentability for all inventions and consistent with the views of the Commission, the Board of Appeal is of the view that Article 52 must probably be revised to ensure compliance with the current trend.

Second, the interpretative Guidelines published by the EPO in respect of the EPC are not binding as the only source of substantive law in respect of European Patent applications is the terms of the EPC itself. Though this seems rather surprising it is entirely consistent with the terms of the Convention, and positions the Board of Appeal to revisit certain areas seemingly settled within the Guidelines.

Third, the present bar on the patentability of computer programs 'as such' under Article 52 means that inventions lacking a technical character cannot be considered as patentable. As discussed above, the Board of Appeal re-iterated the requisite 'technical character' of a computer program is that which is a 'further effect' than the mere physical modification of hardware that derives from the program's functioning. 'Where the said further effects have a technical character or where they cause the software to solve a technical problem, an invention which brings about such an effect' may be patentable.⁴⁶ All programs that produce such a technical effect may properly be the subject matter of a European Patent; what cannot be subject of the patent is a claim in respect of physical hardware modifications *per se* (though the program and hardware may together produce the technical effect). Thus, 'a claim directed to the use of a computer program for the solution of a technical problem' does not mean that a patent is issued in respect of the program as such 'even if the basic idea underlining the invention may be considered to reside in the computer program itself'.⁴⁷ The fact that the basic idea resides in the program does not bring the invention within Convention-barred subject-matter. Most importantly, where the underlying idea resides in the program (such that hardware or the media upon which the program is stored is not part of the invention), the technical effect might only be realised when the program is actually run on a computer. In such a case, the program properly has the potential to produce a technical effect rather than is that which produces the technical effect in physical reality, but 'this effect may also be technical ... in which case it constitutes a 'further technical effect'. This means that a computer program product [i.e. a program stored in some medium] may possess the potential to produce a "further" technical effect'. In such a case, 'the Board sees no good reason for distinguishing between a direct technical effect on the one hand and

⁴⁵ [1999] RPC 861, 868.

⁴⁶ 871.

⁴⁷ 872; citing *Vicom*.

the potential to produce a technical effect, which may be considered an indirect technical effect, on the other hand'.⁴⁸

This extension of patent protection to carrier claims is a dramatic change. Computer programs when stored on a diskette, or a CD-ROM, or other storage media that have the ability to produce 'a further technical effect' (an effect that occurs when the program is executed) can now be the subject of a patent, and the counterfeiter who copies the program as stored infringes patent rights in the invention in so doing. Thus, where the invention is in respect of a method (the program comprises all the features of a method that produces a technical effect and which, when run, implements that method) or a product (the computer configured by the software produces the technical effect), it is logical and right in the Board of Appeal's view, to protect the invention in the form of a 'computer program product' (that is, when it is merely stored in some medium).

The importance of this development is more procedural than substantive, in that it allows for greater enforcement of European patent rights in qualifying software, by removing the practical impediments to a successful claim for direct infringement of the patent by unauthorized reproduction. The development has been accepted by the British Patent Office which has recently changed its practice accordingly.⁴⁹ The British Patent Office takes the position that this change is not inconsistent with previous cases, such as *Gale's Application*,⁵⁰ where it could not be said that the programs in issue in such cases satisfied the technical contribution test.⁵¹ Thus, whilst the new practice of the EPO will be adopted in respect of carrier claims by virtue of the further technical contribution doctrine, the substantive bar to patentability of programs as such will remain unaffected and will not, in theory at any rate, admit of patentability merely where the claim is dressed up in the form of a computer program product claim.

3.2 *Changes in Patent Culture and the Rise of Software and E-Commerce Patents in the United States*

3.2.1 *Policy: Changes in American Patent Culture in the 1980s*

Before 1980, American intellectual property policy showed a marked suspicion of the use of patent protection on general principles of competition law, but particularly so in respect of new technologies where there was a fear that patent rights would be used by larger firms to force smaller firms out of the market. This was supported by the institutional reluctance of the examination authority, the Patent and Trademark Office (PTO), which was under-resourced in general and which actively sought to

⁴⁸ 873.

