2. Computer Programs As Excluded Patentable Subject Matter
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Part I: Overview

[1] Introduction

Patent law has been dealing with computer programs and computer based inventions for over 50 years. Over this time, there has been a remarkable series of technological developments. There have also been numerous changes in the way that patent law responds to and deals with computer programs and related inventions as patentable subject matter.

The law in this area is characterised by a number of factors. One of the first is that at a formal level there is a growing consensus in jurisdictions around the world that computer programs as such are not patentable subject matter. While there are no international treaty obligations that require countries to exclude computer programs from protection, one of the things that patent law in many countries around world share in common is the idea that computer programs should be excluded from the scope of patentable subject matter. This is reflected in the fact that more and more countries have provisions in their patent legislation that expressly exclude computer programs or equivalent subject matter from the remit of patentable subject matter. One of the few countries to have gone against this trend is Singapore, where in 1995 the section that expressly excluded computer programs from the definition of patentable subject matter was removed[1]. In other countries, however, legislative reforms have tended to involve changes that ensure that computer programs are expressly excluded from the remit of patentable subject matter. For example, in New Zealand, which is one of the few countries to define invention and in turn determine subject matter on the basis of the seventeenth century phrase 'manner of manufacture', it has recently been suggested that rather than using the open ended and positive definition of invention to exclude computer programs, that an express exclusion from patentable subject matter should be introduced into New Zealand legislation[2]. While there are a growing

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[1] *Patents (Amendment) Act 1995*. The changes were prompted, in part, by the United States of America-Singapore free-trade agreement (USSFTA).

[2] Patent law in New Zealand is currently governed by the Patents Act 1953 No 64 (as amended). However, the Patents Bill 2008 was introduced into Parliament on 9 July 2008. On 5 May 2009, the Bill was sent to a Select Committee for comment.

number of countries that expressly exclude computer programs as such from the scope of patentable subject matter in their patent legislation, a number of countries use different approaches to exclude computer programs. In some cases, computer programs are indirectly excluded on the basis that they are, for example, 'mathematical methods', 'rules and methods for mental activities', or 'mere scientific principle or abstract theorem' which are listed in legislation as excluded subject matter. In other situations, computer programs are excluded on the basis of the way that the 'invention' is construed. In this later case, the courts play a key role in excluding patentable subject matter.

The consensus that computer programs as such are not patentable subject matter is a product of a range of factors, from the continued expansion of the European Patent Convention, the growth in bilateral free trade agreements that necessitate change, and the willingness of courts and patent offices to limit the scope of the subject matter limitations. Another factor that helped to produce a consensus was the US Federal Court's 2008 *Bilski* decision which marked a move away from the liberal approach to patent protection facilitated by the *State Street Bank* decision: a change which served to bring American law with regard to computer programs more in line with the approaches adopted in many other jurisdictions: a position which was confirmed by the US Supreme Court in June 2010 when the decision of *Bilski v Kappos* was handed down[3].

Somewhat paradoxically, at the same time as there has been a growing number of countries that expressly or indirectly exclude computer programs (as such) from patentable subject matter, there is also a growing consensus that although computer programs should be treated as excluded subject matter, this is not necessarily the case where an invention, viewed as a whole, happens to include a computer program. In a growing number of jurisdictions, there is also a trend whereby computer programs as such, or at least aspects thereof, are treated as patentable subject matter. While there may have been a move in some jurisdictions, notably the United States, away from a more liberal approach to computer programs as patentable subject matter, overall the trend has been towards more and more protection for computer programs and for computer-implemented inventions (that is, for inventions that utilise computer programs).

While there is a remarkable degree of similarity between different countries in the way that they decide patentable subject matter, there are a number of important differences,

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[3] *Bilski v Kappos* 561 US __ (2010).

particularly in the way that the rules are interpreted and applied. There are also differences in terms of the extent to which computer programs per se are excluded, either directly or indirectly, from protection. In some cases, there are important differences in terms of the techniques that are used to decide whether a computer program or computer related invention is patentable subject matter. While the difference in approach does not necessarily lead to different forms of protection (although it may), it does have a number of other consequences, some of which potentially impact upon the operation of the patent system.

Another notable characteristic of the law that deals with the fate of computer programs as patentable subject matter is that it is currently in a state of flux. In part this is an inevitable consequence of the fact that law has to pass judgment over complex and rapidly changing technologies. It is also a result of the fact that there have been some dramatic changes in the way that courts and tribunals approach computer programs. As the UK Chartered Institute of Patent Attorneys said, 'the State Street Bank decision from the US Court of Appeals for the Federal Circuit caused a significant increase in the range of subject matter for which a patent could be obtained, while the ... Bilski decision from the same court represents a significant retraction. These two decisions have left US patent law in a state of great uncertainty. There have also been problems in the UK, where the IPO has issued four different Practice Notices relating to computer-implemented inventions in just the last five years. Such rapid changes are clearly undesirable given a patent lifetime of up to twenty years'.[4] It seems that while the 2010 US Supreme Court decision of *Bilski* clarified some aspects of American law pertaining to patentable subject matter that it left many issues unanswered. Similarly, the 2010 decision by the Enlarged Board of Appeal in G/O3 *Computer programs,* has not done much to alleviate differences within Member States of the EPC. While it had been hoped that these decisions would have provide more stability, it seems that this is unlikely to be the case.

Another notable characteristic of the law in this is area is that in many respects the legal position is ambiguous and lacking in certainty.[5] In many countries this is simply because the relevant patent jurisprudence has not been developed beyond the introduction of statutory exclusions. Even in those jurisdictions with extensive case law and commentary there are also many issues that need clarification. For example, following a study undertaken in 2001 about patent protection for computer programs, the UK government concluded that that the law in this

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[4] Chartered Institute of Patent Attorneys (CIPA) Amicus Brief: G3/08 (29 April 2009), 1.
[5] David Booton, 'The Patentability of Computer-Implemented Inventions in Europe' [2007] *IPQ 92.*

area was unclear[6]. This led the UK government to conclude that clarification was needed, particularly as to 'how to define the boundary defining when software is, and is not, part of a technological innovation, so that what is patentable will be clear in specific cases in the future'. [7] Recent experience in relation to the attempt to introduce a European directive on computer programs, combined with the widely diverging views of the amicus curie to the *Bilski* decision and the G/O3 decision of the Enlarged Board of Appeal at the EPO also show that there is little consensus amongst learned commentators about the scope and nature of the law.

[2] Justifications for excluding computer programs from patentable subject matter

Over time, a number of different explanations have been given to explain why computer programs should be excluded from patentable subject matter. One of the earliest explanations given for the exclusion of computer programs from patentable subject matter was because they properly belonged within copyright law[8]. This reflected the idea that computer programs were forms of writing or intellectual works which were traditionally protected by copyright rather than patents[9]. In Cambodia, this is reflected in the rule that where applicants have filed patent applications for certain types of computer programs and computer-related inventions they 'shall be considered as having waived from their right of seeking copyright protection, if available, under article 10(1) of TRIPS Agreement'[10]. The copyright-based arguments that were used to justify the exclusion of computer programs from patentable subject matter were reinforced by the idea that while patent law was exclusively concerned with technical creations, computer programs were not technical and, as such, not appropriate subject matter for patent protection.

Another argument which has been used to justify the exclusion of computer programs can be traced to the idea that computer program are effectively abstract 'mathematical methods' and 'algorithms', which have long been regarded as falling outside the scope of

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6 *Should patents be granted for computer software or ways of doing business?: The government conclusions* (March 2001), para. 11. Available at www.patent.gov.uk/about/consultations/conclusions.htm.

7 '*Should patents be granted for computer software or ways of doing business?: The government conclusions* (March 2001), para. 11, , para. 20. (www.patent.gov.uk/about/consultations/conclusions.htm.

8 It is important to note that a number of counter-arguments have been made against using copyright to protect computer programs: one of the most common is that copyright protection covers expressions and not ideas.

9 While most, but no means all, of the subject matter was excluded because it was abstract and non-technical, this was not the case with computer programs which were excluded because it was thought at the time the EPC was drafted that they were better protected by copyright law. G. Kolle, 'The Patentable Invention in the EPC' (1974) 5 *IIC* 140, 147–8.

10 *Prakas (declaration) on the procedure for the grant of patents and utility model certificates* (Phnom Penh, May 28, 2007). Rule 44(2).

patentable subject matter. In some cases, it has also been argued that computer programs, whether in their own right, or as mathematical products or algorithms, should not be regarded as patentable subject because of their abstract nature. This can be seen, for example, in the 1972 United States Supreme Court decision of *Gottschalk v Benson* which concerned 'a patent application claiming a mathematical algorithm embodied in a program embedded in a piece of hardware to convert binary-coded decimal numerals to pure binary numerals'[11]. The United States Supreme Court rejected the application on the basis that '[p]henomoena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are basic tools of scientific and technological work'[12]. More specifically, the Supreme Court said that to grant protection would have precluded any further use of the algorithm. This decision built upon the longstanding view, highlighted by the mid-nineteenth century American decision of *Le Roy v Tatha*, that 'a principle is not patentable. A principle, in the abstract, is a fundamental truth: an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right'[13]. Typically, the justification given for excluding 'basic tools of scientific and technological innovation'[14] was that it ensured that future inventors would be able to utilise and build upon these inventions. In a sense, the justification for exclusion was to protect the scientific commons[15]. The important role that the non-patentability of abstract ideas was reiterated by the Supreme Court in the 2010 Bilski decision when it was said '[i]n searching for a limiting principle, this Court's precedents on the unpatentability of abstract ideas provide useful tools'[16]. Indeed, the Supreme Court decided to exclude the application in question on the basis that 'the patent application at issue' fell 'outside of §101 because it claims an abstract idea'.[17]

One of the main problems with recognising abstract ideas as patentable subject matter is that do not provide practical useful outcomes. This is because 'abstract ideas constitute disembodied concepts or truths which are not "useful" from a practical standpoint alone, i.e., they are not "useful" until reduced to some practical application'[18]. The exclusion of abstract ideas is often justified because of the negative impact protection would have on future research and development. Another reason given to justify the exclusion of abstract

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[11] 409 US 63, 67 (1972).
[12] 409 US 63, 67 (1972).
[13] *Le Roy v Tatham*, 55 US 156, 175 (1852).
[14] 409 US 63, 67 (1972).
[15] As such they remain part of the 'storehouse of all men'. *Funk Brothers Seed Co v Kalo Inoculant Co* 333 US 127, 130 (1948).
[16] *Bilski v Kappos* 561 US (2010), page 12.
[17] *Bilski v Kappos* 561 US (2010), page 13.
[18] *In re Alappat*, 33 F. 3d 1526 n 18 (Fed Cir 1994).

ideas is that the patent would not disclose a practical, specific output. Interestingly, the idea that inventions should only be granted for practical tangible outcomes has been used (in reverse) to determine whether an application is patentable subject matter. The argument that computer programs fall outside the scope of patentable subject matter on the basis that they are abstract algorithms have been particularly notable in the United States, where patentable subject matter has largely been determined on the basis of first principles.[19] This is in contrast to other jurisdictions, such as Australia, Bangladesh and New Zealand, where computer programs have, for the most part, been discussed in terms of whether they are inventions (as defined legislatively). In the bulk of countries, however, computer programs have been directly excluded in the relevant patent legislation. In many of these jurisdictions, the impetus for the exclusion of computer programs is that it is required for them to become a member of a regional treaty (such as the European Patent Convention).

One of the changes that has occurred since the decision was first made to exclude computer programs as such from patentable subject matter is that the way the technology is viewed has become more nuanced. Instead of seeing computer programs as a unified entity that belongs either in copyright or patent law, computer programs are now more often seen as multifaceted products and processes: aspects of which should be protected by copyright and patents. In part, this change has been facilitated by and reflects the tendency to link computer programs and computer-implemented inventions. The former, which is excluded from protection (often on the basis that it is not technical); while the later (technical) invention is not. It should be noted that while there is broad support for the idea that there are certain aspects of computer programs that will never be patentable, there are many who disagree.

Over the past ten years or so, the nature of the debates and the arguments made as to why computer programs should be excluded from patentable subject matter have changed. In particular, the policy based arguments used to justify the exclusion of computer programs have become both more direct and, at the same time, more nuanced. This is particularly the case in countries which expressly exclude or are planning to expressly excluded computer programs from patentable subject matter. This can be seen in the discussions which are now occurring about the impact that patent protection for software has on downstream research,

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[19] Three categories of subject matter are excluded: 'laws of nature, natural phenomena, and abstract ideas' . *Diamond v Diehr*, 450 US 175, 185 (1981).

how it creates patent thickets, and the like[20]. In part the changing nature of the debates and the reasons given for exclusion is a consequence of the fact that while earlier debates tended to be based on perceived threats and fears, more recent debates build upon actual events and experiences. It is also a product of the fact that opponents of patent protection for computer programs have become more actively involved in policy debates in this area. This can be seen, for example, in the discussions surrounding the failed EC Computer Programs Directive, and in the failed attempt made in 2005 to change Indian patent law to provide that the technical application to industry of mathematical or business methods, computer programs, and a combination of computer program and hardware was patentable. It can also be seen in the ongoing debates in New Zealand as part of the patent reform process where opponents of 'software patenting' have been very successful in preventing changes that go against their interests.

[3] Computer programs and computer-implemented inventions

In some situations, it will be relatively clear that a patent application falls foul of one of the excluded categories of subject matter: whether directly as a 'computer program', indirectly via another category of legislatively proscribed subject matter (such as a mathematical method), or as a result of the way the 'invention' is judicially interpreted. In other situations, however, it is less clear as to whether a particular application falls foul of the excluded subject matter. In some cases, this may be because of the way that the patent has been drafted. In other cases, it may be because the invention does not readily equate to the excluded subject matter. These problems are exacerbated by the fact that while computer programs as such are routinely excluded from patentable subject matter, whether by the legislature or the judiciary, this does not mean, however, that inventions that embody or utilise computer programs are also necessarily excluded. This is based on the longstanding, widely accepted, and problematic distinction that is drawn between unpatentable subject matter (such as abstract ideas, principles, mathematical methods etc) and patentable inventions that embody or apply the excluded subject matter. While abstract ideas, mathematical methods, algorithms and a range of other types of subject matter may not be

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[20] See Carl Shapiro, 'Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting' (2000) Vol 1 *Innovation Policy and the Economy* 119; Gavin D. George, 'What is Hiding in the Bushes? eBay's Effect on Holdout Behavior in Patent Thickets' (2007) 13 *Mich. Telecomm. Tech. L. Rev.* 557; Rosa Maria Ballardini, 'The Software Patent Thicket: A Question of Disclosure' (2009) 6:2 *SCRIPTed* 207; Andres Guadamuz Gonzalez, 'The software patent debate' (2006) 1(3) *Journal of Intellectual Property Law & Practice* 196; Dan L. Burk, Mark A. Lemley, *The patent crisis and how the courts can solve it* (Chicago: Uni of Chicago Press, 2009). For a critical response see Ronald J. Mann, 'The Myth of the Software Patent Thicket: An empirical investigation of the relationship between intellectual property and innovation in software firms'. Bepress Legal Series, University of Texas School of Law, (2004) Paper 183.

patentable, this is not necessarily the case where the excluded subject matter is applied or implemented[21]. This can be seen, for example, in the mid-nineteenth century decision of *O'Reilly v Morse*[22]. While the court rejected the attempt by Morse to patent 'the use of the motive power of the electric or galvanic current [or] electro-magnetism' – primarily because of the possibility that it would hinder and restrict the 'onward march of science'[23] – the court did accept that the specific implementations of electro-magnetism were valid[24]. In many jurisdictions, a similar logic is applied to computer programs[25]. This means that while computer programs as such may be excluded from the remit of patentable subject matter, this is not the case with inventions that include or embody computer programs: what are sometimes referred to as computer-implemented or computer-related inventions.

The distinction that is drawn been computer programs as such and computer-implemented inventions has a number of important consequences. While in some situations, the question of the extent to which computer programs are patentable subject matter is discussed as a topic in its own right, in the majority of situations, however, discussions about computer programs as patentable subject matter usually takes place as part of broader discussions about the standing of inventions that include or embody computer programs. One of the consequences of this is that discussions about computer programs are often closely connected to discussions about computer-implemented inventions. Another consequence is that while the types of issues that arise are dictated, to some extent, by the method that is used to exclude computer programs (statutory definitions, for example, often give rise to acute definitional problems), nonetheless one of things that underpins nearly all of the jurisdictions surveyed is a simple question: namely, how do you distinguish between unpatentable subject matter such as a computer program as such, and potentially patentable subject matter, such as a computer-implemented invention that embodies or utilises a computer program? No matter how simple the question may be, it has proved very difficult to answer. As the Enlarged Board of Appeal noted recently, a 'uniform understanding of where to draw the dividing line between applications relating to programs for computers as such ... and applications relating to patentable technical solutions, in the form of [computer

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[21] While 'a scientific truth, or the mathematical expression of it, is not a patentable invention, a novel and useful structure created with the aid of the knowledge of scientific truth may be'. *Mackay Co v Radio Corp*, 306 US 86, 94 (1939).

[22] 56 US 62 (1853).

[23] 56 US 62, 113 (1853).

[24] As the US Supreme Court said in 1948, a person 'who discovers a hitherto unknown phenomena of nature has no claim to a monopoly of it which the law recognizes. If there is to invention from such a discovery, it must come from the application of the law of nature to a new and useful end'. *Funk Brothers Seed Co v Kalo Inoculant Co* 333 US 127, 130 (1948).

[25] For example see *Diamond v Diehr* 450 US 175, 185 (1981).

implemented inventions], still cannot be assumed despite considerable convergence in recent court rulings'.[26]

[4] Mode of excluding computer programs

A number of different techniques are used to regulate the status of computer programs as patentable subject matter. While there is a degree of overlap, these fall into three different approaches.

(i)   The first is where the relevant patent legislation expressly excludes computer programs from patentable subject matter.

(ii)   In some jurisdictions, patent legislation does not directly exclude computer programs. Nonetheless, computer programs are indirectly excluded by virtue of a legislatively excluded subject matter other than computer programs.

(iii)   In some cases, patent legislation does not specifically exclude any type of subject matter. In a limited number of jurisdictions where this occurs, computer programs are either excluded on the basis of the way that 'invention' is defined or categorised.

We will look at each in turn.

[4.1] Direct legislative exclusion of computer programs

The most common way that computer programs are dealt with as patentable subject matter is for them to be expressly excluded from patentable subject matter in the relevant patent legislation. More and more countries have provisions in their patent legislation that expressly excludes computer programs or equivalent subject matter form the remit of patentable subject matter. One of the few countries to have gone against this trend is Singapore, where in 1996 the express exclusion of computer programs that had existed in the 1994 Patent Act was removed from the legislation[27]. In other countries, the practice has been to expressly exclude computer programs from the remit of patentable subject matter. It has recently been suggested in New Zealand, which is one of the few countries to rely upon the seventeenth century definition of invention as a 'manner of manufacture', that rather than using the open ended and positive definition of invention to exclude computer programs,

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[26] *Programs for computers* G 03/08 (12 May 2010), para 4.1 (EBA). 'Given the ubiquity of computers in modern life it is not surprising that the precise limitations of [Patents Act section (1)2(c)] have given rise to difficulty'. *Autonomy Corporation v Comptroller General* [2008] *EWHC* 146 (Pat).
[27] Patents (Amendment) Act 1995. The changes were prompted, in part, by the United States of America-Singapore free-trade agreement (USSFTA).

that an express exclusion from patentable subject matter should be introduced into New Zealand patent legislation.

In most jurisdictions, but not all, the legislation includes a proviso that demarcates and limits the scope of the exclusion. Thus in countries such as Croatia, Malaysia, and the United Kingdom computer programs as excluded 'as such', while in Germany computer programs are only excluded to 'the extent that the application is directed to these areas in and of themselves'. While the language may differ, the sentiment is clear: the exclusion only applies to computer programs per se, it does not apply to inventions that include a computer program. The fact that the exclusion is limited to computer programs as such has been used in some cases to justify allowing inventions that incorporate a computer program (ie a computer-implemented invention) as patentable subject matter. One question that sometimes arises in jurisdictions that do not include an 'as such' proviso or some equivalent thereof is whether this means that computer-implemented inventions are also excluded. This is the case, for example, in Thailand where the *Patent Act* merely excludes 'computer programs' from protection.[28] The consensus in Thailand, as with other countries where similar issues arise, seems to be that the exclusion is effectively limited to computer programs as such, thus allowing for the possibility of computer-related inventions.[29]

One issue that arises in jurisdictions that expressly exclude computer programs from patentable subject matter is the extent to which patent law actually provides defacto or, in some cases, direct protection for computer programs per se (usually under the auspices of computer-related inventions).[30] In some jurisdictions, support for this comes from the fact that protection has been allowed for a computer program that is stored on computer readable media (or a program product claim).[31] One of the clearest examples where computer programs are allowed as patentable subject matter despite the exclusion of computer program as such is provided by two decisions by the EPO's Technical Board of Appeal, both involving applications by IBM[32]. The Board said that when the EPC referred to

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[28] Patent Act B.E. 2522 (of 1979) (amended by the Patent Act (No 2) of 1992), section 9(3). (Thailand).

[29] See Saravuth Pitiyasak, 'Thailand Debates software patents' (2002) *Managing Intellectual Property* 62. Chavalit Uttasart, 'AIPI Report Q 158: The Patentability of Business Methods' (Report of the Thai Group) (2004), 2.

[30] See, for example, K. Beresford, 'European patents for software, E-commerce and business method inventions' (September 2001) 23(2) *World Patent Information* 253. 'There has been a widespread misconception that computer software cannot be protected by patents in Europe'. Ibid, 253.

[31] This is sometimes called a Beauregard claim.

32 *IBM/Computer programs* (T 935/97) was for a method for allowing information in a data-processing system that was displayed in one window to be altered if that window was obscured by another window. The application included claims for software in itself, and for software recorded in a

computer programs *as such*, it meant mere abstract creations, lacking in technical character[33]. In more positive terms this meant that computer programs that had a technical character were potentially patentable.[34] In so doing, the Board distinguished between computer programs as such (which are not patentable) and computer programs that had a technical character (which are patentable).[35] As is discussed below, one of the consequences of the 'any hardware approach' that has been adopted at the EPO is that 'a claim to a computer implemented method or a computer program on a computer-readable storage medium will never fall within the exclusion of claimed subject-matter under Article 52(2) and (3) EPC'[36]. The Enlarged Board of Appeal also made it clear that in relation to Article 52(2) EPC, it does not make any difference whether a computer program is claimed by itself or as a record on a carrier.[37]

[4.2] Indirect legislative exclusion of computer programs

While the growing trend is towards the express exclusion of computer programs from patentable subject matter, some jurisdictions do not include computer programs in the list of subject excluded from protection. In these jurisdictions, computer programs are indirectly excluded from patentable subject matter on the basis of other statutory exclusions. Typically, this will be on the basis that the relevant patent legislation excludes subject matter such as 'mathematical methods', 'rules and methods for mental activities'[38], 'mere scientific principle or abstract theorem'.[39] This is the situation, for example in Canada where there is no express legislative exclusion of computer programs from patentable subject matter. Instead, computer programs per as are excluded from patentable subject matter on the basis of a mixture of statute and case law.