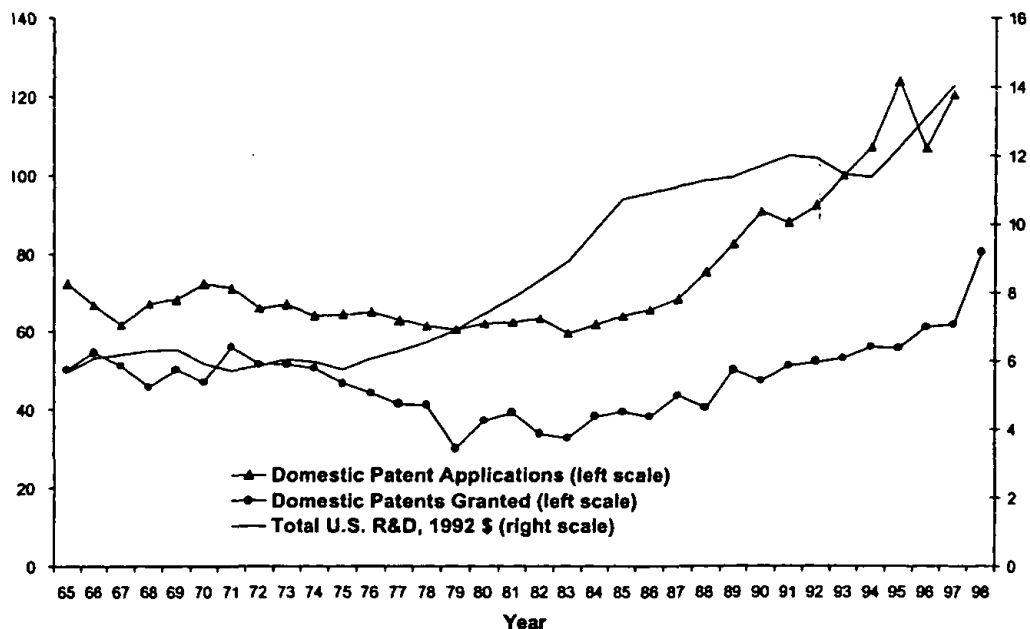
⁴⁹ Patent Office Practice Note [1999] RPC 563.

⁵⁰ [1991] RPC 305 (where the program was contained on a ROM chip).

⁵¹ [1999] RPC 563, 565.

deter patent applications in areas in which there were difficulties providing adequate examination (particularly new technologies).⁵²

With the change in executive administration in 1980, policy towards intellectual property protection, and the use of patents in particular, changed quite dramatically.⁵³ Thus by the mid 1980s, one can clearly discern a marked and dramatic increase in patent applications and grants in the United States. This has had a disquieting effect world-wide, with the implication being that American industry will occupy a much more advantageous position both at home and in foreign markets given this increase in patent rights, especially in respect of areas of new technology. Certainly that has been the effect on the European Commission. Notwithstanding the general reluctance of lawyers to consider tables and charts, the trend in America can best be appreciated when considered graphically.⁵⁴



Patent, Research & Development Trends in the United States, 1965-1998

The intriguing question is whether the changes in policy and substantive patent law in the United States was causative of this trend. Certainly this was a period of rapid technological innovation, and the implicit assumption accepted by the European Commission is that there was in fact some

⁵² GJ Maier and RC Mattson 'Street Bank In The Context Of The Software Patent Saga' (1999), 8 Geo Mason LR 307, 309.

⁵³ See LG Kastner, 'The Revival of Confidence in the Patent System' (1991), 73 J of Pat & Trademark Office Soc'y 6.

⁵⁴ A Jaffe, 'The US Patent System in Transition: Policy Innovation and the Innovation Process' (Cambridge, Mass: National Bureau of Economic Research, Working Paper 7280, 1999), 54.

degree of causation such that changes in the European regime will result in more research, new inventions and contribute to increased competitiveness within a given industry. Great care should be taken in reaching such a conclusion. Whilst the question has not received an inordinate amount of analysis by lawyers, there has been interesting work done by economists on the point.