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computer-readable medium. *IBM/Computer programs*, T935/97 [1999] *EPOR* 301. The second *IBM* decision (T 1173/97) related to 'resource recovery in a computer system' *IBM/Computer programs*, T1173/97 [2000] *EPOR* 219.

33 *IBM/Computer programs*, T935/97 [1999] *EPOR* 301, 309; T1173/97 [2000] *EPOR* 219, 226.

34 They did so on the basis of EPC r. 27, 29. *IBM/Computer programs*, T1173/97 [2000] *EPOR* 219, 226.

35 In so doing, the Board overturned *EPO Guidelines* C-IV 2.3 which state that a 'computer program by itself or as a record on a carrier is not patentable, irrespective of its content'. The Board also distinguished *ATT/System for generating code*, T204/93 (29 Oct. 1993). *IBM/Computer programs*, T935/97 [1999] *EPOR* 301, 308.

36 *Programs for computers* G03/08 (12 May 2010). Para 10.13.1 (EBA).

37 *Programs for computers* G03/08 (12 May 2010). Para 10.7.2 (EBA). Citing 1173/97 (reasons, point 13).

38 In China Article 25 provides that scientific discoveries, as well as rules and methods for mental activities are not patentable. Rules and methods for mental activities are said not to be patentable because they are not technical. 'As originally enacted the law also prohibited the grant of claims for computer programs as such, although from an early stage a practice developed to permit patents for computer-related inventions as long as what us claimed is the technical solution to a technical problem'. Ladas and Parry, 'The Patent Law of the People's Republic of China', note 1.

39 Subsection 27(8) of the Canadian *Patent Act.*

[4.3] Non-legislative exclusions of computer programs

In a limited and decreasing number of countries, patent legislation is silent as to whether or not computer programs are patentable subject matter[40]. This is the situation in countries such as Australia, Bangladesh, Japan, New Zealand, Singapore, and the United States. In these jurisdictions, the question of whether computer programs are patentable subject matter is decided on the basis of the way that the invention is defined. Typically, but not necessarily, the relevant case law is based on the legislative definition of invention. This is the case in Australia, Bangladesh, and New Zealand where invention is defined as a manner of manufacture. It is also the case in Japan where there is no legislative provisions that expressly exclude certain types of creations from patentable subject matter; instead the fate of computer programs and computer related inventions is decided on the basis of the legislative definition of an invention as 'the highly advanced creation of technical ideas by which a law of nature is utilized'.[41] Given that the abstract nature of the way that invention is defined in these jurisdictions, it is not surprising that judges and patent offices have played a pivotal role in giving shape to the law in this area: the relative role of each depending, in part, on the judicial system in question. In the United States, while decisions often make reference to patent legislation and to the constitutional provisions under which it was enacted, the fate of computer programs has also been decided by the courts, although this has tended to be based on the way that invention is categorised. In particular, it turns on the fact that section 101 of the Patents Act specifies four independent categories of inventions or discoveries that are eligible for protection: processes, machines, manufactures, and compositions of matter.[42]

[5] How to distinguish potentially patentable inventions from excluded subject matter?

At a general level, the task of determining whether a computer program or a computer-related invention is patentable subject matter involves three questions which, in turn, give rise to a series of subsidiary questions. A preliminary question is: how should the law deal with an application that includes a computer program as one of its components? Another related question that arises is how should the invention be characterised? Once these

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[40] One of the notable things about patent law in countries that do not provide a legislative list of excluded subject matter is that there is less concern with the meaning of 'computer program', 'mathematical method' etc.

[41] Article 2(1), Patent Act (Act No. 121 of 1959).

[42] On this see *Bilski v Kappos* 561 US __ (2010), page 4.

preliminary questions have been answered, it is then possible to decide whether or not the invention as characterised is excluded. We will look at each of these questions in turn.

[5.1] How to construe an invention that includes a computer program?

One of the preliminary questions that arises when considering whether a computer-implemented invention is excluded is: what happens if an application contains a mixture of both excluded and permitted features? That is, what should be done if an invention includes as one of its elements a computer program which is expressly excluded? While this question typically arises in jurisdictions which expressly exclude computer programs as such from patentable subject matter, it also arises in jurisdictions that indirectly exclude programs from patentable subject matter on other grounds. In many situations, this question has arisen as a result of a desire to avoid 'artful drafting'[43] which presents non-patentable subject matter as if it were patentable.

In some jurisdictions, early discussions focused on the meaning that should be given to the 'as such' proviso which states that the listed exclusions only apply to the extent that the alleged invention relates to that thing *as such*. Given the ambiguous nature of the proviso, it is not surprising that it lent itself to a number of different and sometimes conflicting styles of interpretation.[44] In determining how to construe inventions that included a computer program, two alternative interpretations arose. The first suggested that the exclusion meant that computer programs should be excluded from the invention leaving the invention minus the program for examination. If followed, it would have greatly limited the protection available for computer-implemented inventions. A second approach – which is known as the 'whole-contents' approach to interpretation -- suggested that the invention as a whole should be examined (including the computer program). Despite some initial doubts, most countries have come down in favour of the second approach[45]. This means that when considering whether an invention falls foul of an excluded subject matter, the courts disregard the fact that the invention has as one of its elements a computer program and

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[43] See *Diamond v Diehr*, 450 US 175, 1982 (1981).

44 It was initially suggested that when determining whether an invention falls within PA s. 1(2)/EPC Art. 52, the courts should separate the excluded and non-excluded elements of the application and focus only upon the non-excluded components. *Merrill Lynch's Application* [1988] *RPC* 1.

[45] In the US see *In re Schrader*, 22 F 3d 290, 294 (Fed. Cir. 1994). *Arrhythmia Research Tech Inc v Corazonix Corp* 958 F 2d 1053, 1058 (Fed Cir 1992) ('it is next determined whether the claimed invention as a whole is no more than the algorithm itself'). *In re Alappat*, 33 F 3d 1526, 1543 n 21 (Fed Cir 1994). In the UK see *Merrill Lynch Application* [1989] *RPC* 561 (CA); *Genentech v. Wellcome* [1989] *RPC* 147, 204–14, 224 ff. At the EPO see *Vicom/Computer-related invention*, T208/84 [1987] *OJEPO* 14; [1987] *EPOR* 74; *Kock & Sterzel/X-ray apparatus*, T26/86 [1988] *EPOR* 72; [1988] *OJEPO* 19.

focus instead on the invention *as a whole*. In so doing the courts have reinforced the fact when determining whether an invention is patentable it is not necessary to compare the non-technical and the technical elements of the invention. That is, it is irrelevant that an invention is made up of a mixture of technical and non-technical elements.[46]

[5.2] How to characterise the invention?

There are a myriad of different ways that an invention as a whole can be characterised. The technique that is chosen to characterise the invention has the potential to play an important role in determining whether or not an application is treated as patentable subject matter. While there is widespread, almost universal, support for the whole contents approach, there is less of a consensus as to how the invention as whole should be characterised. More specifically, there are differences in terms of those aspects of an invention that will be highlighted when deciding whether it is excluded. The problems that exist in this context are exacerbated by the fact that in many countries this issue has yet been explored in any real detail: primarily because it usually only arises when the abstract rules are applied. This means that while the task of characterising the invention necessarily arises when determining whether an application is excluded, in many jurisdictions it is not an issue that is discussed or considered in any detail. Over time three different approaches, or variations thereof, have been used.

[5.2.1] Contribution approach

One approach that is widely used to determine how the invention should be characterised focuses on the contribution that the invention as a whole makes to the prior art. Rather than attempting to identify the essential nature of the invention, this approach focuses on what the invention does. That is, when determining whether an invention falls within excluded subject matter, the courts have concentrated upon the *contribution* or *effect* that the invention has upon the known art (or knowledge in the area in question). As the superseded Examination Guidelines at the European Patent Office said, under the contribution approach it was necessary to disregard the form or kind of claim and concentrate on its content in order to *identify the real contribution* which the subject matter claimed, considered as a whole, adds to the known art.[47]

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46 *Kock & Sterzel/X-ray apparatus*, T26/86 [1988] *EPOR* 72; [1988] *OJEPO* 1; *Pension Benefit Systems Partnership*, T931/95 [2001] *OJEPO* 441, 450 (TBA); Cf. *IBM/Text clarity processing*, T38/86 [1990] *EPOR* 606.
47 *EPO Guidelines* C-IV, 2.2 (emphasis added). The revised Guidelines have taken out the reference to the contribution made by the invention.

While the contribution approach is followed in many jurisdictions, it has begun to attract some criticism. Many of the criticisms that have been made about the contribution approach were summed by the Board of Appeal at the European Patent Office in the *Pension Benefits* decision.[48] The first and most general criticism was that there 'is no basis in the EPC for distinguishing between "new features" of an invention and features of that invention which are known from the prior art when examining whether the invention concerned to be an invention within the meaning of Article 52(1) EPC'.[49] The contribution approach was also criticized because it failed to keep the subject matter inquiry separate and distinct from the questions as to industrial applicability, novelty, and inventive step. The Board also said that the contribution approach confused the requirement of 'invention' with the requirements of 'novelty' and 'inventive step'.[50] Moreover, the Board believed that the contribution approach incorrectly imported issues relating to inventive step into the inquiry into whether a patent complied with subject matter inquiries Article 52(1).[51] As a result, the Board rejected the contribution approach saying that there 'is no basis in the EPC for applying this so-called contribution approach'.[52] The contribution approach has also been criticised for the fact that has 'proven difficult to apply consistently in practice and ... provide much less certainty to patent applicants and the public'.[53]

[5.2.2] The 'any hardware' approach

Another approach which has been used to characterise the invention is known as the 'any hardware' or 'any technical means' approach.[54] One of the first occasions where the 'any hardware' approach was used was by the German Federal Court of Justice in the *Speech Analysis Device (Sprachananalyseeinrichtung*[55]) decision from 2000, which concerned an application for a computer-related language analysis device. The Patent Court rejected the

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48 The Board said that the distinction drawn between a method of doing business and an apparatus situated to perform such a method was justified by the fact that while 'schemes, rules and methods' are non-patentable categories in the field of economy and business, but the category of 'apparatus' in the sense of 'physical entity' or 'product' is not mentioned in Article 52(2) EPC. *Pension Benefit Systems Partnership*, T931/95 [2001] *OJEPO* 441, 452 (TBA).
49 *Pension Benefit Systems Partnership*, T931/95 [2001] *OJEPO* 441, 454 (TBA).
50 The TBA cited the German Federal Court of Justice (BGH) decision of *Sprachanalyseeinrichtung (Speech Analysis Apparatus)* (11 May 2000). For further discussion see *Dell USA* O/177/02 (24 Apr. 2002), para. 24 (Patent Office).
51 The Board said that the contribution approach used to determine whether a patent complied with Art. 52(1) was 'so very closely related to examination with regard to the requirement of inventive step that the examining division decided in fact implicitly that there was lack of inventive step under Article 56 EPC'. *Pension Benefit Systems Partnership*, T931/95 [2001] *OJEPO* 441 455 (TBA).
52 *Pension Benefit Systems Partnership*, T931/95 [2001] *OJEPO* 441, 442.
53 Business Software Alliance (BSA) BSA Amicus Brief Case G3/08 (30 April 2009), 2.
54 *Programs for computers* G03/08 (12 May 2010). Para 10.6 (EBA).
55 Case No X ZB 15/98 11 May 2000, (2000) *GRUR* 1007, (2002) *IIC* 343.

application on the basis that 'the contribution that the invention made to the state of the art was of a non-technical nature, and that it consisted of the implementation of a set of grammatical (ie non-technical) rules on a common computer'.[56] The Federal Court of Justice overturned this decision, suggesting that the court had 'confused the requirements of technicality and novelty/inventive step'. The Federal Court of Justice stated that any industrially producible and commercially applicable device which in operation spent energy and in which different switching states occurred was to be considered a technical device. This included standard computers'. Importantly, the Federal Court of Justice added that 'a technical device was technical regardless of whether or not it made a technical contribution to the state of the art. The latter was a matter of novelty/inventive step'.[57] [Utilising this new approach, the Federal Court of Justice concluded that 'a data processing device which is programmed in a certain manner has technical character and is therefore per se patentable. This applies if the device is performing text or language processing … a standard computer which is programmed in a defined manner to perform certain functions is a technical device and is therefore in principle patentable'[58][59].

While German courts may have moved away from the position outlined in 2000[60], this is not the case at the European Patent Office, which has embraced the hardware approach. The any hardware approach as developed by EPO was first set out by the Technical Board of Appeal in the decision of *Pension Benefits Systems Partnership*[61] and subsequently expanded in

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[56] Felix Rummler, 'Computer Program Inventions before the German Courts – A review' (2005) *IIC* 225, 226.

[57] Felix Rummler, 'Computer Program Inventions before the German Courts – A review' (2005) *IIC* 225, 226.

[58] J. Ahmes, 'Patenting program-related Inventions' (Sept 2000) 102 *Managing Intellectual Property* 69.

[59] See *Electronic Payment System (Elektrnoscher Zahlungsverkehr)* Case No X ZB 20/03 24 May 2004; (2005) 36 *IIC* 243, 248 (comments by Jürgen Betten).

[60] Initial reactions in the United Kingdom were mixed. In one Patent Office decision, the *Pension Benefits* approach was used to decide whether an application for 'behaviour modification' fell within section 1(2). *John Edward Rose*, O/075/01 (14 Feb. 2001) (As in *Pension Benefits*, the application was eventually excluded on the basis that it lacked inventive step). cf *Pintos Global Service's Application*, O/171/01 (6 Apr. 2001) (Patent Office); *Hutchins' Application* [2002] *RPC* 8; *James Shanley*, O/422/02 (16 Oct. 2002) (Patent Office) which expressly rejected the *Pension Benefits* approach. In *Aerotel* the Court of Appeal clearly rejected the any hardware approach, suggesting that it 'must be wrong' and that it was 'not intellectually honest'. *Aerotel v Telco Holdings* [2007] 1 *ALL ER* 225, para 27 -29. Jacob LJ's argument in this regard are far from convincing. In particular, it is difficult to imagine an application for an iPod loaded with a new piece of music being non-obvious. Interestingly, most of the criticisms of the EPO decisions are in relation to the way that they applied inventive step, rather than how they approach excluded subject matter. Jacob LJ also said that *Pension Benefits*, and like-minded decisions at the EPO, were based on the mistaken assumption that the various categories of excluded subject matter were all limited to something abstract or intangible. Ibid, para 30. Jacob LJ continued saying 'We have already observed that the categories are disparate with differing policies behind each. There is no reason to suppose there is some common factor (particularly abstractness) linking them. The travaux prepatoires at least confirm this'. Ibid.

[61] *Pension Benefit Systems Partnership*, T931/95 [2001] *OJEPO* 441 (TBA).

Hitachi[62]. Any doubts there might have been about the any hardware approach at the European Patent Office disappeared with the 2010 decision of the Enlarged Board of *Programs for computers* G03/08 which clearly endorsed the any hardware approach; despite noting that it was 'distasteful to some people'[63].

Under the any hardware approach (in its expanded form), an invention will not be fall within any of the excluded categories (which are set out in Article 52(2)) if it embodies or is implemented by some technical means (such as a computer). This is the case even if the technical means is used in relation to a non-technical activity. In effect, under the any hardware approach, the tribunal will stand back from the invention – whether a method or an apparatus – and ask whether it can be classified as a form of technology (irrespective of whether it is novel or inventive): all that matters is that the invention makes use of, or embodies, some form of technology (or hardware). One of the consequences of this is that under the any hardware approach, the tribunal is more concerned with categorising the subject matter in question, rather than focusing on the contribution that the invention makes to the state of the art.

Using the example of a patent application that claims a cup carrying a certain picture (such as a company logo), the Enlarged Board explained the contribution and any hardware approaches, and how they differed. Under the contribution approach, the Enlarged Board of Appeal said that as cups are known, the only contribution made by the 'cup with logo' was to provide information (brand awareness). In this situation, the only contribution to the art made by the invention is in a field excluded from patentability. In contrast, under the hardware approach, the Enlarged Board said that the 'claimed subject-matter has to be considered without regard to the prior art. Applying this to the example of a patent application that claims a cup carrying a certain picture (such as a company logo), the Enlarged Board said that a claim to a cup is clearly not excluded from patentability under Article 52(2) EPC[64].

There are a number of notable features of the any hardware approach. One is that it is based on the idea that questions about excluded subject matter are *separable and distinct* from the questions whether the subject matter is susceptible of industrial application, is new and

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[62] *Hitachi/Auction Method* T258/03 (2004) *OJEPO* 575.
[63] *Programs for computers* G03/08 (12 May 2010). Para 10.6 (EBA).
[64] *Programs for computers* G03/08 (12 May 2010). Para 10.6 (EBA).

involves an inventive step.[65] Another notable feature is that rather than looking at the contribution made by the invention and determining whether this was technical, the focus is on the *character* of the invention. That is, it is necessary to distil the essence or kernel of the invention, rather than looking at what the invention did. A key feature of the any hardware approach is the belief that it is not appropriate to look to the contribution made by the invention. Instead, the any hardware approach requires the tribunal to look to the character or essence of the invention: the contribution made by the invention is only looked at when novelty and inventive step are examined. As we explain below, one of the consequences of the adoption of the any hardware approach is that it is much easier for an invention, whether for an apparatus or claim, to satisfy the subject matter requirement than had previously been the case. This does not mean that it necessarily lowers the standards of patentability, so much as that it shifts the focus of attention away from subject matter exclusions towards the use of novelty and (more particularly) inventive step.

[5.3] How to determine whether the invention as characterised is excluded?

Once the invention has been characterised, it is then possible to ask whether the subject matter in question is patentable. At a very general level, this has been answered in two ways. The first consists of negative rules that spell out the subject matter that is excluded from patentability. The second consists of more positive rule about the subject matter that *may* be patented. It should be noted that the negative and positive rules often operate side-by-side: the two approaches co-exist, and are used as and when needed. In cases where an application is readily accepted as falling within an excluded category, the negative rule will suffice. In situations where it is unclear whether an application falls within one of the excluded categories, patent jurisprudence tends to rely upon more positive rules about what can be patented.

In most of the countries surveyed, patent law includes a negative rule that outlines the type of subject matter that is excluded. In situations where the invention clearly fell within one of the excluded categories, it would not be patentable.[66] In most situations, the negative exclusion

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65 *EPO Guidelines* C-IV, 1.2.
66 This can be seen, for example, in *Merrill Lynch's Application* [1989] *RPC* 561 (CA) where the Court of Appeal was called upon to consider whether an automatic share-trading system, operated using a computer program, fell within the scope of section 1(2)(c). While the invention had a computer program as one of its elements, the court said that as the invention needed to be looked at as a whole, this did not necessarily mean that the patent was invalid. Rather what the court needed to ask was whether the invention viewed as a whole made a contribution in a field not excluded from patentability. Unfortunately for the applicants, the Court of Appeal found that the contribution made

will be expressed in legislative terms. For example, Brazilian patent law expressly excludes from patentable subject matter: discoveries, scientific theories and mathematical models; purely abstract concepts; schemes, plans, principles or methods of a commercial, accounting, financial, educational, or advertising nature or for games of chance or surveillance; literary, architectural, artistic and scientific works or any aesthetic creation; computer programs *per se*; presentations of information; and rules for games[67]. In a limited number of situations, however, the negative rules will be derived from the way that 'invention' is defined, or from first principals. For example, in Australia, patents are granted for 'manner of new manufacture'. This has been interpreted to mean 'a mode or manner of achieving an end result which is an artificially created state of affairs of utility in the field of economic endeavour'[68]. Over time this has given rise to the negative rule that mathematical algorithms without effect are not patentable.[69]

While there is widespread acceptance that certain types of subject matter should not be patentable, at the same time there has also been a push to develop positive rules about the subject matter that *may* be patented. In a limited number of countries, this is based on the way that invention is defined in the patent legislation. Typically, the abstract and vague nature of the definition has seen the development of more specific (positive) rules about patentable subject matter. The need for certainty and guidance has led to the development of positive tests that can be used to determine whether something is patentable subject matter. Whether it is expressed in terms of examination guidelines, academic commentary, or judicial guidance, one of the things that most countries share in common is that the negative rules about excluded subject matter are recast in more positive terms about what can be protected. In part the move to adopt positive rules has occurred as a consequence of problems that arise in interpreting statutorily excluded subject matter; a problem which is rendered all the more problematic by changes in technology. In countries where patentable subject matter is determined by virtue of a positive definition of invention, rather than by way of a legislative list of excluded subject matter, the push for positive rules about patentable subject matter is a product of the abstract and vague way that invention is defined. The task of determining whether an application falls foul of the excluded subject matter exception has been made all the more difficult because of the fact that in some cases

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by the invention was limited to the field of business (explicitly excluded by section 1(2)(c)) and, as such, was unpatentable. Merrill *Lynch's Application* [1989] *RPC* 561, 569.

[67] Patent law in Brazil is governed by Law 9.279/96 (Brazil) Article 10. Article 8, 'An invention shall be patentable if it meets the requirements of novelty, inventive step and industrial application'.

[68] *CCOM v. Jiejing* 122 ALR-417 (1994).

[69] [2006] FCAFC 120, IP Australia *Patent Manual of Practice and Procedure*, 2.9.2.7, 'Computer Software Related Inventions and Mathematical Algorithms.'

attempts have been made to patent excluded subject matter by presenting it in the guise of a computer-related invention.

A range of different tests have been used to decide whether an application consists of patentable subject matter. Of all the issues that arise in this context, this is probably the most contentious and also the most vexed. Not only does the approach vary between countries, there are also often variations within specific jurisdictions. With this in mind, the following section will outline some of the different tests that have been used to determine patentable subject matter. It is important to keep in mind the warning of the UK Court of Appeal that it is dangerous to suggest that there is a clear rule 'available to determine whether or not a program is excluded [subject matter]. Each case must be determined by reference to its particular facts and features'.[70] With this rider in mind, the following section will outline some of the different approaches that have been used to determine whether or not subject matter is patentable.

[5.3.1] Technical character

One factor which is commonly used to decide whether an application falls foul of the subject matter exclusion is the fact that it is technical. While the nature of the way that the requirement is expressed varies from country to country, there is a widespread consensus that an application will not be excluded as non-patentable subject matter if it is 'technical'. The prevalent but largely implicit idea that patents are granted for technological creations is now entrenched in international treaties by way of Article 27(1) of TRIPS which states that 'patents shall be available for any inventions, whether products or processes, in all fields of technology' and that 'patents shall be ... enjoyable without discrimination as to ... field of technology'.[71]

In some countries, technical character is expressly provided for in patent legislation. For example, the Japanese Patent Act defines an invention as 'the highly advanced creation of technical ideas by which a law of nature is utilized'[72]. In other jurisdictions, technical character operates as a *de facto* non-statutory requirement for patentability. For example, under the European Patent Convention**,** the tribunals ignore the often difficult question of whether the invention was, for example, a computer program. Instead, they asked whether

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[70] Symbian Ltd v Comptroller General of Patents [2008] *EWCA Civ* 1066, para 5.

[71] This reconfiguration of computer programs as technical creations has been particularly important in light of   Article 52(1) EPC that patents should be available in all fields of technology'. Chartered Institute of Patent Attorneys   (CIPA) Amicus Brief: G3/08 (29 April 2009), 1.

[72] Article 2(1) Patent Act (Act No. 121 of 1959).

the invention-as-claimed is 'technical'. If the invention exhibited technical character or the problem that the invention solves was technical,[73] this was taken to mean that it fell outside the scope of excluded subject matter set out in Article 52(2).[74] Conversely, the absence of technical character was treated as virtual proof that the invention fell within the scope of excluded subject matter in Article 52(2) and that it was therefore unpatentable. The introduction of technical character as a *de facto* non-statutory requirement for patentability owes its origin to an imaginative interpretation of Article 52 of the European Patent Convention. This provides that all the categories in Article 52(2) have in common is that they are non-technical, either because they are abstract (discoveries, scientific theories) or because they are clearly non-technical (aesthetic creations or presentations of information).[75] As Article 52(1) and (2) only exclude from protection those inventions which are non-technical, it is a short inductive leap to conclude from this that the term 'invention' relates to inventions of a technical nature. This conclusion was reinforced by the Rules and Guidelines of the European Patent Convention that clearly state that in order for an invention to be patentable it must be technical.[76]

Evidence of technical character also underpins the way that Chinese patent law determines questions in relation to patentable subject matter. Following Article 2 of the Chinese Patent Law and Rule 21 of the Implementing Regulations, an application relating to a computer programs is only the subject matter of patent protection if it constitutes a technical solution.[77] To satisfy this requirement, the application must:

    (i) solve technical problems

    (ii) use technical measures, and

    (iii) be capable of producing a technical effect.[78]

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73 *IBM/Data processor network*, T6/83 [1990] *OJEPO* 5; [1990] *EPOR* 91; *IBM/Computer-related invention*, T115/85 [1990] *EPOR* 107. The feature of using technical means for a purely non-technical purpose and/or for processing purely non-technical information does not necessarily confer technical character to any such individual steps of use or to the method as a whole: in fact, any activity in the non-technical branch of human culture involves physical entities and uses, to a greater or lesser extent, technical means.

74 The mere occurrence of technical features in a claim is not enough: *Pension Benefit Systems Partnership*, T931/95 [2001] *OJEPO* 441, 450 (TBA).

75 *Sternmheimer/Harmonic vibrations*, T366/87 [1989] *EPOR* 131.

76 A patentable invention must relate to a technical field: EPC r. 27(1)(b); it must be concerned with a technical problem: EPC 2000 r. 43(1), and it must be characterized in the claims by means of technical features: EPC 2000 r. 43(1)9b). *EPO Guidelines* C-IV, 1.2(ii).

77 Examination Guidelines, 2006, Ch.1, 2, Pt II

78 See (SIPO) Guidelines for Examination, 2006, Chapter 9, Part II (based on Article 25 of the Patent Law and article 2(1) of the Patent Law Implementing Regulations – which requires an invention to be a new technical solution). See Xiang Yu, 'The Patent Protection for business methods in China' (2008) 30(10) *European Intellectual Property Review* 412; Lin Deng, 'How to protect software-related inventions in China' (2004) 142 *Managing Intellectual Property* 20, 21

Importantly, an application will only constitute a technical solution in China when it meets *all* three of these criteria[79]. In relation to computer programs, the Guidelines state that 'if the solution of an invention application relating to computer programs involves the execution of computer programs in order to solve technical problems, and reflects technical means in conformity with the laws of nature by computers running programs to control and process external or internal objects, and thus technical effects in conformity with the laws of nature are obtained, the solution is a technical solution as provided for in Rule 21 [of the Implementing Regulations] and is the subject matter of patent protection'.[80][81]

In a small number of jurisdictions, particularly those countries that determine patentable subject matter either by way of the definition of invention (such as Australia, Bangladesh, and New Zealand) or on first principles (United States), there is often less reliance placed on technical character than in other countries. Instead, the focus of attention tends to be on other more specific tests that are used to determine patentable subject matter (which are discussed below).

One of the advantages of shifting attention towards the idea of technical character in countries that directly or indirectly exclude computer programs in patent legislation is that that courts are able to avoid the difficult task of having to define the excluded subject matter listed: a task which is not only technically problematic but also one that changes in technology are likely to render obsolete. Indeed, one of the problems with subject matter excluded in a legislative form is that the exclusions are drafted in light of contemporary technologies, making them prone to obsolescence or, at least, convoluted interpretations. Whatever advantages there may be in using technical character as a *de facto* requirement for determining whether an invention is patentable subject matter, it still leaves the difficult task of having to formulate and understand what is meant by the term 'technical'.

In some cases, it is relatively easy to ascertain whether an invention is technical. This is because it is generally accepted that certain types of creations, such as those in the fields of

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[79] Guidelines 2006, Ch.9, 5.2. According to the Guidelines 2006: 'If the solution of an invention application relating to computer programs involves the execution of computer programs not in order to solve technical problems, or does not reflect technical means in conformity with the laws of nature by computers running programs to control and process external or internal objects, or the effect obtained is not restrained by the laws of nature, the solution is not a technical solution as provided for in Rule 2.1, and is not the subject matter of patent protection.'

[80] Guidelines 2006, Ch.9, 2, Pt II.

[81] Xiang Yu, 'The Patent Protection for business methods in China' (2008) 30(10) *EIPR* 412, 416.

mechanical engineering or organic chemistry, are technical and as such belong within the remit of patent law. This is made all the easier by the fact that applicants are required to specify the technical field into which their applications fall.

While in some circumstances it may be easy to determine whether an invention is technical, in some situations this is not the case.[82] Typically this arises in relation to creations which fall outside the currently accepted legal limits[83]. This is presently the case with inventions in relation to financial systems, software-generating software, language-processing, text-editing, and computer programs. In these borderline cases, determining whether an invention is technical is often a difficult task. This problem was highlighted by the British Comptroller of Patents who complained that 'in practice it is often very difficult to determine whether a particular invention does as a matter of fact involve the sort of technical contribution or result alluded to in the cases'.[84] The difficulty of this task was borne out by the fact that while the legal studies which prompted the revision of the European Patent Office Guidelines were able to propose 'technical character' as one of the ways of determining whether subject matter was excluded from patentability, they were unable to provide a precise definition of what was meant by the term 'technical'.[85] Instead, they left the task of defining technology to the jurisprudence of the courts.[86]

Over time, a number of different approaches have been used to determine whether an invention is technical and thus whether it is patentable subject matter[87]. The nature of these criteria vary, sometimes considerably, between countries. For example technical character may be implied at the European Patent Office in at least three ways. These are (i) by the physical features of an entity (ii) by the nature of the activity or (iii) conferred on a non-

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82 See J. Thomas, 'An Epistemology of Appropriation: Patentable Subject Matter after *State Street Bank*' [2000] *IPQ* 27, 49 ff.

83 The UK Court of Appeal suggested that there were three possible reasons for this. These were that (a) National tribunals the [EPO] Board may still be at an intermediate stage of working out and identifying the precise location of that line (b) The problem may be inherent and never wholly satisfactorily soluble (c) There are competing views based on different philosophies (the "open source movement represents one extreme, that of companies such as [Symbian Ltd] the other' *Symbian Ltd v Comptroller General of Patents* [2008] EWCA Civ 1066, para 50.

84 *Fujitsu's Application* [1996] *RPC* 511, 521.

85 WG/CP/I/1.

86 In part, this was prompted by the realisation that the word 'technical' was inherently vague (which is not surprising given that it is meant to act as a proxy for the equally vague 'invention'). See, eg, *IGT v Comptroller of Patents* [2007] *EWHC* 134, para 13; *CFPH LLC v Comptroller-General of Patents, Designs, and Trade Marks* [2006] *RPC* 259 ('technical' is ' a useful servant but a dangerous master') *Aerotel v Telco Holdings* [2007] 1 *All ER* 225, para 121-24.

87 *Hitachi/Auction Method* T258/03 (2004) *OJEPO* 575, 585.

technical activity by the use of a technical means[88]. According to the Polish Patent Office, technical character is determined by reference to 'controllable natural forces' (which is similar to notion used in German jurisprudence). In many other countries, such as the United Kingdom, there is much less guidance as to what is meant by technical character. It should be noted that in some jurisdictions, particularly those countries whose patent legislation does not include lists of excluded subject matter, patentable subject matter tends to be directly determined by the subsidiary criteria as tests in their own right, rather than as ways of determining whether an invention is technical.

[5.3.2] Physical change

One factor that is used to determine whether an application consists of patentable subject matter has been to ask whether it brings about a physical change. This has been used both to show technical character and also, more directly, to show patentable subject matter. In jurisdictions where physicality is used to determine patentable subject matter, the courts and patent offices have tended to fall back on the model of the invention that has long been employed in patent law.[89] This is one that sees the process of invention as the reduction of the abstract to the specific, or as a transformation from the general to the concrete, processes which are mediated by the inventor. In turn, this model distinguishes between creations that are abstract, intellectual, mental, undefined, and unpatentable, and those that are concrete, physical, tangible, and patentable.[90] Drawing upon this model of the invention, it has been held that an invention is technical and patentable if it provides or leads to a concrete, causal or non-abstract result or change in things. This means that if it can be shown that the invention brought about a tangible physical change, this is taken as virtual proof that the invention is technical and that it therefore falls outside the scope of the excluded categories.[91] This can be seen, for example, in the European Patent Office's *BBC/Colour television signal* decision where it was said that despite its transient character, as a TV signal could be detected by technical means it had a physical reality and therefore could not be

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[88] *Hitachi/Auction Method* T258/03 (2004) *OJEPO* 575, 585.

89 See *NRDC's Application* [1961] *RPC* 134, 142; *Rote Taube* (1970) 1 *IIC* 136, 137–8.

90 The 'invention must belong not to the field of abstractions or speculations, but to that of practical achievement. It must concern not an abstract principle but a conception which is implemented in industry'. *Christian Franceries/Traffic regulations*, T16/83 [1988] *EPOR* 65, 70; [1990] *OJEPO* 379.

91 The following inventions were held to be unpatentable because they did not bring about a physical change: inventions for document-abstracting (*IBM/Document abstracting and retrieving*, T22/85 [1990] *EPOR* 98); linguistic expression processing (*IBM/Text clarity processing*, T38/86 [1990] *EPOR* 606); a system for listing semantically related linguistic expressions (*IBM/Semantically related expressions*, T52/85 [1989] *EPOR* 454); method for automatically detecting and correcting contextual homophone errors in a text document (*IBM/Text processing*, T65/86 [1990] *EPOR* 181).

considered to be an abstract entity.[92] As such, it was prima facie patentable. One of the justifications for the use of a minimum physicality requirement to help determine patentable subject matter is that it helps to ensure that abstract ideas remain in the public domain.[93] This is a result of the fact that the need to show evidence of physicality ensures that protection is only granted for specific applications, rather than abstract ideas, which are widely seen as being non-patentable.

The use of physical change to determine whether an invention is technical can be seen in so-called Freeman-Walter-Abele test, which was used in the 1980s in the United States[94]. Under this test, the court asked two questions: (i) Is a mathematical algorithm recited or indirectly in the claim? *and* (ii) If so: is the claimed invention as a whole no more than the algorithm itself, i.e. is the algorithm not applied to physical elements of process steps? If both of these questions were answered affirmatively, the subject matter was excluded. The use of physical change reappeared in the 2008 United States Court of Appeals for the of *In re Bilski* where it was said that 'A claimed process is surely patent-eligible under §101 if: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing'[95]. While aspects of the Federal Circuit reasoning were not followed when the matter went on appeal to the Supreme Court (notably the machine-or-transformation test was said not to be the exclusive test for patentable subject matter), nonetheless the Supreme Court did not otherwise discredit the physical nature of the machine-or-transformation test. Instead the Supreme Court noted that 'This Court's precedents establish that the machine-or-transformation test is a useful and important clue, an investigative tool, for determining whether some claimed inventions are processes under §101'[96]. It seems that physical change remains an important but not a sole in indicator of patentable subject matter in the United States. A similar approach is used in Australia, where 'it has long been accepted that ... a mathematical algorithm ... without effect [is] not patentable ... It is necessary that there be some "useful product", some physical phenomenon or effect resulting from the working of a method for it to be properly the subject of letters patent'. A product or result of a method must produce 'a concrete, tangible,

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92 *BBC/Colour television signal*, T163/85 [1990] *EPOR* 599; [1990] *OJEPO* (Suppl.) 19. On this basis the invention did not fall within EPC Art. 52(2)(d).

93 Thomas Cotter, 'A Burkean Perspective on Patent Eligibility, Part II: Reflections on the (Counter) Revolution in Patent Law' (2010) 11(1) *Minnesota Journal Law Science & Technology* 365, 376.

94 See *In re Freeman*, 573 F.2d 1237 (C.C.P.A. 1978); *In re Walter*, 618 F.2d 758 (C.C.P.A. 1980); *In re Abele*, 684 F.2d 902 (C.C.P.A. 1982).

95 545 F.3d 943 (Fed. Cir. 2008).

96 *Bilski v Kappos* 561 US (2010), page 8.

physical, or observable effect'.[97] Canadian patent law also uses physical change to help determine patentable subject matter. This can be seem from the fact that the process of deciding whether the claimed invention is patentable subject matter is drawn from the definition of an invention as a solution to a practical problem which, in turn, is based on the idea that 'to solve a practical problem, the solution must be in a form that can interact directly with the physical world'[98]. An allowable claim must define a contributed, statutory 'practical form' of an invention. A 'practical form' will, by necessity, include at least one physical element.[99] The use of physical change to determine patentable subject matter has also been used at the European Patent Office. This can be seen in the *Vicom* decision where the Board of Appeal explained how unpatentable mathematical methods could be distinguished from patentable inventions. The 'fact that a mathematical method or a mathematical algorithm is carried out on numbers . . . and provides a result also in numerical form, the mathematical method or algorithm being only an *abstract* concept prescribing how to operate on numbers. No direct technical result is produced by the mathematical method as such'. While abstract creations are not patentable, the Board of Appeal added that 'if a mathematical method is used in a technical process, that process is carried out on a physical entity (which may be a material object but equally an image stored as an electrical signal) by some technical means implementing the method and provides as its result a certain *change* in that entity'.[100]

One of the consequences of using physicality as a means to determine patentable subject matter, particularly in relation to computer programs and computer-related inventions, is that it inevitably gives rise to a series of further questions; one of the most important being what is meant by a physical change? In jurisdictions that have used physicality as a means to determine subject matter, this has been a very important question, since it often determines the fate of particular subject matter. Thus, in one decision which spoke of 'electronic signals, seismic waves, and other physical transformations not apparent to the naked eye'[101][102]. In a move that has important ramifications for many inventions, particularly in the field of information technology, the physical conception of technology has been interpreted very

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[97] [2006] FCAFC 120, IP Australia *Patent Manual of Practice and Procedure*, 2.9.2.7, 'Computer Software Related Inventions and Mathematical Algorithims'.

[98] *Manual of Patent Office Practice*, chapter 12 (revised 2009), 12.03. Claims must relate to 'useful art's 'manual and reproductive arts'; which the patent office considers to mean 'fields of technology'.

[99] *Manual of Patent Office Practice*, 13.05.03.

[100] *Vicom/Computer-related inventions*, T208/84 [1987] *EPOR* 74, 79.

[101] *Arrhythmia Research Tech v Corazonix Corp* 958 F 2D 1053, 1059 (Fed Cir 1992). See W. M. Schuster, 'Predictability and Patentable Processes: The Federal Circuits In Re Bilski Decision and its effect in the incentive to invent' (2010) 11 *The Columbia Science and Technology Law Review* 1, 31.

[102] '[P]hysical objects or substances [or objects which are representative of physical objects or substances'. *Bilski,* 545 F 3d 943, 963 (Fed Cir 2008) (en banc).

broadly at the European Patent Office. This can be seen in the comment that 'physical entities' includes 'a real thing, i.e. an image, even if that thing was represented by an electrical signal'.[103]

[5.3.3] Tests that encompass the non-physical

While physical change is widely used as one of the means to determine patentable subject matter, it has been subject to criticism. Judge Radar's dissent in the United States Court of Appeals for the Federal Circuit decision of *In re Bilski* captured many of these problems when he asked 'What form of amount of "transformation" suffices? When is a "representative" of a physical object sufficiently linked to that object to satisfy the transformation test?'[104] Questions have also been asked as to whether the 'physical' transformation test is inherently biased against software and related technologies[105]. The US Supreme Court raised concerns about physically based tests in the 2010 Bilski decision when it was said: 'In the course of applying the machine-or-transformation test to emerging technologies, courts may pose questions of such intricacy and refinement that they risk obscuring the larger object of securing patents for valuable inventions without transgressing the public domain'[106]. The use of physical change as a way of determining patentable subject matter has also been criticised for the fact that leads to strained questions such as is a change in an electronic signal 'physical'? [107] In some jurisdictions, these problems have been avoided because of the fact that the test for patentable subject matter is determined without reference to physical change. For example, in Australia it has been suggested that for an invention to be patentable subject matter it must disclose 'a mode or manner of achieving an end result

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103 *IBM/Document abstracting and retrieving*, T22/85 [1990] *EPOR* 98, 105.

104 *Bilski* 545 F 3d 943 at 1015 (Fed Cir 2008) (Radar J dissenting).

105 It has been suggested that tribunals tend to get bogged down in the 'unscientific hermeneutics of attempting to distinguish between the non-physical and the physical'. Steven Roosa, 'The Next Generation of Artificial Intelligence in Light if *In re Bilski*' (March 2009) 21:3 *Intellectual Property and Technology Law Journal* 6, 10.

106 *Bilski v Kappos* 561 US __ (2010), page 9.

107 '[W]hile the law is clear that patents cannot be granted on a fundamental principle unless embodied in otherwise patentable invention, deriving the exact line of demarcation between a fundamental principle and implementation thereof presents difficult and interrelated problems that the USPTO and the courts are ill equipped to address. Specifically, inherently difficult metaphysical questions such as "what is an abstract idea" ... are not the expertise of judges or patent examiners but philosophers'. W. M. Schuster, 'Predictability and Patentable Processes: The Federal Circuit's In Re Bilski Decision and its effect in the incentive to invent' (2010) 11 *The Columbia Science and Technology Law Review* 1, 8. It has also been said that 'what constitutes patentable subject matter under section 101 is a philosophical and abstract inquiry unrelated to the essential question "What did applicants invent". Manual of Patent Examining Procedure § 2106 (8th edn, Rev 6, Sept 2007). As cited in R. Morris, Brief for Roberta Morris, as Amicus Curiae Supporting Appellants, 5-6.

which is an artificially created state of affairs of utility in the field of economic endeavour'[108]. Similarly, for a period of time in the United States, physicality was downplayed[109], sidelined and replaced[110] by a test that required applicants to show a 'useful, concrete and tangible test'.[111] While this position is no longer followed in the United States, it highlights an approach that can potentially be used to determine patentable subject

[5.3.4] Specific examples of computer-related patentable subject matter

An increasing number of countries offer specific guidance about the types of inventions that will and will not be regarded as patentable subject matter. Typically these will be issued by the patent office or by a relevant government body. For example, in Malaysia, the Patent Office's Guidelines for Examination provide that if a computer program is claimed in the form of a physical record such as a conventional tape or disc, the contribution is regarded as a computer program per se as 'as such of a purely intellectual character'. However, if an invention consists of a computer program in combination with a computer, and it causes the computer 'to operate in a different way forma technical point of view, the combination might be patentable'.[112] In other situations, the specific examples of patentable subject matter can be found in implementing regulations. For example in Cambodia, the Implementing Regulations provide that (a) process inventions which, in whole or in part, consist of steps that are performed by computer and are directed by a computer; and (b) product inventions consisting of elements of a computer-implemented invention, including in particular: machine-readable computer program codes stored on a tangible medium such as a floppy disk, computer hard drive or computer memory; and a general purpose computer whose novelty over the prior art arises primarily due to its combination with a specific computer program[113].

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[108] *CCOM v. Jiejing* (1994) 122 ALR 417.

[109] *AT&T v Excel*, 172 F 3d 1352, 1358 (Fed Cir) 1999.

[110] *In re Alappat*, 33 F 3d 1526, 1544   (Fed Cir 1994). It was suggested that this led the US Federal Circuit to 'reject a blanket requirement that patent claims to processes involve a physical transformation of subject matter into a different state or thing'. A. Patrick, 'Patent Eligibility and Computer-Related Processes: A Critique of In re Bilski and the Machine-or-Transformation test' (2009) 14 *Virginia Journal of Law and Technology* 181, 197.

[111] *State Street Bank & Trust Co v Signature Financial Group* 149 F. 3d 1368 (Fed Cir 1998)   ('the transformation of data ... by a machine through a series of mathematical calculations ... constitutes a practical application of a mathematical algorithm, formula or calculation, because it produces a useful, concrete and tangible result'. Ibid, 1373).

[112] Intellectual Property Corporation of Malaysia, *Guidelines for Patent Examination* (22 March 2004), 2.2, 20.

[113] *Prakas (declaration) on the procedure for the grant of patents and utility model certificates* (Phnom Penh, May 28, 2007) No: 766 MIME.DIP.PRK, These were made in accordance with Article 130 of the Law on Patents and Utility Model Certificates and Industrial Designs.

The status of the non-legislative, non-judicial guidance about the status of computer programs as patentable subject matter will vary between jurisdictions. In some jurisdictions, the question of the extent to which computer programs are patentable subject matter is determined by way of specific examples of what can and cannot be protected. For example, in China and Japan, the advice given in the examination guidelines by the patent offices will be very influential. In other countries, the Guidelines may be limited to providing guidance about likely examination practices. While in these countries the Guidelines will be less influential in shaping the law, in the absence of legislative or judicial guidance, the Guidelines may still be very influential.

[5.3.5] The 'any hardware approach'

Strictly speaking, and particularly in comparison to the contribution approach, the any hardware approach is primarily concerned with how the invention is characterised. Once the invention has been characterised, there is nothing to suggest that a particular test to determine whether the subject matter of the invention-as-characterised is patentable ought to be adopted. It could be married for example with physical or by non-physical criteria. Given that the approach used at the European Patent Office is at odds with the approaches adopted in many other jurisdictions, it may be helpful to look at it in more detail.

In the *Pension Benefits* decisions, the Board said that what was claimed was a computer system suitably programmed for use in a particular field. Once the invention had been characterized, the next question to be decided was whether the invention exhibited the requisite technical character. In answering this question, the Board said that 'a computer system suitably programmed for use in a particular field, even if that is the field of business and economy, has the character of a concrete apparatus in the sense of a physical entity, man-made for a utilitarian purpose'. Given that an invention is likely to have a technical character if it leads to or produces a physical change in things, it is not surprising that the Board said that an 'apparatus constituting a physical entity or concrete product suitable for performing or supporting an economic activity, is an invention within the meaning of Article 52(1) EPC'.[114] That is, unlike the situation with the method claim, the apparatus claim could not be classified as a method of doing business and, as such, did not fall foul of Article 52(1). (It is important to note that the patent was refused on the basis that it lacked inventive step.) The upshot of the reasoning in *Pension Benefits* was that where a claim is to a *method* which consists of an excluded category, it is excluded, even if hardware is used to carry out

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114 Ibid., 453.

the method. In contrast, a claim to *an apparatus* itself, being concrete is not caught by Article 52(2).