In their 1997 study,⁵⁵ Kortum and Lerner took note of the change in patent culture and sought to explain why more American patents, measured either in absolute or percentage terms, were applied for between 1985 and 1995 than any other decade in the twentieth century.⁵⁶ The authors focused on systemic changes (the availability of new patent-specific judicial resources in the form of the Federal Circuit Court of Appeals) and the impact of technological innovation in such fields as biotechnology and information technology (the 'fertile technology' effect) to explain this new propensity to patent. Rejecting both of these explanations and related variants as primary factors, Kortum and Lerner tentatively concluded that an increase in the production of patentable subject-matter itself explained the increase; that is, 'the increase of patenting has been driven by changes in the management of innovation, involving a shift to more applied activities'.⁵⁷

A more recent and detailed study that considers the same subject has been completed by another noted economist.⁵⁸ Jaffe considered the systemic changes and the patenting associated with new areas of technological innovation in the Kortum and Lerner study as well as changes in American federal funding to university and government laboratories which encouraged private patenting of commercially useful discoveries,⁵⁹ expansion of patentable subject-matter, and the introduction of global standards through the TRIPs agreement. Disappointingly, Jaffe was not able to make robust statements about the effects of the structural and substantive changes in the strength and breadth of American patents on innovation and research. He did, however, draw attention to two alternative hypotheses that the analysis would provisionally support (though, again, the state of the research indicated that further study is needed): the innovation process was generally unaffected by the changes in the patent system, or, that patents are not central to appropriating the returns to

⁵⁵ S Kortum and J Lerner, 'Stronger Protection or Technological Revolution: What is Behind the Recent Surge in Patenting?' (Cambridge, Mass: National Bureau of Economic Research, Working Paper 6204, 1997).

⁵⁶ In 1995, the application rate was roughly three times the statistical average.

⁵⁷ Kortum and Lerner, 33.

⁵⁸ A Jaffe, 'The US Patent System in Transition: Policy Innovation and the Innovation Process' (Cambridge, Mass: National Bureau of Economic Research, Working Paper 7280, 1999).

⁵⁹ The Stevenson-Wyler Technology Innovation Act of 1980 created institutional structures to carry out explicit policy goals regarding technology transfer. The Bayh-Dole Act of 1980 allowed university and non-profit research centres to retain patent rights in publicly-funded research to give effect to a policy encouraging technology transfer to the private sector.

research and development in most industries. Jaffe ends on a cautious note:⁶⁰

There is widespread unease that the costs of stronger patent protection may exceed the benefits. Both theoretical and, to a lesser extent, empirical research suggest this possibility . . .

Thus, the research would seem to indicate that patents might not have played the crucial role in the rise of the highly successful information technology industry that one might think given the coincidence of the growth of technology, structural changes in the patent regime, and the explosion of patents. Indeed, diversion of funds that might otherwise have been spent on other matters like research and development may have been allocated to the acquisition, defence and enforcement of intellectual property rights in the form of patent.

3.2.2 *Doctrine: State Street Bank & Trust Co. v. Signature Financial Group Inc.*

As referred to briefly above, the range of patentable inventions in the United States has expanded in the past twenty years, specifically with respect to the treatment of computer programs.

The United States is a federal system, and the Congressional legislative grant to enact laws in the area of intellectual property protection is governed by Article 1(8) of the American Constitution:

[The Congress shall have the power . . .]

To promote the Progress of Science and the useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.

The Patent Act⁶¹ provides as follows in respect of patentable subject-matter:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The patentability of software in the United States, as in Europe, depends on the subject-matter of the application being patentable under the general invention section of the legislation and the fulfilment of the requisite elements of novelty, utility, and non-obviousness.

Until 1981, the American position was unsympathetic to software

⁶⁰ Jaffe, 47.