The reasoning that was developed by the Technical Board of Appeal in *Pension Benefits* was applied and expanded in *Hitachi* (T 258/03)[115]. The upshot of *Hitachi*, which has been applied in subsequent decisions at the EPO[116] and endorsed by the Enlarged Board of Appeal, is that (i) a claim to *hardware* is not caught by Article 52(2) and (ii) a claim to a *method* of using that hardware is also not excluded. This means that so long as a technical means such as a computer is used, the resulting invention will not fall foul of Article 52(1). This is the case even if the invention is for a purely non-technical purpose[117].

As the Board noted in *Hitachi*, the broad interpretation given to the term 'invention' under the any hardware approach means that it will include activities which are so familiar that their technical character tends to be overlooked, such as the act of writing using pen and paper[118]. One of the consequences of the adoption of the any hardware approach at the European Patent Office is that it is much easier for an invention, whether for an apparatus or claim, to satisfy the subject matter requirement than had previously been the case. Indeed, one commentator has suggested that Article 52 is now an insignificant bar to patentability, given that all that is required to 'impart the requisite technical character to a claimed method is the specification of some technical means, however banal or well-known'[119].

While the any hardware approach has meant that more applications are now able to satisfy the subject matter requirement in Article 52, it does not mean that the applications will necessarily be patentable. One reason for this is that while the any hardware approach has made it easier to satisfy the subject matter threshold at the European Patent Office, this does not mean that all inventions will necessarily meet the threshold. [120] Another reason why the

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[115] *Hitachi/Auction Method* T258/03 (2004) *OJEPO* 575.

[116] See, for example, *Man/Provision of product-specified data* (2007) *OJEPO* 421, 427 (the claims in question did not bear scrutiny in light of *Pension Benefits* T 931/95 and *Hitachi T 258/03); Pitney Bowes/Undeliverable Mail* (2007) *OJEPO* 16;

[117] As the Microsoft/data transfer with expanded clipboard formats. Simply ask whether there is claim to something concrete eg an apparatus: if yes, the exclusion does not apply.

[118] *Hitachi/Auction Method* T258/03 (2004) *OJEPO* 575, 585.

[119] David Booton, 'The Patentability of Computer-Implemented Inventions' (2007) IPQ 92, 102. J. Pila, 'Dispute over the Meaning of Invention in Art 52(2) EPC: The Patentability of Computer-Implemented Inventions in Europe' (2005) 36 *IIC* 173.

[120] For example, in *Pitney Bowes/Undeliverable Mail,* an application for a method of responding by a mailer to notice from a postal service that a piece of mail was undeliverable was held to fall within Article 52(1). The telling factor in this case was that no technical means whatsoever were described in the application. The fact that the invention *might* have been implemented by an unspecified technical process was not enough to prevent the application from being excluded on the basis that

any hardware approach does not necessarily mean that more inventions will now be patentable is because the invention still needs to be new, non-obvious, and susceptible to industrial application. One of the consequences of the any hardware approach is that it shifted the focus of attention at the European Patent Office away from the inquiry as to whether a patent complies with Article 52(1) to the inquiry of whether there is an inventive step (and arguably also novelty and industrial applicability).[121] This is spelt out clearly in the revised European Patent Office Guidelines that say that when examining computer-related inventions it may 'be more appropriate for the examiner to proceed directly to the questions of novelty and inventive step, without considering beforehand the question of technical character'. The shift towards inventive step is reinforced in the European Patent Office Guidelines by the fact that when 'assessing whether there is an inventive step, the examiner must establish an objective technical problem. The solution of that problem constitutes the invention's technical contribution to the art. The presence of such technical information establishes that the claimed subject matter has a technical character and therefore is indeed an invention within the meaning if Art. 52(1)'.[122] The shift has also been confirmed in subsequent decisions at the European Patent Office that have focused on inventive step rather than exclusion from patentability.[123]

If an invention is implemented by a computer, it will be considered to use technical means and by that very token will be taken to have technical character[124]. This means that so long as an invention makes use of, or is implemented by, a computer, it will fall outside the subject matter exclusion. This can be seen in *Hitachi/Auction method*, where a method of using a memory (clipboard) on a computer was held to an invention for the purposes of Article 52(1)[125]. The liberal interpretation is can also be seen in the *Microsoft/Clipboard formats I* decision[126]. The application in question, which was for a way of 'facilitating data exchange across different formats', consisted of both method claims and a claim to program on a computer readable medium. The Board said that the 'method was implemented in a computer and this amounted to a technical means sufficient to escape the prohibition in

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it was for a method of doing business for the purposes of Article 52(2)(c)*Pitney Bowes/Undeliverable Mail* T388/04 *(2007) OJEPO 16, 23.*

121 The 'inference from Pension Benefit . . . is that lack of technical contribution might be a matter for inventive step rather than exclusion from patentability'. *Dell USA*, O/177/02 (24 Apr. 2002), para. 27 (M. Wilson) (Patent Office).

122 *EPO Guidelines* C-IV, 2.3.

123 *Comvik/Two identities*, T641/00 [2003] *OJEPO* 352; *International Computers/Information modelling*, T49/99 (5 Mar. 2002).

124 *Infineon Technologies/Circuit simulation* I T1227/05 (2007) *OJEPO* 574, 581.

125 T 258/03 (2004) OJEPO 575:

126 *Microsoft/Clipboard formats I* T0424/03 (23 Feb 2006), para 5.1.

Article 52'. More specifically the Board said that 'a method implemented in a computer system represents a sequence of steps actually performed and achieving an effect"'. Even though a method, in particular a method of operating a computer, may be put into practice with the help of a computer program, a claim relating to such a method does not claim a computer program as such[127].

The any hardware approach has been extended beyond computer-implemented inventions in relation to the medium on which a computer program is supported. (Jacob LJ in *Aerotel* said that this presupposes that computer program is defined narrowly as an abstract set of instructions). As the Technical Board of Appeal said in the *Microsoft/Clipboard formats I* decision, an invention will have technical character where it relates to computer-readable medium (a technical product involving a carrier). That is, a computer-readable medium is a technical product and thus has technical character. This means that where a computer program enhances the internal operations of a computer it will have technical character: so long it goes beyond the elementary interaction of hardware and software of data processing[128].

[6] Further questions

The discussion so far has focused on the ways that different jurisdictions approach computer programs as patentable subject matter. This section outlines a number of more general questions that arise when considering the status of computer programs as patentable subject matter.

One question that has arisen is whether or not the test that is used to determine patentable subject matter matters. In some cases, such as with the *State Street Bank* decision in the United States, it is clear that the test that is used to determine patentable subject matter can have an important bearing on what is able to be patented.[129] In other situations, however, it has been suggested that the approach chosen does not matter, as they reach the same results but by different routes[130]. This is particularly the case when comparing the technical contribution and hardware orientated approaches. For example, it has been said that while

[127] *Ibid.*

[128] Ibid; *IBM/Computer program product* (1999) *OJEPO* 609. In *Astron Clinica,* Kitchen J said that the Board in *Microsoft/Clipboard formats* appears to have found that any program on a carrier has a technical character and so escapes the prohibition in Article 52'.

[129] EBA considered the question of whether decisions differ if they come to the same verdict on different grounds *Programs for computers* G 03/08 (12 May 2010). Para 7 (EBA).

[130] cf the Enlarged Board of Appeal 'Legal rulings are characterised not by their verdicts, but by their grounds'. *Programs for computers* G 03/08 (12 May 2010). Para 7.3.7 (EBA).

'the approach determining whether subject matter is an invention in view of Article 52 [EPC] appears to have changed, the changes are somewhat academic'.[131]

One of the characteristics of the technical contribution approach is that it shifts the focus of attention away from subject matter towards inventive step. While this does mean that the role that subject matter plays in filtering out the types of inventions that are patentable is downplayed, it does not necessarily mean, however, that it leads to an increase in what is patentable[132]. This will depend on the rigour with which the inventive step requirement is applied. It also depends on the role that is attributed to subject matter exclusion[133]. One of the consequences of this is that it gives rise to interesting questions about the role of excluded subject matter in regulating the patentability of computer programs and computer-related inventions. In essence, it asks us to consider whether the roles performed by the subject matter exclusion could or should be performed by other criteria for patentability. This is particularly relevant in jurisdictions which conflate subject matter with novelty and inventive step (which is a feature of the contribution approach to patentable subject matter). A number of factors are relevant here. One is the capacity of the relevant examination authority to decide inventive step – given that it presupposes that patent offices have the expertise and resources to examine inventive step. (This argument carries less weight in jurisdictions which conflate subject matter with novelty and inventive step). One of the potential problems with the shift to inventive step is that makes the examination and exclusion of types of inventions less visible. With the fate of particular inventions being dealt with on a case-by-case basis, rather than as a result of broad-brush exclusions of types of subject matter, the process of reviewing and critiquing the law also becomes more difficult.

Another question that needs to be considered is *when* should questions about subject matter be asked? There is widespread consensus that the inquiry into whether an application embodies patentable subject matter is a question that must be considered before any other

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[131] International Business Machined (IBM) Brief of Amicus Curia G3/08 (27 April 2009), 2. while recognising that the existence of different practical approaches creates confusion')

[132] There is occasional support for this approach outside of Europe. For example it has been suggested that 'a rational patent system might strive to constrain the potential social costs [of improper patents] through judicious applications of such proxies as non-obviousness, claim definiteness, and enablement doctrine'. Thomas Cotter, 'A Burkean Perspective on Patent Eligibility, Part II: Reflections on the (Counter) Revolution in Patent Law' (2010) 11(1) *Minnesota Journal Law Science & Technology*, 379.

[133] Patent eligibility has been described as a 'crude filter for carrying out social policy' Thomas Cotter, 'A Burkean Perspective on Patent Eligibility, Part II: Reflections on the (Counter) Revolution in Patent Law' (2010) 11(1) *Minnesota Journal Law Science & Technology* 365, 379.

questions are asked.[134] As the Supreme Court said in *Bilski* the subject matter 'section 101 patent-eligibility inquiry is only a threshold test'.[135] Should, as is so often assumed, the subject matter exception be treated as a gatekeeper that always needs to be addressed prior to exploring other requirements of patentability?

Another important question that needs to be considered is *who* should ask the subject matter exception? The answer to this question is closely tied to the legal-political system adopted in a particular country. In some jurisdictions, particularly those with little case law or where the precedential role of the courts is less important, patent offices have played an important role in construing the relevant law. In many other jurisdictions, the judiciary have played a key role in determining whether computer programs and computer-related inventions are patentable subject matter. In some jurisdictions, such as Australia, Bangladesh, and New Zealand, this is a consequence of the legislative decision to introduce and retain a broad and largely meaningless definition of invention (namely 'manner of manufacture'), which is only given any real shape through judicial interpretation. In the United States, the courts have to interpret the broad categories of invention set out in section 101 of the US Patent Act (namely: processes, machines, manufactures, and compositions of matter[136]). In these situations, the task of adapting patent law to new technology is effectively delegated by the legislative body to the courts. In other jurisdictions, the tribunals have taken it upon themselves to actively construe and update legislative provisions. In this regard, witness the way in which despite the clear wording of the European Patent Convention and corresponding national legislation, that the European Patent Office and national courts of the Member States have allowed the patenting of computer related inventions. Whether this is a consequence of outdated (or technologically specific) legislative exceptions, or a consequence of judicial activism (whether to liberalise or restrict protection), the outcome is the same, namely that the fate of computer programs as patentable subject matter depends on the approach taken by the relevant courts. In part, this has contributed to dramatic changes that have taken place, at least in some jurisdictions.

The role of the courts and patent offices in changing the law in this area seems set to continue. One factor that is relevant here relates to the fact many recent attempts to use legislative mechanisms to modify pre-existing legal arrangements in relation to computer programs have failed. In part this is because while patent protection for computer programs

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[134] In the US see *Paine, Webber, Jackson & Curtis v Merrill Lynch, Pierce, Fenner & smith* 564 F Supp 1358, 1366 (D. Del. 1983).

[135] On this see *Bilski v Kappos* 561 US __ (2010), page 5. (KennedyJ.)

[136] On this see *Bilski v Kappos* 561 US ___ (2010), page 4.

has long been regarded as an important subject that attracted a reasonable amount of interest, in recent years the patenting of computer programs has become highly politicised. For example one of the reasons why the EC draft Computer Programs Directive failed[137] was because a consortium of interests led by members of the open-source community campaigned against greater protection.[138] Similar problems have also occurred in India. To the extent that legislative changes have occurred, they have tended to be a result of changes necessitated to enable a country to become a member of a regional patent law treaty (notably the European Patent Convention and the Eurasian Patent Convention). In other cases, changes to the standing of computer programs have occurred as result of bilateral free trade agreements (as with Singapore). One of the consequences of this is that it seems that it will be difficult to achieve targeted legislative changes in this area, at least in the short term. In the meantime, it seems that any changes that are likely to occur will be a result of judicially led changes, or changes brought about by patent offices. As one commentator noted, 'patent subject matter has been expanded [and contracted] mainly via interpretation, and to a certain degree, by the action of patent office administrative interpretation'[139]. While some commentators welcome the role of the judiciary in adapting patent law to new technologies, others have been more critical. For example, it has been said that in an 'area where the law itself is not clear, interpretation constructs a social meaning, and influences the norm. A liberal interpretation of the text of the law introduces new subject matter without any democratic check and balances that any legislative changes need to subject'.[140] To the extent that change is instigated by patent offices, it contributes to a unique characteristic of the patent law system, namely that there is 'an administrative body that ... actually make[s] policy and grants rights at the same time'.[141]

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[137] So too with attempts to remove the computer programs exclusion from the 1973 EPC. The first draft of the Basic Proposal, which proposed that EPC 1973 said that 'the deletion of computer programs from Article 52(2)(c) EPC has met with broad consensus' was ultimately rejected by 16 of the 20 Member States.

138 These include EuroLinux and the Association for the Promotion of Free Information Infrastructure (FFII).

[139] Nari Lee, 'Computer Program Patents and the Law and Policy of Patent Eligible Subject Matter: the Creation of a Pribvate Social Contract?', 9.

[140] Nari Lee, 'Computer Program Patents and the Law and Policy of Patent Eligible Subject Matter: the Creation of a Pribvate Social Contract?', 8.

[141] Nari Lee, 'Computer Program Patents and the Law and Policy of Patent Eligible Subject Matter: the Creation of a Pribvate Social Contract?', 9.

Part II: Country Summary

[1] International Treaties

[1.1] TRIPS

International treaties that impact upon patent law are largely silent in relation to computer programs as patentable subject matter. The one possible exception to this is the TRIPS Agreement. Article 27(1) of TRIPS states that 'patents shall be available for any inventions, whether products or processes, in all fields of technology' and that 'patents shall be ... enjoyable without discrimination as to ... field of technology'.[142] Questions have arisen as to what this means for computer programs as patentable subject matter. On the one hand, supporters of software patenting have suggested that Article 27(1) does not allow computer programs or software to be excluded from patentability on the basis that they are a field of technology.[143] On the other hand, however, it has been argued that the discussions preceding the adoption of TRIPS did 'not confirm such a reading'[144]. The United Kingdom Court of Appeal provided support for this view when they rejected an argument that Article 27 of TRIPS supported an application for the patentability of a computer-related invention, saying that the 'point begs the question: to what extent is a computer program to be treated as 'an invention ... in ... technology'[145]. In light of arguments of this nature, it has been suggested that TRIPS 'leaves it to the member states to determine what constitutes a patentable invention, and whether or not that includes computer software as such'[146].

[2] Regional Treaties

[2.1] African Intellectual Property Organization

The African Intellectual Property Organization (OAPI) was formed by the adoption of a new convention signed in Bangui on 2nd March 1977. The OAPI consists of sixteen west and Central African countries, namely; Benin, Burkina Faso, Cameroon, Central African

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[142] The Board of Appeal noted that as the EPO was not a signatory to TRIPS, they were not bound by it. However, on the basis that TRIPS aimed at 'setting common standards and it acted as an

[143] For examples of situations where this has been argued see R. Bakels and Bernt Hugenholtz, '*The Patentability of Computer Programs*' (European Parliament; Legal Affairs Series, 2002) Working Paper, 13 note 3.

[144] R. Bakels and Bernt Hugenholtz, '*The Patentability of Computer Programs*' (European Parliament; Legal Affairs Series, 2002) Working Paper, 13.

[145] *Symbian Ltd v Comptroller General of Patents* [2008] *EWCA* Civ 1066, para 30. (approach was 'understandable, indeed desirable'). See also *Computer Program Product/IBM* T 1173/97 OJ EPO (1999), 609. Technical Board of Appeal at the EPO took account of Article 27(1) (at para 2.3).

[146] R. Bakels and Bernt Hugenholtz, *The Patentability of Computer Programs*' (European Parliament; Legal Affairs Series, 2002) Working Paper, 13.

Republic, Chad Congo, Cote d'Ivoire, Equatorial Guinea, Gabon, Guinea, Guinea Bissau, Mali, Mauritania, Niger, Senegal, and Togo.

Patent law under the OAPI is dealt with under the Bangui Accord[147]. Article 1 of the Bangui Accord provides that 'invention means an idea that permits a specific problem in the field of technology to be solved in practice'. The scope of patentable subject matter is qualified by Article 6 which provides that excluded subject matter includes

- discoveries, scientific theories and mathematical methods -- Article 6(b)
- schemes, rules or methods for doing business, performing purely mental acts or playing games -- Article 6(d)
- mere presentations of information- Article 6(f) and
- computer programs -- Article 6(g)

[2.2] African Regional Industrial Property Organization (ARIPO)

The African Regional Intellectual Property Organization (ARIPO), formerly the African Regional Industrial Property Organization, is an intergovernmental organization with 16 Member States. Registration of patents under ARIPO is governed by the Harare Protocol, (The Protocol on Patents and Industrial Designs), which allows the ARIPO Office to undertake substantive examination and grant patents. Botswana, Gambia, Ghana, Kenya, Lesotho, Liberia, Malawi, Mozambique, Namibia, Sierra Leone, Sudan, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe are parties to the Harare Protocol. Article 9 of the Harare Protocol provides that inventions for which patents are granted by the Office shall be new, shall involve an inventive step and shall be industrially applicable.

[2.3] Andean Pact

Andean supranational legislation provides the basic intellectual property legal system to the countries under the Pact (Bolivia, Colombia, Ecuador, and Peru), to which ancillary domestic provisions may be added as supplementary law. Colombia has relinquished to provide such domestic counterpart. In 2008 Venezuela abandoned the Pact and revived the 1955 IP domestic law then quiescent.

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[147] Article 1 Annex 1: Patents, Agreement Revising the Bangui Agreement of March 2, 1977, on the Creation of an African Intellectual Property Organization (Bangui (Central African Republic) 24 February 1999.

Andean law prevails over domestic law[148]. According to Andean Decision 689 of 2008[149], countries may provide in their national laws more enhanced protection than the one provided under general Andean standards[150], thus allowing that supranational rules work in a supplementary and minimum level role whenever the domestic laws apply, and not anymore as principal body of law. This was needed as result of the Andean jurisprudence stating that legislation not in conformity with Andean Decision 486 was to be held invalid[151]. It is generally held that the Andean IP statutes and especially its case law is the most important body of law throughout the region [152].

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[148] PROCESO 14-AN-2000. 'It is necessary to point out that the legal system of the Andean integration prevails in its application to internal and national standards, being essential feature of Community law, as a basic requirement for building integration. This was recognized by the Cartagena Agreement Commission composed of the plenipotentiaries of the Member Countries, in the declaration adopted at its Twenty-Ninth Ordinary Session (Lima, May 29-June 5, 1980), when he declared the "full validity" of following concepts: a) the law of the Cartagena Agreement has identity and autonomy, is a common law and is part of the national legal systems, b) the law of the Agreement prevails, within the framework of its powers, the rules national, but they may oppose him unilateral measures or the Member Countries, c) the decisions which create obligations for member countries enter into force on the date indicated or otherwise, on the date of the Final Act of the meeting respectively, in accordance with Article 21 of the Rules of the Commission. Accordingly, those decisions are binding and acquire the required compliance from the date of its validity'.

[149] See: http://www.comunidadandina.org/normativa/dec/D689.htm

[150] See: http://www.barredamoller.com.pe/store/publicaciones/78/September_2008.pdf, visited 15/4/2010.

[151] For instance, in DICTAMEN N° 07-2007, República del Perú – Reclamo de THE REGENTS OF THE UNIVERSITY OF CALIFORNIA. For all the above, the Secretary General considers that the Republic of Peru has committed a breach of Article 26, letter k) and 32 of Decision 486, establishing through internal regulations (Legislative Decree 823 and Decree Law 807) formal requirements additional to those contained in Decision 486 for the filing of patents. Similarly, the Republic of Peru has also violated the provisions of Article 4 of the Treaty Creating the Court, by which the Member Countries of the Andean Community made a commitment to take the necessary measures to ensure compliance Andean Community (obligations to do), and the commitment not to take any action or use would be contrary to the Andean system or in any way hinder its implementation (obligations not to do). Indeed, "the breach of any rule of law, originating in or derived from a member country inevitably leads to violation of Article 4 No ...."

[152] L. Helfer, K. Alter, and Guerzovich, M. Florencia, 'Islands of Effective International Adjudication: Constructing an Intellectual Property Rule of Law in the Andean Community' Vol. 109 (2009) *American Journal of International Law*, Vanderbilt Law and Economics Research Paper No. 08-53; Vanderbilt Public Law Research Paper No. 08-53; Northwestern Law & Econ Research Paper No. 08-22; Northwestern Public Law Research Paper No. 08-41. Available at SSRN: http://ssrn.com/abstract=1306318. 'The Andean Community - a forty-year-old regional integration pact of small developing countries in South America - is widely viewed as a failure. In this Article, we show that the Andean Community has in fact achieved remarkable success within one part of its legal system. The Andean Tribunal of Justice (ATJ) is the world's third most active international court, with over 1400 rulings issued to date. Over 90% of those rulings concern intellectual property (IP). The ATJ has helped to establish IP as a rule of law island in the Andean Community where national judges, administrative officials, and private parties actively participate in regional litigation and conform their behavior to Andean IP rules'.

Article 14 of the Decision 486[153] (Common Intellectual Property Regime) of The Commission of the Andean Community provides that Member Countries shall grant patents for inventions, whether goods or processes, in all areas of technology, that are new, involve an inventive step, and are industrially applicable. This is qualified by Article 15, which provides that the following shall not be considered inventions:

(a) discoveries, scientific theories, and mathematical methods;

…

(c) literary and artistic works or any other aesthetic creation protected by copyright;

(d) plans, rules, and methods for the pursuit of intellectual activities, playing of games, or economic and business activities;

(e) computer programs and software, as such; and,

(f) methods for presenting information.

[2.4] European Patent Convention

The *European Patent Convention* (EPC) was signed in Munich in 1973 and came into operation on 1 June 1978.[154] The EPC is based upon (and modified) the patent law of the various member states in force at the time. The EPC is an intergovernmental treaty that is distinct from the European Community. As such, membership extends beyond members of the EC. At the beginning of 2010 the EPC had 37 member states. These are: Albania, Austria, Belgium, Bulgaria, Cyprus, Croatia, Czech Republic, Denmark, Estonia, Finland, France, the former Yugoslav Republic of Macedonia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Poland, Portugal, Romania, San Marino, Slovenia, Slovakia, Spain, Sweden, Switzerland, Turkey, and the United Kingdom. In addition there are three extension states: Bosnia and Herzegovina, Montenegro, and Serbia.

When the EPC was being formulated, it was decided that for there to be an effective single granting process, it was necessary for the member states to harmonize the basic rules of patent law. This was particularly the case in relation to the rules on patentability and validity.

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[153] http://www.comunidadandina.org/normativa/dec/D486.htm

[154] Work began on a European patent system in 1949 in the Council of Europe with the Longchambon plan. For background see K. Haertel, 'The Munich Diplomatic Conference on European Patent Law' (1973) 4 *IIC* 271. See also P. Braendli (1974) 4 *IIC* 402.

In 2007, the 1973 *European Patent Convention* was replaced by the *European Patent Convention* 2000, which is known as the 'EPC 2000'. The revised Convention and new Implementing Regulations were adopted by the European Patent Office Administrative Council on 28 June 2001 and came into force on 13 December 2007. The new law applies to all European patent applications and to patents granted on the basis of this application which were filed after the EPC came into force. In certain situations, the EPC 2000 also applies to applications that were pending on 13 December 2007 and to patents that had already been granted by that date. Under the transitional provisions of the EPC 2000 most of the provisions of the new law will apply to applications lodged and patents granted prior to the EPC 2000 coming into force. The provisions of the EPC 2000 apply unless the transitional provisions provide for the applicability of the EPC 1973 provide otherwise.

The EPC is primarily concerned with the granting of European patents.[155] This was facilitated by the establishment of the European Patent Office (EPO) in Munich, which acts as a centralized system for the grant of European patents. When an applicant wishes to protect their invention in a number of European countries, the European Patent Office provides them with the benefit of a single application and search procedure, and a single grant of a bundle of national patents in each of the countries designated.[156] Upon grant, a European patent becomes a bundle of national patents that have effect in each of the member states for twenty years from the date of filing..

The EPC 2000 contains a non-exhaustive list[157] of creations which are deemed *not* to be inventions.[158] Article 52(2) EPC 2000 provides 'that the following (among other things) are not inventions for the purposes of this Act, that is to say, anything that consists of:

   (a) a discovery, scientific theory or mathematical method[159];

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[155] This has cast doubts over the independence of the Office. Interestingly, the European Parliament suggested that the EPO reconsider the practice whereby it 'obtains payments for the patents that it grants as this practice harms the public nature of the institution'. *Proposal for a Directive of the European Parliament and of the Council on the Patentability of Computer-implemented Inventions* COM (2002) 92 final, Recital 7b (introduced by European Parliament, Amendment 95).

[156] The second planned element of the European patent system, the Community Patent Convention (CPC), provided for the establishment of Community-wide patent. It has not yet come into force and has been supplanted by the EC's plan for a Europe-wide patent.

157 See *Lux Traffic v. Pike Signals* [1993] *RPC* 107, 137ff.; *Christian Franceries/Traffic regulations*, T16/83 [1988] *EPOR* 65.

158 G. Kolle, 'The Patentable Invention in the EPC' (1974) 5 *IIC* 140, 144.

[159] For a discussion of 'mathematical methods' see *Citibank v Comptroller General of Patents* [2006] *EWHC* 1676 (Ch), para 19 (concept did not merely operate at the rarefied atmosphere of calculus but also extended to 'lower levels': para 21).

(b) a literary, dramatic, musical or artistic work or any other aesthetic creation whatsoever;

(c) a 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'

This is subject to the proviso that provides that the 'foregoing provisions shall not 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'. While most, but no means all, of the material listed in Article 52(2) is excluded because it is abstract and non-technical[160], this is not the case with computer programs which were excluded because it was thought at the time the EPC was drafted that they were better protected by copyright law.[161]

Over time the approach that has been adopted at the European Patent Office to computer programs has changed considerably. While some aspects of the law, such as the reliance on technicality as a criteria to determine patentability has remained constant, the approach that is taken to determine whether an application is excluded has changed substantially. To understand the current approach at the European Patent Office, it is important that the old approach is also understood. This is also important because some of the EPC Member States still apply the old law. It is also important because some countries outside of Europe proclaim to follow the approach at the EPO (which often refers to the old approach).

Under the old law at the EPO, subject matter protection was available based on the European Patent Office's application of the technical effects doctrine. The first task that was undertaken when deciding whether an invention fell within one of the excluded categories under this approach was that it was necessary to determine what was being claimed. In particular, it was necessary to construe the claims to identify the contribution made by the invention. Once the invention has been characterized, it was then possible to determine whether it fell within the scope of Article 52(2). In situations where the invention clearly fell within one of the excluded categories set out in Article 52(2), it would not be patentable.

In determining whether an invention fell within the scope of Article 52(2) the European Patent Office ignored the often difficult question of whether the invention was, for example, a computer program or a mathematical method. Instead, they asked whether the invention-

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[160] Cf Jacob LJ in *Aerotel v Telco Holdings* [2007] 1 *ALL ER* 225, para 9.
[161] G. Kolle, 'The Patentable Invention in the EPC', (1974) 5 *IIC* 140, 147–8.

as-claimed was 'technical'. If the invention exhibited technical character or the problem that the invention solves was technical,[162] this was taken to mean that it fell outside the scope of Article 52(2).[163] Conversely, the absence of technical character was treated as virtual proof that the invention fell within the scope of Article 52(2) and that it was therefore unpatentable. In a sense what happened, at least in difficult border-line cases, was that the negative criteria set out in Article 52(2) were recast in more positive terms. This meant that for an invention to be patentable it was necessary to show that the invention exhibited technical character or, in other words, that it made a technical contribution to the art.

The introduction of technical character as a *de facto* non-statutory requirement for patentability owes its origin to an imaginative interpretation of Article 52 of the EPC. This provides that all the categories in Article 52(2) have in common is that they are non-technical, either because they are abstract (discoveries, scientific theories) or because they are clearly non-technical (aesthetic creations or presentations of information).[164] As Article 52(1) and (2) only exclude from protection those inventions which are non-technical, it is a short inductive leap to conclude from this that the term 'invention' relates to inventions of a technical nature. This conclusion was reinforced by the Rules and Guidelines of the EPC that clearly state that in order for an invention to be patentable it must be technical.[165]

 The use of technical character as a way of determining whether an invention falls within the scope of the excluded subject matter is set out in the leading EPO decision of *Vicom*.[166] In deciding that an application which related to a method of digitally filtering images using a device called an operator matrix which aimed at producing enhanced images was patentable, the Board stressed that even if the idea underlying an invention was a

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162 *IBM/Data processor network*, T6/83 [1990] *OJEPO* 5; [1990] *EPOR* 91; *IBM/Computer-related invention*, T115/85 [1990] *EPOR* 107. The feature of using technical means for a purely non-technical purpose and/or for processing purely non-technical information does not necessarily confer technical character to any such individual steps of use or to the method as a whole: in fact, any activity in the non-technical branch of human culture involves physical entities and uses, to a greater or lesser extent, technical means.

163 The mere occurrence of technical features in a claim is not enough: *Pension Benefit Systems Partnership*, T931/95 [2001] *OJEPO* 441, 450 (TBA).

164 *Sternmheimer/Harmonic vibrations*, T366/87 [1989] *EPOR* 131.

165 A patentable invention must relate to a technical field: EPC r. 27(1)(b); it must be concerned with a technical problem: EPC 2000 r. 43(1), and it must be characterized in the claims by means of technical features: EPC 2000 r. 43(1)9b). *EPO Guidelines* C-IV, 1.2(ii).

166 *Vicom/Computer-related invention*, T208/84 [1987] *EPOR* 74; [1987] *OJEPO* 14. Beyer 'Der Begriff der Information als Grundlage fur die Beeurteilung des technischen Charakters von programmbezogenen Erfindungen' [1990] *GRUR* 399.

mathematical method it could still be patentable if the invention as a whole made a technical contribution to the known art[167].

One of the main advantages of shifting attention towards the idea of technical character is that the courts are able to avoid the difficult task of having to define the subject matter listed in Article 52(2), a task which is not only technically problematic but also one that changes in technology are likely to render obsolete. Whatever advantages there may be in using technical character as a *de facto* requirement for determining whether an invention falls within the ambit of Article 52(2), it still left the European Patent Office with the difficult task of having to formulate and understand what is meant by the term 'technical'. It is the difficulty in answering this question that led to adoption of the *Pension Benefits* approach at the European Patent Office.

In the vast bulk of cases it is very easy to ascertain whether an invention is technical. This is because it is generally accepted that certain types of creations, such as those in the fields of mechanical engineering or organic chemistry, are technical and as such belong within the remit of patent law. This is made all the easier by the fact that applicants are required to specify the technical field into which their applications fall. While in most circumstances it may be easy to determine whether an invention is technical, in some situations this is not the case.[168] Typically this arises in relation to creations which fall outside the currently accepted legal limits. This is presently the case with inventions in relation to financial systems, software-generating software, language-processing, text-editing, and computer programs. In these borderline cases, determining whether an invention is technical is often a difficult task. This problem was highlighted by the British Comptroller of Patents who complained that 'in practice it is often very difficult to determine whether a particular invention does as a matter of fact involve the sort of technical contribution or result alluded to in the cases'.[169] The difficulty of this task was borne out by the fact that while the legal studies which prompted the revision of the European Patent Office guidelines were able to propose 'technical character' as one of the ways of determining whether subject matter was excluded from patentability, they were unable to provide a precise definition of what was meant by the

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[167]   *Hitachi/Auction Method* T258/03 (2004) *OJEPO* 575, 580 (the term invention is to construed as 'subject matter having a technical character').

[168] See J. Thomas, 'An Epistemology of Appropriation: Patentable Subject Matter after *State Street Bank*' [2000] *IPQ* 27, 49 ff.

[169] *Fujitsu's Application* [1996] *RPC* 511, 521.

term 'technical'.[170] Instead, they left the task of defining technology to the jurisprudence of the courts.

In determining whether an invention is technical, the European Patent Office tended to fall back on the model of the invention that has long been employed in patent law.[171] This is one that sees the process of invention as the reduction of the abstract to the specific, or as a transformation from the general to the concrete, processes which are mediated by the inventor. In turn, this model distinguishes between creations that are abstract, intellectual, mental, undefined, and unpatentable, and those that are concrete, physical, tangible, and patentable.[172] Drawing upon this model of the invention, it has been held that an invention is technical and patentable if it provides or leads to a concrete, causal or non-abstract result or change in things. When translated into the context of Article 52(2), this means that if it can be shown that the invention brought about a tangible physical change, this is taken as virtual proof that the invention is technical and that it therefore falls outside the scope of the excluded categories.[173]

The use of physical change to determine whether an invention is technical can be seen in *Vicom* where the Board of Appeal explained how unpatentable mathematical methods could be distinguished from patentable inventions 'the fact that a mathematical method or a mathematical algorithm is carried out on numbers . . . and provides a result also in numerical form, the mathematical method or algorithm being only an *abstract* concept prescribing how to operate on numbers. No direct technical result is produced by the mathematical method as such'. While abstract creations are not patentable, the Board of Appeal added that 'if a mathematical method is used in a technical process, that process is carried out on a physical entity (which may be a material object but equally an image stored as an electrical signal) by some technical means implementing the method and provides as its result a certain *change* in that entity'.[174]

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170 WG/CP/I/1.

171 See *NRDC's Application* [1961] *RPC* 134, 142; *Rote Taube* (1970) 1 *IIC* 136, 137–8.

172 The 'invention must belong not to the field of abstractions or speculations, but to that of practical achievement. It must concern not an abstract principle but a conception which is implemented in industry'. *Christian Franceries/Traffic regulations*, T16/83 [1988] *EPOR* 65, 70; [1990] *OJEPO* 379.

173 The following inventions were held to be unpatentable because they did not bring about a physical change: inventions for document-abstracting (*IBM/Document abstracting and retrieving*, T22/85 [1990] *EPOR* 98); linguistic expression processing (*IBM/Text clarity processing*, T38/86 [1990] *EPOR* 606); a system for listing semantically related linguistic expressions (*IBM/Semantically related expressions*, T52/85 [1989] *EPOR* 454); method for automatically detecting and correcting contextual homophone errors in a text document (*IBM/Text processing*, T65/86 [1990] *EPOR* 181).

174 *Vicom/Computer-related inventions*, T208/84 [1987] *EPOR* 74, 79.

In a move that has important ramifications for many inventions, particularly in the field of information technology, the physical conception of technology was interpreted very broadly at the European Patent Office. This can be seen in the comment that 'physical entities' includes 'a real thing, i.e. an image, even if that thing was represented by an electrical signal'.[175] The wide definition given to physical entity can also be seen in the European Patent Office decision of *Kock & Sterzel*. In this case, it was held that the fact that the invention controlled X-ray tubes in such a way as to ensure optimum exposure while at the same time minimising against the danger of overloading of the tube was sufficient change for the application to be deemed technical.[176] Perhaps the best example of the way in which the meaning of 'physical entity' has been extended can be seen in *BBC/Colour television signal* where it was said that despite its transient character, as a TV signal could be detected by technical means it had a physical reality and therefore could not be considered to be an abstract entity.[177] As such, it was prima facie patentable.

The question of the scope of the exclusion of computer programs was considered in two decisions by the Technical Board of Appeal, both involving applications by IBM**.** The invention in the first decision *IBM/Computer programs* (T935/97) was for a method for allowing information in a data-processing system that was displayed in one window to be altered if that window was obscured by another window. The application included claims for software in itself, and for software recorded in a computer-readable medium.[178] While some of the claims were accepted, the Examining Division refused the application insofar as it was directed to a computer-program product. The second *IBM* decision (T1173/97) related to 'resource recovery in a computer system'.[179] Again, the Examining Division rejected the application insofar as it claimed a computer-program product. In both cases the question for consideration related to the scope of the exclusion of computer program *as such*. The reasoning in both cases was identical.

 The Board of Appeal began by noting that the language of Articles 52(2) and (3) showed that the legislators did not want to exclude all computer programs from patentability.[180]

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[175] *IBM/Document abstracting and retrieving*, T22/85 [1990] *EPOR* 98, 105.
[176] *Kock & Sterzel/X-ray apparatus*, T26/86 [1988] *EPOR* 72; [1988] *OJEPO* 14. See also *IBM/Computer-related invention*, T115/85 [1990] *EPOR* 107; [1990] *OJEPO* 30 (an invention which automatically gave visual indications about conditions prevailing in an apparatus or system was said to resolve a technical problem).
[177] *BBC/Colour television signal*, T163/85 [1990] *EPOR* 599; [1990] *OJEPO* (Suppl.) 19. On this basis the invention did not fall within EPC Art. 52(2)(d).
[178] *IBM/Computer programs*, T935/97 [1999] *EPOR* 301.
[179] *IBM/Computer programs*, T1173/97 [2000] *EPOR* 219.
[180] *IBM/Computer programs*, T935/97 [1999] *EPOR* 301, 309; T1173/97 [2000] *EPOR* 219, 226.

Instead, all that was excluded were computer programs *as such*. Drawing upon the logic that has been applied to Article 52(2) and (3) generally, the Board said that when the EPC referred to computer programs *as such*, it meant mere abstract creations, lacking in technical character. In more positive terms this meant that computer programs that had a technical character were potentially patentable.[181] In so doing, the Board distinguished between computer programs as such (which are not patentable) and computer programs that had a technical character (which are patentable).[182]

This gives rise to the question: when does a computer program have a technical character? As with all inventions, the requisite technical character may exist either in technical effects or in the solution to a technical problem. In addressing this question, the Board began by noting that a computer program cannot be assumed to have a technical character merely for the reason that it is a program for a computer. This means that *normal* 'physical modifications of the hardware (causing, for instance, the generation of electrical currents) deriving from the execution of the instructions given by programs for computers cannot *per se* constitute the technical character required for avoiding the exclusion of those programs'.[183] The Board added that such modifications were a common feature of all computer programs and therefore could not be used to distinguish programs with a technical character from programs 'as such'. Instead, the Board said that the technical character must be found elsewhere in the effects caused by the execution of the computer program by the hardware. That is, a computer program product could be patentable if it resulted in additional technical effects that went beyond the 'normal' physical interaction between the program (software) and the computer (hardware) on which it was run.

The Board also noted that computer program products only produced and showed an effect when the program concerned was made to run on a computer. The effect only shows in physical reality when the program is being run. On the basis that there was no good reason to distinguish between a direct technical effect and the potential to produce a technical effect, the Board accepted that a computer program that had the potential to cause a

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181 They did so on the basis of EPC r. 27, 29. *IBM/Computer programs*, T1173/97 [2000] *EPOR* 219, 226.
182 In so doing, the Board overturned *EPO Guidelines* C-IV 2.3 which state that a 'computer program by itself or as a record on a carrier is not patentable, irrespective of its content'. The Board also distinguished *ATT/System for generating code*, T204/93 (29 Oct. 1993). *IBM/Computer programs*, T935/97 [1999] *EPOR* 301, 308.
183 *IBM/Computer programs*, T935/97 [1999] *EPOR* 301, 310; T1173/97 [2000] *EPOR* 219, 227.

predetermined further technical effect was in principle not excluded from patentability under Article 52(2) and (3).[184]

After reviewing the scope of protection for computer programs, the Board remitted both cases to the Examining Division to determine whether the applications complied with this reading of Article 52(2)(c). While it is clear that the *IBM* decisions mark a victory for the proponents of greater protection for information-technology-related inventions, ultimately the extent to which computer programs are patentable depends on how 'technical character' is construed. One factor that suggests that the exclusion will be read narrowly flows from the Board's comment that it does not make any difference for the purpose of the exclusion whether a computer program is claimed by itself or as a record on a carrier.[185] This means that so long as a computer program is technical, the medium in which it is recorded (the carrier) is irrelevant.[186] This would allow, for example, patents to be granted for software-implemented inventions distributed over the Internet[187] and to computer-program products directly loadable into the internal memory of a digital computer.[188]

The second approach used to determine whether an invention falls within Article 52(2)/section 1(2), which is currently applied at the European Patent Office has been called, somewhat pejoratively, the 'any hardware approach'. The new approach was developed by European Patent Office Technical Board of Appeal in the decision of *Pension Benefits Systems Partnership*[189] and subsequently expanded in *Hitachi*[190]. Under the any hardware approach (in its expanded form), an invention will not be fall within any of the excluded categories in Article 52(2) if it embodies or is implemented by some technical means (such as a computer). This is the case even if the technical means is used in relation to a non-technical activity. In effect, under the any hardware approach, the tribunal will stand back from the invention – whether a method or an apparatus – and ask whether it can be classified as a

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184 *IBM/Computer programs*, T935/97 [1999] *EPOR* 301, 313; T1173/97 [2000] *EPOR* 219, 230.

185 *IBM/Computer programs*, T935/97 [1999] *EPOR* 301, 317; T1173/97 [2000] *EPOR* 219, 234.

186 The Board said that if the 'computer program product comprises a computer-readable medium on which the program is stored, this medium only constitutes the physical support on which the program is saved and thus constitutes hardware'. *IBM/Computer programs*, T935/97 [1999] *EPOR* 301, 312; T1173/97 [2000] *EPOR* 219, 229.

187 R. Hart, P. Holmes, and J. Reid, *The Economic Impact of Patentability of Computer Programs* (2000), 13.

188 J. Lang, 'Patent Protection for e-Commerce Methods in Europe' [2000] *Computer and Telecommunications LR* 117, 119 (contrasting the IBM decisions with the US decision of *Re Beauregard*, which held that computer programs embodied in a tangible medium, such as floppy discs, are patentable). R. Hart, 'Computer Program-Related Patents' (1999) 15:3 *Computer Law and Security Report* 188, 189.

189 *Pension Benefit Systems Partnership*, T931/95 [2001] *OJEPO* 441 (TBA).

190 *Hitachi/Auction Method* T258/03 (2004) *OJEPO* 575.

form of technology (irrespective of whether it is novel or inventive): all that matters is that the invention makes use of, or embodies, some form of technology (or hardware).

The first key decision that outlined the any hardware approach was the *Pension Benefits* decision which was published in 2001. The patent at issue in *Pension Benefits* related to a computer-related invention that performed a number of different tasks (such as calculating amounts payable and determining future assets) that were necessary in running pension benefit schemes. The patent included both method claims for controlling a pension benefits system and apparatus claims for controlling a pension benefits system. The method claim (a method of controlling a pension benefits program by administering at least one subscriber employer account who is to receive periodic payments) was made up of a series of steps, including the provision of data, determining the average age of all employees and so on. The apparatus claim was for a data processing means which was arranged to receive and process information to be used to control a pension benefits system.

 The approach the Technical Board of Appeal adopted to the *method claim* in *Pension Benefits* was very similar to the approach previously adopted at the European Patent Office. The Board began by noting that the question to be asked was whether the method claim represented a method of doing business as such. The Board then went on to characterize the invention saying that all the features of the method claim were 'steps of processing and producing information having purely administrative, actuarial and/or financial character. Processing and producing such information are typical steps of business and economic methods'.[191] On this basis the Board concluded that the method claim was merely a method of doing business as such, and was therefore excluded from patentability under Article 52(2)(c).[192] The mere fact that the invention operated on a computer did not turn the subject matter of the claim into an invention within the meaning of Article 52(1).[193] (As we will see, this aspect of *Pension Benefits* has been modified in *Hitachi*).

 While the Board found that the method claims fell foul of Article 52(2), this was not the case with the *apparatus claims*. The apparatus claims in question were for an apparatus for controlling a pension benefits system consisting of a suitably programmed computer or system of computers. In considering whether the apparatus claims were patentable, the Board made a number of general comments. The Board began by noting that there are four

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191 *Pension Benefit Systems Partnership*, T931/95 [2001] *OJEPO* 441, 449. (TBA).
192 Ibid.
193 Ibid.

basic requirements of patentability under the EPC, namely, firstly that there must be an invention, and furthermore that the invention must satisfy the requirements of industrial applicability, novelty, and inventive step.[194] The Board also said that the basic test of whether there is an invention within the meaning of Article 52(2) is *separable and distinct* from the questions whether the subject-matter is susceptible of industrial application, is new and involves an inventive step.[195] The Board added that 'in addition to these basic requirements' the EPC and the Implementing Regulations implicitly contain the further requirement that the invention must be of technical character.[196]

The Board also considered the way that an invention should be characterized when deciding whether it complies with Article 52(2). In particular they looked at the 'contribution approach' recommended in the European Patent Office Guidelines for Examination (which is basically the same as the approach used in the United Kingdom). These said that when deciding whether an invention complied with Article 52 it was necessary to:

'disregard the form or kind of claim and concentrate on its content in order to *identify the real contribution* which the subject matter claimed, considered as a whole, adds to the known art. If this contribution is not of a technical character, there is no invention within the meaning of Art 52(1)'.[197]

The Board said that there were a number of problems with the contribution approach.[198] The first and most general criticism was that there 'is no basis in the EPC for distinguishing between "new features" of an invention and features of that invention which are known from the prior art when examining whether the invention concerned to be an invention within the meaning of Article 52(1) EPC'.[199] The contribution approach was also criticized because it failed to keep the Article 52(1) inquiry separate and distinct from the questions as to industrial applicability, novelty, and inventive step. The Board also said that the

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194 *EPO Guidelines* C-IV, 1.1 (The Guidelines were changed as of 31 Aug. 2001 to bring them into line with EPO case law on computer-related inventions).