⁶¹ 35 USC § 101. The classification of patentable subject-matter is based on the 1793 Act, save that 'process' replaced 'art' in the 1952 Act (though both terms are accorded the same meaning).

patents⁶² and the PTO fought against software applications to such an extent that the profession was mainly of the view that software was largely unpatentable. This position was based primarily on two Supreme Court decisions which had held that a mathematical formula in the form of a method for converting binary-coded decimal numbers into pure binary numerals in a computer program was non-patentable subject-matter,⁶³ as was a process using a mathematical formula which monitored certain variables during a catalytic conversion process and set alarm limits.⁶⁴ The reasoning and policy analysis in each of these cases was similar but somewhat obscure. The Court was concerned that, in each application, the applicant sought to patent an abstract idea in the form of a mathematical formula (and in so doing pre-empt the algorithm's further use) which would violate the long-held rule that mathematical expressions of scientific truths are not patentable for reasons of policy.⁶⁵ The Court's decisions also endorsed the institutional position that the PTO had advanced with some consistency since the early 1970s: computer programs as a new type of invention would place undue pressure on the examining authority such that it was preferable for the legislature to intervene with an explicit grant of patentability to ensure validity of the issued patent. Whilst the Court refused to go the extra mile and hold that computer programs *per se* were unpatentable subject-matter, the lasting effect was to cloud the application of the general principles of patent law in confusion in respect of how to treat a mathematical algorithm in terms of patent.⁶⁶

With its decision in *Diamond v. Diehr*,⁶⁷ the Supreme Court considered a patent application in respect of a process for moulding and curing synthetic rubber which incorporated a computer program into the control of the process and brought some greater clarity to the law on this point. The Court agreed that where a computer program incorporating a non-patentable algorithm⁶⁸ is part of a traditional manufacturing process, patentability will not be barred merely because of the presence of the non-patentable element. Thus, on par with Board of Appeal's later reasoning in *Vicom*, the Court held that where the invention taken as a

⁶² Rather than being discussed in terms of computer programs and computer-related inventions, the issue is formed in American law as to the patentability of mathematical algorithms. The term itself can have a variety of meaning but one can assume a meaning equivalent to a series of steps to perform a given task. See the useful discussion by J Swinson, 'Copyright or Patent or Both: An Algorithmic Approach to Computer Software Protection' (1991), 5 Harv J Law & Tech 145, 145-157.

⁶³ *Gottschalk v. Benson*, 409 US 63 (1972).

⁶⁴ *Parker v. Flook*, 437 US 584 (1978).

⁶⁵ *Mackey Radio & Telegraph Co. v. Radio Corp.*, 306 US 86 (1939).

⁶⁶ See P Samuelson, 'Benson Revisited: The Case Against Patent Protection for Algorithms and Other Computer-Related Inventions' (1990), 39 Emory LJ 1025, 1033-1040, and, 'A Case Study on Computer Programs' in MB Wallerstein, ME Mogue and RA Schoen, *Global Dimensions of Intellectual Property Rights in Science and Technology* (Washington: National Academy Press, 1993).

⁶⁷ 450 US 175 (1981).

⁶⁸ In the sense that the algorithm was not novel as being an industry-standard measurement.

whole does not offend developed principles of non-patentable subject-matter (as here), the application may then be considered in its various claims under the statutory requirement for issuance of the patent. Thus, the majority held:⁶⁹

This Court has undoubtedly recognized limits to 101 and every discovery is not embraced within the statutory terms. Excluded from such patent protection are laws of nature, natural phenomena, and abstract ideas.

...

Our recent holdings in *Gottschalk v. Benson* . . . and *Parker v. Flook* . . . both of which are computer-related, stand for no more than these long-established principles.

...