195 *EPO Guidelines* C-IV, 1.2.

196 *Pension Benefit Systems Partnership*, T931/95 [2001] *OJEPO* 441, 454; following *EPO Guidelines* C-IV, 1.2.

197 *EPO Guidelines* C-IV, 2.2 (emphasis added). The revised Guidelines have taken out the reference to the contribution made by the invention.

198 The Board said that the distinction drawn between a method of doing business and an apparatus situated to perform such a method was justified by the fact that while 'schemes, rules and methods' are non-patentable categories in the field of economy and business, but the category of 'apparatus' in the sense of 'physical entity' or 'product' is not mentioned in Article 52(2) EPC. *Pension Benefit Systems Partnership*, T931/95 [2001] *OJEPO* 441, 452 (TBA).

199 *Pension Benefit Systems Partnership*, T931/95 [2001] *OJEPO* 441, 454 (TBA).

contribution approach confused the requirement of 'invention' with the requirements of 'novelty' and 'inventive step'.[200] Moreover, the Board believed that the contribution approach incorrectly imported issues relating to inventive step into the inquiry into whether a patent complied with Article 52(1).[201] As a result, the Board rejected the contribution approach saying that there 'is no basis in the EPC for applying this so-called contribution approach'.[202]

Rather than looking at the contribution made by the invention and determining whether this was technical, the Board focused on the *character* of the invention. That is, the Board attempted to distil the essence or kernel of the invention, rather than looking at what the invention did. On the facts the Board said that what was claimed was a computer system suitably programmed for use in a particular field. Once the invention had been characterized, the next question to be decided was whether the invention exhibited the requisite technical character. In answering this question, the Board said that 'a computer system suitably programmed for use in a particular field, even if that is the field of business and economy, has the character of a concrete apparatus in the sense of a physical entity, man-made for a utilitarian purpose'. Given that an invention is likely to have a technical character if it leads to or produces a physical change in things, it is not surprising that the Board said that an 'apparatus constituting a physical entity or concrete product suitable for performing or supporting an economic activity, is an invention within the meaning of Article 52(1) EPC'.[203] That is, unlike the situation with the method claim, the apparatus claim could not be classified as a method of doing business and, as such, did not fall foul of Article 52(1). (It is important to note that the patent was refused on the basis that it lacked inventive step.) The upshot of the reasoning in *Pension Benefits* was that where a claim is to a *method* which consists of an excluded category, it is excluded, even if hardware is used to carry out the method. In contrast, a claim to *an apparatus* itself, being concrete is not caught by Article 52(2).

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200 The TBA cited the German Federal Court of Justice (BGH) decision of *Sprachanalyseeinrichtung (Speech Analysis Apparatus)* (11 May 2000). For further discussion see *Dell USA* O/177/02 (24 Apr. 2002), para. 24 (Patent Office).

201 The Board said that the contribution approach used to determine whether a patent complied with Art. 52(1) was 'so very closely related to examination with regard to the requirement of inventive step that the examining division decided in fact implicitly that there was lack of inventive step under Article 56 EPC'. *Pension Benefit Systems Partnership*, T931/95 [2001] *OJEPO* 441 455 (TBA).

202 *Pension Benefit Systems Partnership*, T931/95 [2001] *OJEPO* 441, 442.

203 Ibid., 453.

The reasoning that was developed by the Technical Board of Appeal in *Pension Benefits* was applied and expanded in *Hitachi* (T 258/03)[204]. The invention in *Hitachi* was for an automatic auction method executed in a server computer. In essence the invention was for a method of carrying out a Dutch auction, that is an auction in which the seller starts at a high price which is lowered until a bid is received. As in *Pension Benefits*, the application included both a product and a method claim. The Technical Board of Appeal began by reaffirming that there was no basis in the EPC for applying the contribution approach when deciding whether an invention falls foul of Article 52 EPC[205]. The Board also said that as the reasoning used in *Pension Benefits* was independent of the category of the claim, it would be inconsistent to reject the contribution approach for apparatus claims, but not for method claims. On this basis, the Board held that 'In order to be consistent with the finding that the so-called contribution approach … is inappropriate for judging whether claimed subject-matter is an invention within the meaning of the Article 52(1) EPC there should be no need to further qualify the relevance of technical aspects of a method claim in order to determine the technical character of the method'. While in *Pension Benefits* the Board of Appeal had only been willing to apply the any hardware approach to apparatus claims (preferring to retain the contribution approach for the method claim), this was not the case in *Hitachi*, where the Board applied the any hardware approach to both apparatus *and* method claims[206]. That is, the Board concluded that a method involving a technical means is an invention within the meaning of Article 52(1). The upshot of *Hitachi*, which has been applied in subsequent decisions at the EPO[207], is that (i) a claim to *hardware* is not caught by Article 52(2) and (ii) a claim to a *method* of using that hardware is also not excluded. This means that so long as a technical means such as a computer is used, the resulting invention will not fall foul of Article 52(1). This is the case even if the invention is for a purely non-technical purpose[208].

The any hardware approach was extended in *Microsoft/Clipboard formats I* decision. The application in question, which was for a way of 'facilitating data exchange across different formats', consisted of both method claims and a claim to a program on a computer readable

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[204] *Hitachi/Auction Method* T258/03 (2004) *OJEPO* 575.

[205] Ibid, 581-2.

[206] In this sense, we see *Hitachi* as a continuation of the approach that was begun in *Pension Benefits*. Cf the comments by the UK Court of Appeal that these decisions are 'mutually contradictory'. *Aerotel v Telco Holdings* [2007] 1 *ALL ER* 225, para 25. (CA)

[207] See, for example, *Man/Provision of product-specified data* (2007) *OJEPO* 421, 427 (the claims in question did not bear scrutiny in light of *Pension Benefits* T 931/95 and *Hitachi* T 258/03); *Pitney Bowes/Undeliverable Mail* (2007) *OJEPO* 16;

[208] As the Microsoft/data transfer with expanded clipboard formats. Simply ask whether there is claim to something concrete eg an apparatus: if yes, the exclusion does not apply.

medium. The Board said that the 'method was implemented in a computer and this amounted to a technical means sufficient to escape the prohibition in Article 52'. As Kitchin J said in *Astron Clinica,* the Board in *Microsoft/Clipboard formats* appears to have found that any program on a carrier has a technical character and so escapes the prohibition in Article 52'[209].

There are a number of notable features of the any hardware approach. The first relates to the way the invention is to be characterized when determining whether it complies with Article 52(1). A key feature of the any hardware approach is the belief that it is not appropriate to look to the contribution made by the invention. Instead, the any hardware approach requires the tribunal to look to the character or essence of the invention: the contribution made by the invention is only looked at when novelty and inventive step are examined. One of the consequences of this is that under the any hardware approach, the tribunal is more concerned with categorising the subject matter in question, rather than asking whether the application has disclosed an invention.

As the Board noted in *Hitachi*, the broad interpretation given to the term 'invention' under the any hardware approach means that it will include activities which are so familiar that their technical character tends to be overlooked, such as the act of writing using pen and paper[210]. While this has meant that more applications are now able to satisfy Article 52, it does not mean that the applications will necessarily be patentable. While the any hardware approach has made it easier to satisfy the subject matter threshold at the European Patent Office, this does not mean that all inventions will necessarily meet the threshold. For example, in *Pitney Bowes/Undeliverable Mail,* an application for a method of responding by a mailer to notice from a postal service that a piece of mail was undeliverable was held to fall within Article 52(1). The telling factor in this case was that no technical means whatsoever were described in the application. The fact that the invention *might* have been implemented by an unspecified technical process was not enough to prevent the application from being excluded on the basis that it was for a method of doing business for the purposes of Article 52(2)(c)[211]. Another reason why the any hardware approach does not necessarily mean that more inventions will now be patentable. This is because the invention still needs to be new, non-obvious, and susceptible to industrial application. One of the consequences of the any hardware approach is that it shifted the focus of attention at the European Patent Office away from the inquiry as to whether a patent complies with Article 52(1) to the inquiry of

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[209] *Astron Clinica v Comptroller General of Patents* [2008] *EWHC* 85.
[210] *Hitachi/Auction Method* T258/03 (2004) *OJEPO* 575, 585.
[211] *Pitney Bowes/Undeliverable Mail* T388/04 *(2007) OJEPO 16, 23.*

whether there is an inventive step (and arguably also novelty and industrial applicability).[212] This is spelt out clearly in the revised European Patent Office Guidelines that say that when examining computer-related inventions it may 'be more appropriate for the examiner to proceed directly to the questions of novelty and inventive step, without considering beforehand the question of technical character'. The shift towards inventive step is reinforced in the European Patent Office Guidelines by the fact that when 'assessing whether there is an inventive step, the examiner must establish an objective technical problem. The solution of that problem constitutes the invention's technical contribution to the art. The presence of such technical information establishes that the claimed subject matter has a technical character and therefore is indeed an invention within the meaning if Art. 52(1)'.[213] The shift has also been confirmed in subsequent decisions at the European Patent Office that have focused on inventive step rather than exclusion from patentability.[214]

In May 2010, the long awaited decision of G03/08 (*Programs for computers*) was handed down by the Enlarged Board of Appeal[215]. The decision arose from a referral made by the (then) President of the European Patent Office in relation to questions that had arisen about the status of computer programs at the EPO. It had also been hoped that the decision would address differences that had developed, particularly between UK courts and European Patent Office, in this area. This matter was not addressed. While much of the decision is concerned with the validity of the questions that had been referred to the Enlarged Board[216], it does offer some guidance in relation to the approach at the European Patent Office in relation to the standing of computer programs as excluded subject matter under the EPC.

One notable feature of the Enlarged Board's decision in G03/08 (*Programs for computers*) was that it endorsed (both for the purpose of the any hardware and contribution approaches) the whole contents approach to patentable subject matter[217]. Another important aspect of the decision was that the Enlarged Board endorsed the 'any hardware approach' set out decision in T 1173/97, where the Board consciously abandoned the so-called contribution

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212 The 'inference from Pension Benefit . . . is that lack of technical contribution might be a matter for inventive step rather than exclusion from patentability'. *Dell USA*, O/177/02 (24 Apr. 2002), para. 27 (M. Wilson) (Patent Office).

213 *EPO Guidelines* C-IV, 2.3.

214 *Comvik/Two identities*, T641/00 [2003] *OJEPO* 352; *International Computers/Information modelling*, T49/99 (5 Mar. 2002).

215 *Programs for computers* G 03/08 (12 May 2010). EBA

216 As is allowed under EPC 2000, Article 112(1).

217 *Programs for computers* G03/08 (12 May 2010). Para 12.2.1-2 (EBA).

approach, which had been applied, somewhat inconsistently in the earlier case law.[218] While the Enlarged Board noted that for some the any hardware approach is 'in some way distasteful to some people' [presumably British patent judges], the Enlarged Board of Appeal endorsed the decision of T 1173/97 and the any hardware approach that it established. [219] Using the example of a patent application that claims a cup carrying a certain picture (such as a company logo), the Enlarged Board also provided some guidance as to operation of the contribution and any hardware approaches, and how they differed. Under the contribution approach, the Enlarged Board of Appeal said that as cups are known, the only contribution made by the 'cup with logo' was to provide information (brand awareness). In this situation, the only contribution to the art made by the invention is in a field excluded from patentability. As such, it would be excluded subject matter. In contrast, under the hardware approach as set out by T 1173/97, the Enlarged Board said that the 'claimed subject-matter has to be considered without regard to the prior art'. Applying this to the example of a patent application that claims a cup carrying a certain picture (such as a company logo), the Enlarged Board said that a claim to a cup is clearly not excluded from patentability under Article 52(2) EPC[220]. As the Enlarged Board noted, one of the consequences of the 'any hardware approach' is that 'a claim to a computer implemented method or a computer program on a computer-readable storage medium will never fall within the exclusion of claimed subject-matter under Article 52(2) and (3) EPC, just as a claim to a picture on a cup will also never fall under this exclusion'[221]. The Enlarged Board of Appeal also made it clear that in relation to Article 52(2) EPC, it does not make any difference whether a computer program is claimed by itself or as a record on a carrier'.[222]

[2.5] The Eurasian Patent Convention

The Eurasian Patent Convention (EAPC) is an international patent law treaty which established the Eurasian Patent Organization (EAPO). The Eurasian Patent Convention was signed on September 9, 1994 in Moscow by the Republic of Azerbaijan, the Republic of Armenia, the Republic of Belarus, Georgia, the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Moldova, the Russian Federation, the Republic of Tajikistan, Ukraine and came into force on August 12, 1995 after Turkmenistan, Belarus and Tajikistan

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[218] As identified by the then chairman P. Van den Berg, 'The law and practice of the Enlarged Board of Appeal of the European Patent Office during its first ten years'. As cited in *Programs for computers* G03/08 (12 May 2010). Para 10.4 (EBA).

[219] *Programs for computers* G03/08 (12 May 2010). Para 10.6 (EBA).

[220] *Programs for computers* G03/08 (12 May 2010). Para 10.6 (EBA).

[221] *Programs for computers* G03/08 (12 May 2010). Para 10.13.1 (EBA).

[222] *Programs for computers* G03/08 (12 May 2010). Para 10.7.2 (EBA). Citing 1173/97 (reasons, point 13).

deposited their instruments of accession to the Convention to the WIPO Director General, on March 1, 1995, May 8, 1995 and May 12, 1995 respectively. According to the Eurasian Patent Organization, the Convention has been ratified by the Russian Federation, the Republic of Kazakhstan, Republic of Azerbaijan, the Kyrgyz Republic, the Republic of Moldova and the Republic of Armenia. The Eurasian Patent Convention aims to establish a regional system of patent protection based on a common Eurasian patent (which applies to member countries). Applications for registration can be made either through national or central office.

Article 6 of the Eurasian Patent Convention provides that the 'Eurasian Office shall grant a Eurasian patent for any invention that is new, involves an inventive step and is industrially applicable'. Rule 3(3) of the Patent Regulations under the Eurasian Patent Convention provide that the following shall not, as such, be recognized as inventions *inter alia*: [223]
— discoveries;
— scientific theories and mathematical methods;
— presentation of information;
— methods of economic organization and management;
— symbols, schedules and rules;
— methods for performing mental acts;
— algorithms and computer programs;
— topographies of integrated circuits;
— projects and plans for structures and buildings and for land development;
— solutions concerning solely the outward appearance of manufactured goods and aimed at satisfying aesthetic requirements.

The Regulations also provide that the above-listed subject matter shall not be recognized as inventions in those cases where a Eurasian application or a Eurasian patent are directly pertinent to any of the above-listed subject matter as such.

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[223] adopted by the Administrative Council of the Eurasian Patent Organization (EAPO) at its second (1st ordinary) session on December 1, 1995, with the amendments and additions adopted by the Administrative Council of the EAPO at its sixth (4th ordinary) session on November 25 and 26, 1997, its eleventh (8th ordinary) session from October 15 to 19, 2001, fourteenth (10th ordinary) session from November 17 to 21, 2003, seventeenth (12th ordinary) session from November 14 to 18, 2005, nineteenth (14th ordinary) session from November 13-15, 2007, and twenty first (6th extraordinary) session from March 30 to 31, 2009)

[3] Individual Countries

[3.1] Albania

From May 1, 2010, Albania is a member of the EPC[224]. Patent law in Albania is governed by Law Number 9977 dated 07.07.2008 On Industrial Property. Article 5(2) of this law provides that 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'

This is subject to Article 5(3) which provides that 'Paragraph 2 shall exclude patentability of the subject-matter or activities referred to therein only to the extent to which a patent application or a patent relates to such subject matter or activities as such'.

[3.2] Algeria

Algerian patent law is governed by Ordinance No. 03-07 on Patents (19 Joumada El Oula 1424 corresponding to July 19, 2003), as approved by Law No. 03-19 on Patents (of 9 Ramadhan 1424 corresponding to November 4, 2003). Article 7 provides that for the purposes of this Law, the following are not regarded as inventions:

(1)   principles, theories and discoveries of science and mathematical methods

(2)   schemes, rules or methods of performing purely mental acts or games;

(3)   methods and systems of education, organization, administration or business (management);

        ...

(5)   mere presentations of information;

(6)   computer programs;

(7)   purely artistic works[225].

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[224] The Albania's Parliament has approved with the Law no.10179 dated 29.10.2009 "On accession of the Republic of Albania to the European Patent Convention" the accession of Albania in the European Patent Office. This law was decreed by the President's decree No. 6338 dated November 17, 2009

[225] Au sens de la présente ordonnance, ne sont pas considérés comme inventions: (1) les principes, théories et découvertes d'ordre scientifique ainsi que les méthodes mathématiques (2) les plans,

[3.3] Armenia

The Republic Of Armenia is a member of the Eurasian Patent Convention. Domestic patent law in Armenia is governed by The Law of the Republic of Armenia on Patents. Article 5 (7) of the Armenian law provides that the following are not subject to legal protection:

a) discoveries, scientific theories and mathematical methods,

b) methods of economic organization and management,

c) symbols, schedules and rules,

d) rules of playing games, rules and methods of doing business or performing purely mental acts,

e) algorithms for calculating machines,

f) projects and plans for structures, buildings and for land development,

g) solutions concerning the outward appearance of manufactured articles having exclusively aesthetic requirements.

[3.3] Argentina

In Argentina, according to Law 24.481, Art. 4,[226] product or process inventions are patentable, whenever they are new, comprehend an inventive activity and are subject to industrial application. Article 6 declares that the following are not considered inventions:

- discoveries, scientific theories and mathematical methods,

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principes ou méthodes en vue d'accomplir des actions purement intellectuelles ou ludiques (3) les méthodes et systèmes d'enseignement, d'organisation, d'administration ou de gestion …. (5) les simples présentations d'information (6) les programmes d'ordinateurs (7) les créations de caractère exclusivement ornemental

[226] Ley 24.481 (Argentina): Art. 4 - Serán patentables las invenciones de productos o de procedimientos, siempre que sean nuevas, entrañen una actividad inventiva y sean susceptibles de aplicación industrial. a) A los efectos de esta ley se considerará invención a toda creación humana que permita transformar materia o energía para su aprovechamiento por el hombre. b) Asimismo será considerada novedosa toda invención que no esté comprendida en el estado de la técnica. c) Por estado de la técnica deberá entenderse el conjunto de conocimientos técnicos que se han hechos públicos antes de la fecha de presentación de la solicitud de patente o, en su caso, de la prioridad reconocida, mediante una descripción oral o escrita, por la explotación o por cualquier otro medio de difusión o información, en el país o en el extranjero. d) Habrá actividad inventiva cuando el proceso creativo o sus resultados no se deduzcan del estado de la técnica en forma evidente para una persona normalmente versada en la materia técnica correspondiente. e) Habrá aplicación industrial cuando el objeto de la invención conduzca a la obtención de un resultado o de un producto industrial, entendiendo al término industria como comprensivo de la agricultura, la industria forestal, la ganadería, la pesca, la minería, las industrias de transformación propiamente dichas y los servicios. Regulamento: ARTICULO 4 - Para la obtención de una patente de invención deberá presentarse una solicitud, en los términos del artículo 12 de la Ley y demás normas de esta reglamentación, ante la Administracion Nacional De Patentes o ante las delegaciones provinciales que habilite al efecto el Instituto Nacional De La Propiedad.

- literary or artistic works or any aesthetic creation, as well as scientific works;

- plans, rules and methods for the practice of intellectual activity, for games or economic-commercial activities, as well as computer programs;

- the manner of presenting information; [227]

Argentina only mentions computer programs without qualifying the exception; the possibility of patenting shall be confirmed regarding inventions that include software elements, display inventive items beyond the software itself[228].

[3.4] Australia

Australian legislation does not directly deal with computer programs as patentable subject matter. Instead, computer programs and computer related inventions are dealt with on the basis of the statutory definition of invention as interpreted by the courts. Section 18(1) of the *Australian Patent Act* 1990 provides that patents are granted for 'manner of new manufacture'. This has been interpreted to mean 'a mode or manner of achieving an end result which is an artificially created state of affairs of utility in the field of economic endeavour'[229]. A mathematical algorithm *per se* is neither 'an artificially created state of affairs', nor is it something having 'utility in the field of economic endeavour'. Pure or abstract methods of doing business, abstract intellectual concepts – on their own – are excluded. The presence of a mathematical algorithm per se does not necessarily exclude the claim form patentability. Practical applications of algorithms are patentable.

The test for manner of manufacture is applied to the invention as a whole. Australian Patent Office Manual cites the US Supreme Court decision of *Diamond v Diehr* (1981) that 'it is

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[227] Ley 24.481 (Argentina): ARTICULO 6 - No se considerarán invenciones para los efectos de esta ley: a) Los descubrimientos, las teorías científicas y los métodos matemáticos; b) Las obras literarias o artísticas o cualquier otra creación estética, así como las obras científicas; c) Los planes, reglas y métodos para el ejercicio de actividades intelectuales, para juegos o para actividades ecónomico-comerciales, así como los programas de computación; d) Las formas de presentación de información; e) Los métodos de tratamiento quirúrgico, terapeútico o de diagóstico aplicables al cuerpo humano y los relativos a animales; f) La yuxtaposición de invenciones conocidas o mezclas de productos conocidos, su variación de forma, de dimensiones o de materiales, salvo que se trate de su combinación o fusión de tal manera que no pued an funcionar separadamente o que las cualidades o funciones características de las mismas sean modificadas para obtener un resultado industrial no obvio para un técnico en la materia; g) Toda clase de materia viva y sustancias preexistentes en la naturaleza.
Regulamento: ARTICULO 6 - No se considerará materia patentable a las plantas, los animales y los procedimientos esencialmente biológicos para su reproducción."
[228] CABANELLAS, Guillermo de las Cuevas, Derecho de Patentes, Heliasta, Buenos Aires, 2001, Vol. I, p. 812.
[229] CCOM *v*. Jiejing 122 ALR-417 (1994).

inappropriate to dissect the claims into old and new elements and then to ignore the presence of the old elements in the analysis'[230].

Australian patent law focuses on the 'physical' nature of the contribution made by the invention. As was said in *Grant v Commissioner of Patents*, 'it has long been accepted that ... a mathematical algorithm ... without effect [is] not patentable ... It is necessary that there be some "useful product", some physical phenomenon or effect resulting from the working of a method for it to be properly the subject of letters patent'. A product or result of a method must produce 'a concrete, tangible, physical, or observable effect'.[231] Drawing on relevant case law, the Australian Patent Office Manual provides that the following will be a 'mode or manner' and thus patentable subject matter:

- Source code for patentable computer software

- Executable code for patentable computer software, which is in a machine readable form

- A computer, when programmed to achieve any result which has utility in the field of economic endeavour[232]

- Software directed to the operation of a computer (eg controlling data flow within the computer, or enable computer operate faster, or allow a computer to handle larger files, or produce a better quality of output display[233]

[3.5] Bangladesh

Patent law in Bangladesh is governed by the *Patents and Designs Act*, 1911[234]. Invention is defined in section 2(8) of the Act as 'any manner of new manufacture and includes an improvement and an alleged invention'. As with Australia and New Zealand, there is no express exclusion of subject matter.

[3.6] Bahrain

Article 3(A) of Law No. 1 of 2004 in Respect of Patents and Utility Models, as amended by Law No. 14 of 2006, provides that a 'patent shall not be granted in respect of:

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[230] (1981) 209 USPQ 1, 9.

[231] [2006] FCAFC 120. IP Australia *Patent Manual of Practice and Procedure*, 2.9.2.7, 'Computer Software Related Inventions and Mathematical Algorithims'

[232] IP Australia, *Patent Manual of Practice and Procedure*, 2.9.2.7, 'Computer Software Related Inventions and Mathematical Algorithims'

[233] IP Australia, *Patents for Computer Related Inventions* (2005), 2

[234] An Act to amend the law relating to the protection of Inventions and Designs.

1. Any invention which prohibition of commercial use in the Kingdom of Bahrain is imperative for the protection of public order or principles of morality; including the protection of humans life or health or that of animals or plants or to avert causing serious harm to the environment.

2. Animals

3. Diagnostic, therapeutic, and surgical methods necessary for the treatment of humans and animals. This provision however shall not apply to products used in any of these methods'.

[3.7] Belgium

Belgium is a member of the EPC[235]. Section 2 of the Belgian Patents Act provides that patents shall be granted for the exploitation of any invention that is new, that involves an inventive step and that is capable of industrial application. This is qualified by section 3 which provides that the following in particular shall not be regarded as inventions within the meaning of section 2:

(1) discoveries, scientific theories and mathematical methods;

(2) aesthetic creations;

(3) schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers;

(4) presentations of information.

This is subject to the proviso in section 3(2) that says that the provisions of paragraph 1 shall exclude patentability of the subject matter or activities referred to in that provision only to the extent to which a patent application or a patent relates to such subject matter or activities as such.

[3.8] Belize

Patent law in Belize is regulated by the Patents Act, Chapter 253 (revised edition 2000). Section 8(1) provides that a patent may be granted only for an invention which satisfies the following conditions:

(a) the invention is new;

(b) it involves an inventive step; and

(c) it is capable of industrial application.

(2) An invention may be, or may relate to, a product or a process.

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[235] As of 7 October 1977.

Section 8(1) is qualified by section 12(1) which provides that the following, even if they are inventions within the meaning of this Act, shall not be protected as patents:-

(a) a discovery, scientific theory or mathematical method;

(b) a scheme, rule or method for doing business, performing a mental act or playing a game;

According to the Belize IP Office[236], an invention is not patentable if it is –

(i) a discovery;

(ii) a scientific theory or mathematical method;

(iii) an aesthetic creation such as a literary, dramatic or artistic work;

(iv) a scheme or method for performing a mental act, playing a game or doing business;

(v) the presentation of information, or a computer program.

[3.9] Bolivia

Bolivia is a member of the Andean pact. This means that Andean supranational legislation provides the basic intellectual property legal system to which ancillary domestic provisions may be added as supplementary law. In Bolivia the Industrial Property Law of December 12, 1916 stays in force as an adjunct to the Andean rules and subject to them. According to Article 3 of such law, patents are denied to inventions that:

- the mere use of substances or newly discovered natural forces;

- scientific principles or discoveries that are purely speculative;

- plans or combinations of credit or finance[237];

[3.10] Brazil

Patent law in Brazil is governed by Law 9.279/96 (Brazil)[238]. Article 10 of this Law provides that the following shall not be considered inventions or utility models:

> I - discoveries, scientific theories and mathematical models;

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[236] BELIPO (Belize IP Office) 'Protect Your Creation' (13 September 2007), 6.

[237] Artículo 3º.- Son impatentables: 1. La invención o descubrimiento que por ejecución o publicidad dentro o fuera de La república haya caído en dominio público. 2. El simple uso o aprovechamiento de sustancias o fuerzas naturales recién descubiertas. 3. El principio o descubrimiento científico que sea puramente especulativo. 4. Los planes o combinaciones de crédito o de hacienda. 5. La invención o descubrimiento cuya explotación sea contraria a la ley, a la seguridad pública, o a las buenas costumbres o a la moral. 6. Los productos químicos o composiciones farmacéuticas o terapéuticas, sin perjuicio de poder patentarse de nuevos procedimientos para poder producirlos, o sus nuevas aplicaciones industriales.

[238] Article 8, 'An invention shall be patentable if it meets the requirements of novelty, inventive step and industrial application'.

II -   purely abstract concepts;

III -   schemes, plans, principles or methods of a commercial, accounting, financial,
         educational, or advertising nature or for games of chance or surveillance;

IV -   literary, architectural, artistic and scientific works or any aesthetic creation;

V -   computer programs *per se*;

VI -   presentations of information;

VII -   rules for games;

While computer programs per se are excluded, inventions that utilize or build upon
computer programs may be patented if they exhibit 'technical character'. It has been
suggested that the test for determining when a computer-related invention is not excluded is
similar to the approach used under EPO practice [239][240]

[3.11] Bulgaria

Bulgaria is a Member of EPC. Patent law in Bulgaria is governed by Law on Patents and
Utility Model Registration[241]**.** Article 6(2) of this legislation provides that the following shall
not be regarded as inventions:

discoveries, scientific theories and mathematical methods

artistic work results;

schemes, rules and methods for performing mental acts, playing games or doing business,

and programs for computers;

presentation of information.

[3.12] Cambodia

Cambodian patent law is governed by the 2003 *Law on Patents, Utility Model Certificates and
Industrial Designs[242]*. Article 3 paragraph 3 of this law defines an invention as an idea of an
inventor which permits in practice the solution to a specific problem in the field of

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[239] Denis Borges Barbosa. A Patente de Software no Brasil. Revista da ABPI, v. I, p. 17-38, 2007.
[240] Licks, *World Intellectual Property Report*, Vol. 13, N. 4/1999, 140, 143.
[241] Title amended, State Gazette No. 64/2006; in force as from 09.11.2006) Denomination of 05.07.1999
reflected, promulgated in State Gazette No. 27/2 April 1993; supplemented, No. 83/ 1 October 1996;
amended, No. 11/29 January 1998; amended, No. 81/14 September 1999; amended, No. 45/30 April
2002; amended, No. 66/9 July 2002; supplemented, No. 17/21 February 2003; amended, No. 30/11
April 2006; amended, No. 64/8 August 2006; amended, No. 31/13 April 2007; amended No. 59/20
July 2007.
[242] Royal Decree; NS/RKM/0103/005 (adopted by the National Assembly on 28 November and
ratified by the Senate on 31 December 2002).

technology[243]. The definition of invention is qualified by Article 4 which states that the following inventions inter alia shall be excluded from patent protection:

(i) discoveries, scientific theories and mathematical methods;

(ii) schemes, rules or methods for doing business, performing purely mental acts or playing games.

The 2003 *Law on Patents* does not deal with computer programs as patentable subject matter. Instead the patentability of computer programs is dealt with under the Regulation for implementation of the Law on Patents and Utility Model Certificates and Industrial Designs, which was issued in 2007.[244] Interestingly, the Regulations provide positive definition of what can be patentable subject matter. Rule 44(1) of the Regulation provides that the following shall be recognised as inventions for the purposes of Article 3 paragraph 3 of the *Law on Patents*:

(a) process inventions which, in whole or in part, consist of steps that are performed by computer and are directed by a computer; and

(b) product inventions consisting of elements of a computer-implemented invention, including in particular:

> - machine-readable computer program codes stored on a tangible medium such as a floppy disk, computer hard drive or computer memory; and

> - a general purpose computer whose novelty over the prior art arises primarily due to its combination with a specific computer program.

Rule 44(2) goes on to state that 'applicants who have filed patent applications for computer programs and computer-related inventions listed in [Rule 44] paragraph (1) shall be considered as having waived from their right of seeking copyright protection, if available, under article 10(1) of TRIPS Agreement'. [245]

[3.13] Canada

Canadian patent law is regulated by the *Patent Act*, S.C.R. 1985, c. P-4. Invention is defined in the Act to mean 'any new and useful art, process, machine, manufacture or composition of matter, or any new and useful improvement in any art, process, machine, manufacture or

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[243] BNG Legal, *Patent Law in Cambodia*, (February 2010), 2-3.

[244] *Prakas (declaration) on the procedure for the grant of patents and utility model certificates* (Phnom Penh, May 28, 2007) No: 766 MIME.DIP.PRK, These were made in accordance with Article 130 of the Law on Patents and Utility Model Certificates and Industrial Designs.

[245] *Prakas (declaration) on the procedure for the grant of patents and utility model certificates* (Phnom Penh, May 28, 2007). Rule 44(2).

composition of matter.'[246] Patentable inventions are seen as solutions to a practical problem. As the Manual of Patent Office Practice states, 'to solve a practical problem, the solution must be in a form that can interact directly with the physical world'[247].

There is no express legislative exclusion of computer programs from patentable subject matter in Canadian legislation. Instead, computer programs per as are excluded from patentable subject matter on the basis of a mixture of statute and case law. Subsection 27(8) of the *Patent Act* indicates that: 'No patent shall be granted for any mere scientific principle or abstract theorem'. This subsection has been interpreted as proscribing from patentability (*inter alia*) mathematical formulae[248], natural phenomena and laws of nature.[249] The 1981 decision of *Schlumberger* is taken as the basis for the exclusion of algorithms, mathematical formulae and software from patentable subject matter[250]. This is reinforced by case law which excludes 'schemes, plans or rules for performing an operation, achieving a result, controlling a method, or the like[251], or a process that is exclusively a series of mental steps,[252] regardless of the reproducibility of these same (e.g. performing calculations; manipulating data or information to produce data or information having a different purely intellectual meaning or aesthetic significance), is disembodied (abstract) and is not a practical form of an invention'. As the Manual of Patent Office Practice says, a 'computer program (i.e. when not stored on a carrier), whether it takes the form of a proposed series of steps (e.g. a scheme or flow chart) or of specific code or pseudocode, is effectively a scheme, plan or set of rules for operating a computer and is abstract in character'.[253]

While computer programs as algorithms will not be protected per se, it is possible to protect inventions that incorporate computer programs. The exclusion only operates when 'an attempt is made to monopolize the excluded subject-matter in a general sense, but not when (e.g.) a scientific principle, law of nature or mathematical formula is relied on in operating a practical form of an invention'.[254] In interpreting claims that consist of a mix of statutory and

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[246] *Patent Act*, S.C.R. 1985, c. P-4, s.2.
[247] Manual of Patent Office Practice, Chapter 12 (revised Dec 2009), 12.03. Revisions to chapter 16 not yet published.
[248] *Schlumberger Canada Ltd. v. Commissioner of Patents* [(1981), 56 C.P.R. (2nd), 204 (F.C.A.)] at page 206.
[249] *Monsanto Canada Inc. v. Schmeiser* [2004] S.C.C. 34; [(2004), 31 C.P.R. (4th), 161 (S.C.C.)] at paragraph 133. in Arbour J.'s dissension in part. See Manual of Patent Office Practice, 12.05.01.
[250] *Schlumberger Canada Ltd. v. Commissioner of Patents* [1981], 63 C.P.R. (2d) 261.
[251] *Lawson v. Commissioner of Patents* [(1970), 62 C.P.R. (1st), 101 (Ex.Ct.)] at page 115.
[252] *Schlumberger Canada Ltd. v. Commissioner of Patents* [(1981), 56 C.P.R. (2nd), 204 (F.C.A.)] at page 206. Manual of Patent Office Practice, 12.06.02.
[253] Manual of Patent Office Practice, 12.06.02.
[254] Manual of Patent Office Practice, 12.05.01.

non-statutory subject matter, the Manual of Patent Office Practice says that examination into the substance of the invention will look at the 'specification as a whole'. [255]

The process of deciding whether the claimed invention is patentable subject matter is drawn from the definition of an invention as a solution to a practical problem which, in turn, is based on the idea that 'to solve a practical problem, the solution must be in a form that can interact directly with the physical world'[256]. An allowable claim must define a contributed, statutory 'practical form' of an invention. A 'practical form' will, by necessity, include at least one physical element.[257] The Manual provides that for a claim to be patentable it must define at least one statutory element that forms part of the contribution. For a claim to a device to be patentable, the device itself must therefore be a contributed practical form. That is, the device must provide a novel and unobvious technological solution to a technological problem. As the Manual of Patent Office Practice states, a claim must define a practical form, which is either:

(i) a physical object (a machine, article of manufacture or composition of matter), or

(ii) an art or process in a field of technology[258] that that is practiced as an act or series of acts performed by some physical agent upon some physical object to produce in that object some change of either character or condition.[259]

The focus on physical dimension of the invention means that disembodied ideas, concepts or discoveries that underlie or lead to an invention are not patentable. For these to be patentable subject matter, they must first be 'made into an invention by being reduced to a practical form'[260]. 'Where a claim defines subject-matter that is disembodied, it necessarily

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[255] The Manual of Patent Office Practice says 'During examination, the subject-matter of each claim is considered from the perspective of both form and substance. By "form" is meant what the language of a claim, on its face, appears to be defining as the invention. By "substance" is meant the solution to a particular problem to which, in view of the specification as a whole, the applicant appears to be directing the claim' (at 13.05.02). It goes on to say that 'Defects related to the form of a claim are those that may be identified purely from an analysis of the language of the claim itself. Form-based objections can be made, for example, to certain defects arising from a claim's language, or where a claim is explicitly directed to non-statutory subject-matter'.

[256] Manual of Patent Office Practice, chapter 12 (revised 2009), 12.03. Claims must relate to 'useful art's 'manual and reproductive arts'; which the patent office considers to mean 'fields of technology'.

[257] Manual of Patent Office Practice, 13.05.03.

[258] 'An invention that does not relate to a "field of technology" is ... not statutory"'. Manual of Patent Office Practice, chapter 12 (revised 2009), 12.03.02. Fields of human endeavour such as economics, commerce, accounting, record-keeping, marketing and law are not themselves fields of technology:"—while inventions of relevance for such fields to be patentable, advances in the concepts of their practices are beyond the scope of section 2 of the [Canadian] Patents Act'. Manual of Patent Office Practice, chapter 12 (revised 2009), 12.04.02.

[259] Manual of Patent Office Practice, chapter 12 (revised 2009), 12.03.02. See also S. Frost and E. Rahman, 'How to protect software inventions' (2007) 168 *Managing Intellectual Property* 53.

[260] Manual of Patent Office Practice, chapter 12 (revised 2009), 12.03.01.

follows that the matter of the claim is not statutory. Where a claim does define at least one physical object or physical step, it may nevertheless be that the claim does not define a statutory invention'.[261]

An approach similar to that outlined in the Manual of Patent Office Practice was used by the Board in *Kaphan Patent Application No 2,246,933*[262] to deal with inventions which consist of patentable and non-patentable subject matter[263]. The decision concerned Amazon.com's application to patent a 'system for placing orders online using one click.'[264] Customers were identified using cookies stored locally on their computers; these identifiers were then used to obtain the customer's pre-recorded information from Amazon.com's database'. The application was rejected on the basis that it related to unpatentable subject matter. More specifically, the application was rejected on the basis it did not 'cause a change in character or condition of some physical object', which was taken as a defining characteristic of patentable subject matter. As the Board said, a 'common characteristics of the five categories of invention [in section 2] is that they are physical in nature'.[265] 'Amazon.com's one-click application was not a machine, manufacture nor composition of matter since it was not a physical object'. This led the Board to conclude that 'where the claimed invention, in form or in substance, is neither a physical object (a machine, manufacture nor composition of matter) nor an act or series of acts performed by some physical agent upon some physical object to produce in that object some change of either character or condition (art or process) it is not patentable'.[266]

There is relatively little judicial guidance on how Canadian patent law applies to computer-related inventions. One exception to this is the Federal Court of Appeal decision in *Schlumberger Canada Ltd. v. Commissioner of Patents*[267], which held that a method of analyzing measurement data using certain mathematical formulae was not patentable on the basis that

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[261] Manual of Patent Office Practice, chapter 12 (revised 2009), 12.03.02.

[262] (2009) LNCPAT 2.

[263] At para 124.

[264] Emir Aly Crowne-Mohammed. 'The patentability of professional skills and business methods in Canada' (2010) 5:2 *Journal of Intellectual Property Law and Practice* 119, 121.

[265] Kaphan Patent Application No 2,246,933 (2009) LNCPAT 2, para 131. As cited in Emir Aly Crowne-Mohammed. 'The patentability of professional skills and business methods in Canada' (2010) 5:2 *Journal of Intellectual Property Law and Practice* 119, 122.

[266] Kaphan Patent Application No 2,246,933 (2009) LNCPAT 2, para 131. As cited in Emir Aly Crowne-Mohammed. 'The patentability of professional skills and business methods in Canada' (2010) 5:2 *Journal of Intellectual Property Law and Practice* 119, 139. (critical of the Board and the Patent Office's use of physicality).

[267] [1981], 63 C.P.R. (2d) 261.

the invention related to 'mere calculations[268]'. As the Court said, 'the fact that a computer is or should be used to implement a discovery does not change the nature of that discovery', and also that the presence of a computer cannot effect the "transforming into patentable subject-matter [of] what would, otherwise, be clearly not patentable"[269]. This has been 'taken to mean that the use of a computer to implement a discovery does not change the nature of that discovery'[270].

While there is relatively little judicial guidance on how Canadian patent law applies to computer-related inventions, the Manual of Patent Office Practice does provide some indication of existing patent office thinking in this area. As the Manual of Patent Office Practice notes, many methods involve the use of a computer or an apparatus or system including a computer. Whether or not a method relying on a device is statutory is independent of the presence of the device. A method that, on its own merits, would be considered to be non-statutory does not become statutory simply by virtue of some part of the method being carried out on or by a computer. The method itself, as a whole, must be a solution to a practical problem and must lie within a field of technology[271].

In relation to computer-related device claims, the Manual also provides that a device such as a computer itself or an apparatus or system including a computer associated with other devices is generally viewed as falling within the category of 'machine'[272]. Whether or not a claim to a device is patentable depends on the presence of a contribution in the claim and the nature of this contribution. The Manual also provides that the requisite technological solution to a technological problem does not have to be in relation to the operation of the computer as a general purpose device (e.g. it is not necessary that a computer be made more efficient or reliable), but could be simply that the general purpose device has been adapted to act as a special purpose device. Thus, presuming novelty and ingenuity, any of the following provide technological solutions to technological problems and would be viewed as contributed devices: a computer programmed to allow its speakers to provide "surround sound", a computer adapted to operate using two central processing units, a computer programmed to allocate memory to video processing in a manner that increases the

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[268] S. Frost and E. Rahman, 'How to protect software inventions' (2007) 168 *Managing Intellectual Property* 53. See also T. McDonough, 'Appeal Board Decisions with Respect to Computer Software" (1985) 2:1 *Canadian Intellectual Property Review*.
[269] Manual of Patent Office Practice, chapter 12, (revised 2009), 12.06.06.
[270] S. Frost and E. Rahman, 'How to protect software inventions' (2007) 168 *Managing Intellectual Property* 53.
[271] Manual of Patent Office Practice, chapter 12, (revised 2009), 12.06.06*a.*
[272] Manual of Patent Office Practice, chapter 12, (revised 2009), 12.06.06*b.*

efficiency of the device when running several applications, and a computer whose motherboard has an inventive new video card slot with a faster data transfer rate[273].

Where a computer or other device does not provide a solution to a technological problem, the Manual states that computer or device as a whole is not a contributed practical form of an invention. Where the device is further defined in terms of discrete non-statutory features, the claim would be objected to on the ground that it does not define a statutory "invention" within the meaning of section 2 of the *Patent Act*[274]. For example, a computer or other programmable device cannot be patentably distinguished from other computers on the basis of data stored on it. The reason for this is that 'storing data on the computer does not make the computer a new and unobvious solution to a practical problem'. [275]

[3.14] Chile

The Chilean intellectual property statute was amended in 2006 in order to assimilate new international obligations[276]. Article 32 provides that patents are obtainable for all inventions that are new, non-obvious and susceptible of industrial application. This is qualified by Article 37 which excludes from patentable subject matter, inter alia,

- discoveries or other abstract knowledge [277],
- useful but non-technical creations as business methods and rules of games [278]

An invention arises when the new application of a known product solves a technical problem not hitherto solved on a equivalent manner. It is also necessary to show that there has been formal changes in the known product to solve such technical problem.

[3.15] China

Patent Law in China is governed by the Patent Law of the People's Republic of China, which came into force on the 1st April 1985 (as amended[279]). Article 2 of the Patent Law defines an

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[273] Manual of Patent Office Practice, chapter 12, (revised 2009).

[274] See Manual of Patent Office Practice, chapter 12, (revised 2009), section 13.05.03*b* of this manual

[275] Manual of Patent Office Practice, chapter 12, (revised 2009).

[276] Ley Nº 19.039, as resulting from amendments from a Codifying Decree published in March 9, 2006.

[277] Artículo 37.- No se considera invención y quedarán excluidos la protección por patente de esta ley: a) Los descubrimientos, las teorías científicas y los métodos matemáticos (...)

[278] Artículo 37.- No se considera invención y quedarán excluidos la protección por patente de esta ley: (...) c) Los sistemas, métodos, principios o planes económicos, financieros, comerciales, de negocios o de simple verificación y fiscalización; y los referidos a las actividades puramente mentales o intelectuales o a materias de juego.

invention as 'a new technical solution put forward for a product, method or the improvement thereof' and a 'utility model' as 'a new practical technical solution for a products form, structure, or the combination thereof'. The Implementing Regulations of the Patent Law defines an invention as a new technical solution relating to a product, a process, or improvement thereof. This has been taken to mean that 'technical nature' is a prerequisite for a patent[280].

Article 25 provides that scientific discoveries, as well as rules and methods for mental activities are not patentable. Rules and methods for mental activities are said not to be patentable because they are not technical[281]. According to the Guidelines 2006, 'Mental activities' refer to human thinking movements … Because they do not use technical means or apply the laws of nature, nor do they solve any technical problem or produce any technical effect, they do not constitute technical solutions. Rules and methods for mental activities not only fail to comply with Rule 2.1, but fall to be the circumstance as provided in Article 25.1(2)'.[282]

The 2006 Examination Guidelines states that the following two cases are considered to be the rules and methods for mental activities under Art. 25.1(2) of the Patent Law and will be excluded from statutory subject matter: [283]

• Pure rules and methods for mental activities, such as a computer program relating only to an algorithm or rule for mathematical computing rules, or computer programs per se, or computer programs recorded in mediums, or rules or methods for games.

• If a claim, except for the title of the subject matter, is defined by rules and methods for mental activities in the whole contents, in substance it concerns only rules and methods for mental activities, and it shall not be granted a patent right. For example, computer-readable storage medium or a product of computer program that is merely defined by recorded

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[279] Amendments were made in 1993, 2001, 2008, and 2009. Implementing Regulations (in force Feb 1, 2010. For comments see Jack Zhu, 'Patenting Law implementing regulations amended' (2010) 197 *Managing Intellectuals Property* 145.