We recognize, of course, that when a claim recites a mathematical formula (or scientific principle or phenomenon of nature), an inquiry must be made into whether the claim is seeking patent protection for that formula in the abstract. A mathematical formula as such is not accorded the protection of our patent laws . . . and this principle cannot be circumvented by attempting to limit the use of the formula to a particular technological environment . . . when a claim containing a mathematical formula implements or applies that formula in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect (e.g., transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of 101

Following *Diamond v. Diehr*, policy substantially shifted in respect of software patents such that by the mid-1980s one can fairly say that the policy of the PTO was to deny patentability only when it could be said that the mathematical algorithm and program subject of the application were wholly abstract,⁷⁰ and could not constitute ‘a useful, concrete and tangible result’.⁷¹ The practical problem, much like the situation in Europe after *Vicom* in respect of a ‘technical contribution’, is uncertainty in respect of

⁶⁹ 450 US 175, 192–193 (1980).

⁷⁰ The Federal Circuit Court of Appeal has adopted the ‘Freeman-Walter-Abele’ test used in its predecessor court, *In re Abele*, 684 F 2d 902 (CCPA 1982); *In re Walter*, 618 F 2d 758 (CCPA 1980); *In re Freeman*, 573 F 2d 1237 (CCPA 1978). See also the PTO *Examination Guidelines for Computer-Related Inventions*, 61 Fed. Reg. 7478. However, application has not always been consistent; see C Cantzler, ‘State Street: Leading The Way to Consistency for Patentability of Computer Software’ (2000), 71 U Colo LR 423, 449–450.

⁷¹ *In re Alappat*, 33 F 3d 1526, 1544 (Fed Circ 1994).

what constitutes a non-patentable abstract 'mathematical algorithm'. As Judge Plager recently held:⁷²

A mathematical formula alone, sometimes referred to as a mathematical algorithm, viewed in the abstract, is considered unpatentable subject matter ... Courts have used the terms 'mathematical algorithm', 'mathematical formula', and 'mathematical equation', to describe types of non-statutory mathematical subject matter without explaining whether the terms are interchangeable or different. Even assuming the words connote the same concept, there is considerable question as to exactly what the concept encompasses.

Perhaps most significantly, American practice changed in 1995 to allow for carrier claims in respect of software patents.⁷³

It is against this general background that one ought to consider the most recent development of note, *State Street Bank & Trust Co v. Signature Financial Group Inc.*⁷⁴ The import of this case is to liberalize the patentability of useful mathematical algorithms following *Diamond v. Diehr*, and particularly in respect of another area in which patentability was thought to be excluded,⁷⁵ 'business methods'.

The case involved US Patent No. 5,193,056 claiming patent protection for a data processing system that 'allows an administrator to monitor and record the financial information flow and make all calculations necessary for maintaining a partner fund financial services configuration'. Essentially, the subject of the application was a computer program for the management of investments owned by various investment funds which had merged their funds for that purpose, and which was organized advantageously for tax purposes. In compliance with regulation, the software tracks changes in the financial data in respect of the securities owned and their value and market performance, as well as the allocation of assets amongst the owning funds based on changes in the individual funds' ownership of assets within individual investment portfolios. The invention, then, was not part of a traditional manufacturing process nor did it produce a something patentable in and of itself.

Judge Rich held that the application was within the scope of patentable subject-matter under s. 101.⁷⁶

⁷² *AT & T Corp. v. Excel Communications, Inc.*, 172 F.3d 1352, 1355-1356 (Fed Circ 1999); *cert. denied*, 120 S.Ct. 368 (1999). See previous comments by Judge Prager in *In re Warmerdam*, 33 F 3d 1354, 1359 (Fed Circ 1994).

⁷³ *In re Beauregard* 53 F.3d 1583 (Fed. Cir. 1995); incorporated into the USPTO *Examination Guidelines for Computer-Related Inventions*, 61 Fed. Reg. 7478, 7481 ('data structures and computer programs which impart functionality when encoded on a computer-readable medium' are patentable as functional descriptive material under 35 USC § 102, 103).

⁷⁴ 149 F 3d 1368 (Fed Circ 1998); *cert. denied*, 119 S Ct 851 (1999).

⁷⁵ For example, *In re Patton*, 127 F 2d 324 (CCPA 1942).

⁷⁶ 149 F 3d 1368, 1372, 1374.

Unpatentable mathematical algorithms are identifiable by showing they are merely abstract ideas constituting disembodied concepts or truths that are not 'useful'. From a practical standpoint, this means that to be patentable an algorithm must be applied in a 'useful' way.

...

Today, we hold that the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces 'a useful, concrete and tangible result' – a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades.

...

The question of whether a claim encompasses statutory subject matter should not focus on which of the four categories of subject matter a claim is directed to – process, machine, manufacture, or composition of matter – but rather on the essential characteristics of the subject matter, in particular, its practical utility.

That the subject of the application was essentially a business method, Judge Rich held that subsequent statutory amendment has rendered the judicially constructed doctrine inapplicable – '[s]ince the 1952 Patent Act, business methods have been, and should have been, subject to the same legal requirements for patentability as applied to any other process or method'.

State Street is a major development because it is essentially a grant of patent rights in a method of data manipulation – here, manipulation to produce 'a final share price momentarily fixed for recording and reporting purposes'. This departs from earlier doctrine that data manipulation had to represent a measurable physical condition,⁷⁷ and now seemingly data as abstract representation of some quantifiable thing (in this case, share values) is sufficient. If the data has meaning, it is patentable.

The decision has produced an explosion of patents in respect of electronic commerce,⁷⁸ and with it controversy as to the propriety of sweeping expansion of patent rights in this emerging industry which I shall return to below.

⁷⁷ *Arrhythmia Research Technology Inc. v. Corazonix Corp.*, 958 F 2d 1053 (Fed. Cir. 1992); *In re Alappat*, 33 F 3d 1526, 1544 (Fed Circ 1994).

⁷⁸ For example, the Amazon.com 'one-click ordering' patent, US Patent No. 5,960,411; see *Amazon.com, Inc. v. BarnesandNoble.com, Inc.*, 73 F Supp 2d 1228 (Wash Dist Ct 1999).

4 Comments on the Issues

As I have sought to review briefly above, the present European patent regime in relation to computer software is thought to be in need of revision to expand substantive eligibility for patent protection and to provide for more robust enforcement of patent rights against counterfeiters. However, will revision of the patent regime and patent culture to encourage greater utilization of patents in the information technology field actually benefit European industry? I would suggest that the answer to this question is not entirely clear and would offer three points for consideration.

4.1 *The TRIPs Presumption of Patentability and Greater Transparency*

One scholar has written that 'domestic regulation of technical innovation in free-market economies has traditionally evolved from several different directions at once, with parochial disregard for a more coherent approach to what has become a quintessentially trans-national set of problems'.⁷⁹ The last twenty-five years have seen the emergence of intellectual property as an international trade issue with the expectation that a trade-linked approach to the protection of intellectual property on an international basis will produce a more coherent approach. The underlying rationale in this new system is necessarily an economic one – the danger in not achieving harmonization of intellectual property laws amongst trading partners is that the free flow of technology around the globe will be impaired and that such laws may be effective barriers to trade.⁸⁰ There is also concern as to obtaining the necessary resources to enable further innovation of new technologies. As the Bangemann Committee reported with respect to the need for reform in the new technological context, the regulation of crucial aspects of competition in the information age is a prerequisite for mobilising resources and capital necessary for innovation.⁸¹

The approach to patent protection favoured in the new WTO trading system is one based on a presumption of patentability, almost completely excluding statute-based general exclusions based on specific types of subject-matter like computer programs. Thus, Article 27 of the TRIPs agreement provides: 'patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application'. It

⁷⁹ JH Reichman, 'Beyond the Historical Lines of Demarcation: Competition Law, Intellectual Property Rights, and International Trade after GATT's Uruguay Round' (1993), 20 *Brooklyn J. of Int'l Law* 75,76.

⁸⁰ A Gutterman, *Innovation and Competition Law* (London: Kluwer Law International, 1997), 484; JH Reichman, 'Universal Minimum Standards of Intellectual Property Protection under the TRIPs Component of the WTO Agreement' (1995), 29 *The International Lawyer* 345, 346; G Evans, 'Intellectual Property as a Trade Issue' (1995), 18 *World Comp.* 137.

⁸¹ High-Level Group on the Information Society, *Europe and the Global Information Society: Recommendations to the European Council* (1994), Chapter 2.

is worth noting that Article 27(2) allows for the exclusion of patent rights from certain subject matter or from being asserted in appropriate cases, including on the basis of *ordre public*,⁸² that is, public policy.⁸³ Whilst one might argue that this exclusion can be interpreted so broadly as to include exclusion of otherwise patentable subject matter based on broad economic considerations,⁸⁴ I would suggest that the better view is that Article 27(2) should be read more narrowly such that it disturbs the presumption of patentability only to the extent that exploitation of a particular invention may be against the public interest and thus may be deemed non-patentable subject-matter on the basis of negative utility rather than operating against a broad class of inventions as may be deemed non-patentable under Article 27(3) on general principle.

As the European Commission's Green Paper and the Board of Appeal decision in the recent IBM case acknowledge, Article 52 of the EPC seems at odds with the presumption of patentability mandated by TRIP. It seems quite clear that the EPC is in need of revision at least to the point of acceptance of this presumption. I would suggest that the obligation to comply with TRIPs is one that should be welcomed as it provides the stimulus to make the application of the EPC to software inventions more transparent by forcing our attention on the traditional features of patentability – novelty, capacity for industrial exploitation, and the presence of an inventive step/non-obviousness – which diminishes the scope for national disparities in interpretation of substantive doctrine. The additional benefits of such an improved structuring of the current system will be greater efficiency – greater certainty of an application's successful prosecution, better utilization of patents by potential proprietors, optimized expenditures in acquiring and enforcing patent rights, and the availability of more robust remedies against infringement. By the same token, however, it also puts additional pressure on national patent authorities to provide robust and meaningful examination of patent applications in new areas.

4.2 *Revising the Patent Regime: Should the Length and Height of Patents Change?*

Intellectual property policy in Europe has both national and regional

⁸² Article 27(2) provides that 'Members may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect *ordre public* or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the environment, provided that such exclusion is not made merely because the exploitation is prohibited by their law.'

⁸³ See D Gervais, *The TRIPS Agreement: Drafting History and Analysis* (Sweet & Maxwell, 1998), 148–149; consistent with the use of that term in the jurisprudence of the European Court; see, for example, *Cullet v. Centre Leclerc* [1985] 2 CMLR 524, 533. It is interesting to note that residual discretion to deny patentability on grounds of negative utility have been existent in English law in varying forms since the Statute of Monopolies (1624).

⁸⁴ TG Ackermann, 'Dis'ordre'ly Loopholes: TRIPs Patent Protection, GATT and the ECJ' (1997), 32 Texas Int LJ 489, 495–505.

dimensions. Traditionally the interest of the European Community institutions has been to prevent exploitation of intellectual property rights in such a manner is contrary to effective competition and an integrated market,⁸⁵ with substantive rules of entitlement being left to international agreement and domestic law. Indeed, cases in the past ten years tend to show a concern that abuse of intellectual property rights can have an anti-competitive effect.⁸⁶ Like competition policy, substantive patent rules are economic devices to allow the market to function efficiently whilst directing the market to achieving certain goals, i.e. promoting research and development and the creation of new knowledge. Thus, the question that confronts European lawmakers now is not merely one of revising European patent doctrine to meet with the obligations arising from accession to TRIPs, but of *patent policy* and specifically whether the economics of protecting technological innovation through more expansive use of patent within a revised European patent regime represents a more efficient utilization of resources than under the present regime.

If TRIPs does indeed mandate that the breadth of patent protection be expanded in principle (through adoption of the presumption of patentability), considerations respecting the length (i.e. the term) and the height (i.e. the standard of innovation required in the sense of novelty, utility and inventive step) of patent rights should inform law-makers in setting the limits of such doctrine. One should recognize that the danger of over-utilization of monopolistic tendencies through the use of patent protection, precisely in the industries in which policy-makers wish to promote growth such as the software industry, is that overly-broad patent laws may result in the opposite of the intended effect. Indeed, it appears clear that the industry itself is divided on the question of the utility and desirability of patent protection as an appropriate device to promote growth; the under-utilization of patent by the industry may be seen as entirely rational and consistent with those economic analyses that support the proposition that the American IT industry has not evolved based on the use of patent to protect innovative products and technologies. The answer to the problem of under-utilization of patents may not lie in expanding the class of patentable inventions or encouraging industry to patent more through any well timed information campaign, but in adjusting the nature of patent protection to meet the needs of rational industrialists who now do not necessarily favour patent protection.

What is required, then, to move things forward is a thorough consideration of the economic implications of the introduction of software patents in the European software industry with a view to determining the optimum term and eligibility criteria for software patents. For example, many

⁸⁵ See SD Anderman, *EC Competition Law and Intellectual Property Rights* (OUP, 1998), 11.

⁸⁶ For example, *RTE v. Commission* [1995] EC I-743; *Tetra Pak Rausing SA v. Commission (I)* [1990] ECR II-309 and *Tetra Pak Rausing SA v. Commission (II)* 4 CMLR 662.

proposals have been made suggesting that soft or petty patents would be a more advantageous way in which to use patent in this area;⁸⁷ alas, such questions are beyond the scope of this paper but I would suggest that those questions should be answered (and specifically in relation to optimal use of patent protection in economic terms) before advocating a dramatic change in European patent culture to mirror changes in America on the basis of patents as presently constructed. One should recognize, however, that radical reforms can only be realistically accomplished in an international forum under the auspices of the World Trade Organization rather than on a unilateral basis, whether national or regional.

4.3 *The Danger of Building E-Commerce on a Foundation of Invalid Patents*

The United States Patent and Trademark Office, according to journalistic reports at any rate, is presently being besieged by business-method patents, a large number of which involve software applications or the conduct of commerce on the Internet. Unfortunately it is too early in the day to confirm the extent of such recent filings,⁸⁸ but I would suggest that one can assume that in the era after *State Street*, it is certainly in the interest of potential applicants to pursue patent protection so that they might set *de facto* industry standards. However, I would suggest that there is a very real risk that the fledgling e-commerce industry is being built on a foundation of invalid patents and that the resulting potential for misfortune is most disquieting. At the very least, we should be concerned that if such patents are not of the very best quality, they are, inherently, an unfair method of competition which unjustifiably shifts the burden of invalidation to competitors – who themselves may be fledgling entrepreneurs unable to shoulder the costs involved in protracted examination and litigation.

I would suggest that Europe should take care before travelling the same road. One should be aware that the issuance of invalid patents is highly undesirable: valuable resources are wasted in filing and prosecuting the application itself, research is inhibited where potential inventors fear infringement of the (invalid) patent, and resources are wasted by those seeking to speculate rather than invest resources in more productive activities.⁸⁹ Rather than encouraging the high-volume acquisition of patents which are questionable as to validity, I would think that a better goal for the new European patent regime in respect of e-commerce would

⁸⁷ The most influential proposal was that made by P Samuelson, R Davis, M Kapor, and JH Reichman; see 'A Manifesto Concerning the Legal Protection of Computer Programs' (1990), 94 Columbia LR 2308.

⁸⁸ The USPTO estimate that approximately 1300 patent applications were classified as 'class 705' (data processing: financial, business practice, management or cost/price determination) applications in 1998. In 1999, the number of applications doubled to 2600; 65 FR 38811, 38812 (22 June 2000).

⁸⁹ See RP Merges, 'As Many as Six Impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform' (1999), 14 Berk Tech LJ 577, 592.

be the construction of a system of fewer patents that are of high quality. That is, a more optimal use of patent rather than merely more patents. Thus, I would further suggest that it is premature to advocate a policy of encouraging more aggressive acquisition of patents in this industry as suggested by the European Commission until the validity of computer-related business-method patents have matured in doctrine somewhat, at least to the extent of receiving authoritative approval in those jurisdictions presently granting such patents.