[280] Yu Xiang, 'The Patent Protection for business methods in China' (2008) 30(10) *European Intellectual Property Review* 412, 413. See also Yu Xiang and Liu Shan, 'The New Developments in Patent Protection for Inventions involving Computer Programs in China: A study based on the newly amended Chinese Patent Examination Guidelines' (2007) 38 *IIC* 659.

[281] 'As originally enacted the law also prohibited the grant of claims for computer programs as such, although from an early stage a practice developed to permit patents for computer-related inventions as longas what us claimed is the technical solution to a technical problem'. Ladas and Parry, 'The Patent Law of the People's Republic of China', note 1.

[282] Guidelines 2006, Ch.1, 4.2, Pt II.

[283] Commentators have highlighted the uncertain nature of the 'rules and methods of mental activities'. Xiang Yu, 'The Patent Protection for business methods in China' (2008) 30(10) *European Intellectual Property Review* 412, 414.

program, or devices for computer games, etc., which is merely defined by game rules and does not include any technical features.

The Guidelines go on to explain that the following categories fall into this exclusion: methods of examining patent applications; methods of managing organisation; traffic rules; methods of deduction; rules of classifying books; rules of editing calendar; operating instructions; grammar; computer languages; short-cut arithmetic methods; mathematical theories and methods of conversion; methods of psychological test; methods of teaching; methods of games; methods of statistics; music books, food recipes or chess manuals; methods of keeping fitness; methods of disease survey; methods of presenting information; and computer programs per se.'[284]

While rules and methods for mental activities are clearly regarded as unpatentable subject matter, computer programs as such are not expressly excluded. Nonetheless, computer programs per se do not constitute the subject matter for patent protection. While computer programs per may not be patentable, it is possible for an invention that incorporates a computer program to be patentable subject matter. Where an application is made up of a mixture of patentable and non-patentable subject matter[285], the Examination Guidelines stipulate that the application must be considered as a whole[286].

While computer program as such cannot be patented, an invention containing a computer program may be patentable if 'the combination of software and hardware as a whole can really improve prior art, bring about technical results, and constitute a complete technical

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[284] Guidelines 2006, Ch.1, 4.2, Pt II.

[285] Former guidelines adopted the 'technical contribution' principle, which requires that for an invention to be patentable, the contribution of the invention to the prior art must be technical in nature in determining whether an invention relating to rules and methods for mental activities is a patentable subject matter. The lack of a technical contribution to the art was often given as the reason for denying the patentability of claimed matter under Art. 25.1(2) of the Patent Law. The inventions containing not only matter of rule or method for mental activities, but also technical features were always excluded by applying this principle. Due to the existing defect with the mode of assessment'. Xiang Yu, 'The Patent Protection for business methods in China' (2008) 30(10) *European Intellectual Property Review* 412, 414. Citing Cui Aiping, 'Assessment of patentability of inventions relating to "rules and methods for mental activities"', *China Patent & Trademark,* No. 4, 2006.46-51. *WIPO-MOST Intermediate Training Course on Practical Intellectual Property Issues in Business WIPO/IP/BIS/GE/03/7* (7 Nov 2003), para 21 ff (patentability of computer software and business methods in China).

[286] 'According to Guidelines 2006, if a claim in its whole contents contains not only matter of rule or method for mental activities, but also technical features, then the claim, viewed as a whole, is not a rule or method for mental activities and shall not be excluded from patentability under art.25'. Xiang Yu, 'The Patent Protection for business methods in China' (2008) 30(10) *European Intellectual Property Review* 412, 414 note 18. Guidelines 2006, Ch.1, 4.2, Pt II.

solution'[287]. Following Article 2 of the Patent Law and Rule 21 of the Implementing Regulations, an application relating to a computer programs is only the subject matter of patent protection if it constitutes a technical solution.[288] To satisfy this requirement, the application must:

(iv) solve technical problems

(v) use technical measures, and

(vi) be capable of producing a technical effect.[289]

Importantly, an application will only constitute a technical solution when it meets *all* three of these criteria[290]. In relation to computer programs, the Guidelines state that 'if the solution of an invention application relating to computer programs involves the execution of computer programs in order to solve technical problems, and reflects technical means in conformity with the laws of nature by computers running programs to control and process external or internal objects, and thus technical effects in conformity with the laws of nature are obtained, the solution is a technical solution as provided for in Rule 21 [of the Implementing Regulations] and is the subject matter of patent protection'.[291]

While the technical measures (means) requirement is relatively easy to satisfy where a computer is used, the other two criteria are often more difficult to establish. For software related inventions, it has been said that 'it is usually easy to meet the technical means requirement at least because of the use of a computer system. But for some inventions, especially for some business–related inventions, it is very difficult to meet the technical problem and technical effect requirements'.[292] To assist applicants, the Examination Guidelines give a number of examples of patentable and non-patentable subject matter. These are:

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[287] SPO Patent Office, Frequently Asked Questions,' Can computer software be patented in China?'.

[288] Examination Guidelines, 2006, Ch.1, 2, Pt II

[289] See (SIPO) Guidelines for Examination, 2006, Chapter 9, Part II (based on Article 25 of the Patent Law and article 2(1) of the Patent Law Implementing Regulations – which requires an invention to be a new technical solution). See Xiang Yu, 'The Patent Protection for business methods in China' (2008) 30(10) *European Intellectual Property Review* 412; Lin Deng, 'How to protect software-related inventions in China' (2004) 142 *Managing Intellectual Property* 20, 21

[290] Guidelines 2006, Ch.9, 5.2. According to the Guidelines 2006: 'If the solution of an invention application relating to computer programs involves the execution of computer programs not in order to solve technical problems, or does not reflect technical means in conformity with the laws of nature by computers running programs to control and process external or internal objects, or the effect obtained is not restrained by the laws of nature, the solution is not a technical solution as provided for in Rule 2.1, and is not the subject matter of patent protection.'

[291] Guidelines 2006, Ch.9, 2, Pt II.

[292] Yali Shao, 'Software-related Inventions' (Sep 2008) *Managing Intellectual Property* (IP Focus Supplement) 47, 48.

Non-patentable software-related inventions:

'A method for finding the value of n by a computer comprising the steps of: evenly dividing the area of a square into spots: inscribing a circle in the square; counting the evenly distributed spots in the square, using a computer program to calculate the value & pi. According to the Guidelines this method relates to a pure mathematical algorithm, only obtains an non-technical value and does not resolve a technical problem'[293]

Patentable software-related inventions:

'If a computer program is inputted into a general purpose computer and results in a computer-controlled apparatus or a computer-controlled method, then the computer program and the computer hardware together constitute an apparatus of method for industrial process control. The Guidelines use the example of a method of controlling a rubber modelling press, where a program, executed by a computer precisely controls the vulcanising time a rubber material (similar to Benson)'.

'In an invention is a method for improving internal performance of a general purpose by a computer program, it resolves a technical problem and reaches a technical result, and thus constitutes patentable subject matter'.

While abstract entities (logic structures, data stream, code etc) are not patentable, it has been suggested that they can be indirectly protected by linking the abstract entity to a physical entity[294]. For example, while 'a data structure claim is not allowable in China, but a communication system claim defined within a transmitter and receiver for communicating information that has a special data structure can be allowed'[295]. It has also been suggested that compared with the 'technical character' requirement at the EPO, the examination principles of the 'technical solution' and the 'three-element criteria' of SIPO are much stricter'. This means that 'the patentability standards for statutory subject matter in China are even higher than EPO'[296].

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[293] '[P]atentable product usually should be a physical entity such as an apparatus, a device, a network and so on. Thus a logical entity, such as a data structure, data stream, code, photo editor, equation editor or a teleconferencing system is generally not   patentable'. Yali Shao, 'Software-related Inventions' (Sep 2008) *Managing Intellectual Property* (IP Focus Supplement) 47.

[294] Yali Shao, 'Software-related Inventions' (Sep 2008) *Managing Intellectual Property* (IP Focus Supplement), 47.

[295] Yali Shao, 'Software-related Inventions' (Sep 2008) *Managing Intellectual Property* (IP Focus Supplement), 47.

[296] Xiang Yu, 'The Patent Protection for business methods in China' (2008) 30(10) *European Intellectual Property Review* 412, 416.

[3.16] Colombia

Colombia is a member of the Andean pact. This means that Andean supranational legislation provides the basic rules about patentable subject matter, with domestic legislation providing ancillary provisions. As Colombia has not introduced relevant domestic legislation, this means that patentable subject matter in Colombia is governed by the Andean pact rules.

[3.17] Croatia

Croatia is a member of the EPC[297]. Patent law in Croatia is governed by *Patent Act and Amending Patent Act and Act on Amendments to the Patent*[298]. Article 5(1) of the Patent Act provides that a patent shall be granted for any invention, in any field of technology, which is new, which involves an inventive step and which is eligible for industrial application. This is qualified by Article 5(6) which says that the following in particular shall not be considered to be the inventions within the meaning of paragraph (1) of this Article:

   1. discoveries, scientific theories and mathematical methods,

   2. aesthetic creations,

   3. rules, instructions or methods for performing mental activities, playing games or doing business,

   4. presentation of information, and

   5. computer programs.

In deciding whether an invention falls within the ambit of Article 5(6), two things need to be noted. First, applications are only excluded if they relate to a excluded subject matter (such as a computer program) as such[299]. Secondly, examiners concentrate on the content of the claim in order to identify whether the claimed subject-matter, considered as a whole, has a technical character. If it does not, then there is no invention[300]. In relation to computer-implemented inventions (which includes 'claims which involve computers, computer networks, or other programmable apparatus whereby one or more of the features are realised by means of a program or programs'[301]. While computer programs as such are

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[297] 1 January 2008.

[298] G No. 173/2003 of 31 October 2003, OG No. 87/2005 of 18 July 2005, OG No. 76/2007 of 23 July 2007).

[299] State Intellectual Property Office (SIPO) of the Republic of Croatia, *SIPO Guidelines for Patent Search and Examination* (Final Versions, Dec 2007), B-I:1, 1.2.

[300] State Intellectual Property Office (SIPO) of the Republic of Croatia, *SIPO Guidelines for Patent Search and Examination* (Final Versions, Dec 2007), B-I:1, 1.2.

[301] State Intellectual Property Office (SIPO) of the Republic of Croatia, *SIPO Guidelines for Patent Search and Examination* (Final Versions, Dec 2007), B-I:4, 1.9.

excluded, an invention as a whole that has a technical character is not excluded under Article 5(6). Thus, if 'a computer program is capable of bringing about, when running on a computer, a further technical effect, going beyond normal physical effects (eg electrical currents), it is not excluded from patentability'. The requisite technical effect may be found, for example, in the 'control of an industrial process or in the internal functioning of the computer itself or its interfaces under the influence of the program and could, for example, affect the efficiency or security of a process, the management of computer resources required or the rate of data transfer in a communication link'[302].

A computer program will fall outside the excluded subject matter if it has 'the potential to bring about, when running on a computer, a further technical effect that goes beyond the normal physical interactions between the program and the computer'[303].

[3.18] Cyprus

Cyprus is a member of the EPC. Patent law in Cyprus is governed by Patent Law 16(I)/98 as amended.

[3.19] Czech Republic

The Czech Republic is a member of the EPC. Patent law in the Czech Republic is governed by the Industrial Property (Protection) Act (Amendment) 6/04/2000 , No 116. Section 3(2) of the Act provides that the following shall not be regarded as inventions:

(a) discoveries, scientific theories and mathematical methods

(c) schemes, rules, methods for performing mental acts, playing games or doing business, and programs for computers

(d) presentation of information

[3.20] Denmark

Denmark is a member of the EPC[304]. Patent law in Denmark is governed by the Patents Act, which was consolidated in 2009.[305] Section 1(2) of this Act provides that the following shall not be regarded as inventions;

(i) discoveries, scientific theories, and mathematical methods

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[302] State Intellectual Property Office (SIPO) of the Republic of Croatia, *SIPO Guidelines for Patent Search and Examination* (Final Versions, Dec 2007), B-I:4, 1.9.

[303] State Intellectual Property Office (SIPO) of the Republic of Croatia, *SIPO Guidelines for Patent Search and Examination* (Final Versions, Dec 2007), B-I:4, 1.9.

[304] 1 January 1990.

[305] Consolidate Act No 91 of 28 January 2009. Consolidating, inter alia, Law of November 27, 1990, No. 527/1990, as amended by Laws No. 116/2000 and No. 207/2000.

(ii) aesthetic creations

(iii) schemes, rules or methods for performing mental acts, playing games or doing business, or programs for computers

(iv) presentations of information.

[3.21] Ecuador

Patent law in Ecuador is governed by Codificación 2006-013. Article 121 provides for the applicable domestic provisions under Andean rules and pertinent treaties. All inventions satisfying the novelty, technical and industrial utility shall be patentable[306]. This is qualified by Article 125 which provides that the following are deemed not to be an invention:

- discoveries,

- scientific theories and principles, and mathematical methods;

- substances that exist in nature; literary and artistic works or any other aesthetic creation; schemes, rules and methods for performing activities mental acts, playing games or doing business, as well as computer programs or software while not part of an invention susceptible of industrial application and,

- methods of presenting information[307].

[3.22] Egypt

Article 2(2) of the Law on the Protection of Intellectual Property Rights (Law No. 82), adopted on 3 June 2002, provides that patents shall not be granted for 'discoveries, scientific theories, mathematical methods, programs and schemes'.

[3.23] Estonia

Estonia is a member of the EPC[308].

]3.24] Ethiopia

Article 4 (1) of the Proclamation No. 123/1995 concerning Inventions, Minor Inventions and Industrial Designs provides that the following shall not be patentable:

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[306] http://www.wipo.int/clea/docs_new/pdf/es/ec/ec031es.pdf

[307] Art. 125 'No se considerarán invenciones: a) Los descubrimientos, principios y teorías científicas y los métodos matemáticos; b) Las materias que ya existen en la naturaleza; c) Las obras literarias y artísticas o cualquier otra creación estética; d) Los planes, reglas y métodos para el ejercicio de actividades intelectuales, para juegos o para actividades económico-comerciales, así como los programas de ordenadores o el soporte lógico en tanto no formen parte de una invención susceptible de aplicación industrial; y, e) Las formas de presentar información'.

[308] 1 July 2002.

(c)   Schemes, rules or methods for playing games or performing commercial and industrial activities and computer programs.

(d)   Discoveries, scientific theories and mathematical methods.

(f)   Works protected by copyright.

Article 2(2)   adds that the 'provision of sub-article (1)(e) of this article shall not apply to products for use in any of the methods of treatment of the human or animal body by surgery or therapy, as well as diagnostic methods practiced on the human or animal body'.

[3.25] France

France is a member of the EPC.[309] Following this, French law excludes, inter alia,

1. discoveries, scientific theories and mathematical methods

2. aesthetic creations, schemes, rules or methods for performing mental acts, playing games or doing business, and computers programs

3. presentation of information

While computer programs per se are not patentable subject matter, in some situations computer-related inventions may be patentable[310]. For example it has been held that claims 'directed to a technical process which is carried out under the control of a program cannot be regarded as relating to a computer program as such'.[311] As with many other EPC countries, they key factor is whether the invention is technical.

[3.26] Finland

Finland is a member of the EPC.[312] Section 1, of the Finish Patent Act[313] provides that anyone who has, in any field of technology, made an invention which is susceptible of industrial application, or his or her successor in title, is entitled, on application, to a patent and thereby to the exclusive right to exploit the invention commercially, in accordance with this Act. The Act also excludes:

• Discoveries, scientific theories and mathematical methods

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[309] 7 October 1977.

[310] See the Paris Tribunal de grande instance on Case 2011/11641, PIBD No 867 III p 59, (Infomil).

[311] Schlumberger (15 June 1981) (1982) *Ann. Propr. Ind*. 24. Reto Hilty and Christophe Geiger, 'Patenting Software: A Judicial and Socio-Economic Analysis' (2005) 36 *IIC* 615, 624 note 34.

[312] 1 March 1996.

[313] No. 550 of December 15, 1967, as amended by Acts No. 575/71 of 2 July 1971, No. 407/80 of 6 June 1980, No. 387/85 of 10 May 1985 , No. 801/91 of 10 May 1991, No. 577/92 of 26 June 1992, No. 1034/92 of 13 November 1992, No. 1409/92 of 18 December 1992, No. 593/94 of 28 June 1994, No. 717/95 of 21 April 1995, No. 1695/95 of 22 December 1995, No. 243/97 of 21 March 1997, No. 650/00 of 30 June 2000, No. 990/04 of 19 November 2004, No. 896/05 of 18 November 2005, 295/06 of 21 April 2006 and 684/2006 of 21 July 2006.

- Schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers;

- presentations of information

The categories of excluded subject matter are said to be linked by fact that they are 'non-technical' and thus lack industrial applicability.[314]

[3.27] Germany

Germany is a member of the EPC[315]. Patent legislation in Germany is modelled on the EPC. German jurisprudence in this field has been very influential.[316] Section 1 of German Patent Act provides for the granting of patents for 'new inventions which are industrially applicable'. Section 1 also excludes:

1. discoveries, as well as scientific theories and mathematical methods

2. aesthetic creations of form

3. Plans, rules and procedures for mental activities, for plays or for business activities, as well as programs for data-processing system

4. Formats or rendition of information

These are only excluded to 'the extent that the application is directed to these areas in and of themselves'.

German patent law has 'traditionally held that a mental process should not be protected using a technical disguise'. On the basis that a 'program or a related method of operating a computer is essentially the result of a mental process, the technical implementation of the program being straightforward' this was taken to mean that protection was only to be granted in 'exceptional cases'[317]. In early decisions, German courts applied this reasoning as part of the 'core doctrine', which required the court to identify the essence or core of the invention and then to determine whether this 'core comprised technical subject matter'[318]. The meaning of technical subject matter is often traced back to the celebrated *Red Dove (Rote*

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[314] Anti Peltonen et al, AIPPI Report Q 158: The Patentability of Business Methods (Finland) (2004), 1.

[315] 7 October 1977.

[316] See, for examples, Stefan Schohe, Christian Appelt, and Heinz Goddar, 'Patenting software-related inventions in Europe' in (ed.) Toshiko Takenaka *Patent Law and Theory* (Edward Elgar, Cheltenham, 2008), 325, 326.

[317] Stefan Schohe, Christian Appelt, and Heinz Goddar, 'Patenting software-related inventions in Europe' in (ed.) Toshiko Takenaka *Patent Law and Theory* (Edward Elgar, Cheltenham, 2008), 325, 327.

[318] Stefan Schohe, Christian Appelt, and Heinz Goddar, 'Patenting software-related inventions in Europe' in (ed.) Toshiko Takenaka *Patent Law and Theory* (Edward Elgar, Cheltenham, 2008), 325, 327.

Taube[319]*)* decision from 1969 which held that 'an instruction to methodically utilize natural forces for achieving a direct causal result'. It has been said that 'a result, which need not have a technical character, is achieved as the result of process of tangible or measurable events, such as building or operating a machine'.[320] Along with other decisions such as *Chinesische Schriftzeichen*[321], the view developed that something was technical 'if it made use of the operation of controllable natural forces, other than the working of human intelligence, to achieve a causally predictable result'.[322]

The meaning of technicality set out in earlier German Federal Court of Justice (*Bundesgerictshof*) decisions such as *Rote Taube*[323] and *Chinesische Schriftzeichen*[324] was extended by the Federal Court of Justice in the 1999 decision of *Logic Verification (Logikverifikation)*[325]. In this decision, the Federal Court of Justice 'considered the patentability of a computer based method for verifying whether an integrated circuit layout performs the same logical functions it was designed to perform' [326]. The Federal Court of Justice held that as the application involved 'technical considerations' that the claimed method had technical character and was therefore patentable[327]. In so doing the Federal Court of Justice held that the 'technical character of the invention must be determined on the basis of the subject matter as a whole (including all features of claims)' [328]. More specifically, the Federal Court of Justice said that 'an invention was technical in nature if its character resided in findings based on technical considerations'. This was the case 'even if its teachings was not directed to achieving an effect, with discernible cause, brought about by the direct application of controllable natural forces without intervention of the human

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[319] (1969) GRUR 672; (1970) 1 *IIC* 136. Felix Rummler, 'Computer Program Inventions before the German Courts – A review' (2005) *IIC* 225, 227. It has also been said that it was 'the *Reich* Supreme Court that first held, in 1933, that "technology is a matter of the perceptible and not of the spiritual world: it works according to the laws of physics and chemistry'. Berlin Court of Appeals, January 9, 1933 (1933) GRUR 289, 290, as cited in Reto Hilty and Christophe Geiger, 'Patenting Software: A Judicial and Socio-Economic Analysis' (2005) 36 *IIC* 615, 626 .

[320] Stefan Schohe, Christian Appelt, and Heinz Goddar, 'Patenting software-related inventions in Europe' in (ed.) Toshiko Takenaka *Patent Law and Theory* (Edward Elgar, Cheltenham, 2008), 325, 327.

[321] (1992) GRUR 36; (1993) 24 *IIC* 124.

[322] Felix Rummler, 'Computer Program Inventions before the German Courts – A review' (2005) *IIC* 225, 226.

[323] (1969) GRUR 672; (1970) 1 *IIC* 136. Felix Rummler, 'Computer Program Inventions before the German Courts – A review' (2005) IIC 225, 227.

[324] 1992) GRUR 36; (1993) 24 IIC 124.

[325] (X ZB 11/98, 13 Dec 1999) GRUR 2000, 498.

[326] J. Ahmes, 'Patenting program-related Inventions' (Sept 2000) 102 *Managing Intellectual Property* 69.

[327] J. Ahmes, 'Patenting program-related Inventions' (Sept 2000) 102 *Managing Intellectual Property* 69.

[328] See *Electronic Payment System (Elektrnoscher Zahlungsverkehr)* Case No X ZB 20/03 24 May 2004; (2005) 36 *IIC* 243, 248 (comments by Ju:rgen Betten).

mind'[329]. The requisite technical character necessary for patentable subject matter may 'reside in the technical considerations forming the starting point of the software created and that the resulting output by the computer can be used in a generally acknowledged field of technology, for example, the manufacture of semiconductor devices'.[330][331]

While German patent law has consistently used 'technical character' (or some equivalent thereof) as a benchmark to determine patentable subject matter, there have been some marked shifts in the approach that is taken to determine whether an invention is technical. This is most notable in the *Speech Analysis Device (Sprachananalyseeinrichtung*[332]) decision from 2000, which concerned an application for a computer-related language analysis device. The German Patent Court rejected the application on the basis that 'the contribution that the invention made to the state of the art was of a non-technical nature, and that it consisted of the implementation of a set of grammatical (ie non-technical) rules on a common computer'.[333] The Federal Court of Justice overturned this decision, suggesting that the court had 'confused the requirements of technicality and novelty/inventive step'. The Federal Court of Justice stated that any industrially producible and commercially applicable device which in operation spent energy and in which different switching states occurred was to be considered a technical device. This included standard computers'. Importantly, the Federal Court of Justice added that 'a technical device was technical regardless of whether or not it made a technical contribution to the state of the art. The latter was a matter of novelty/inventive step'.[334] Utilising this new approach, which has subsequently been called the 'any hardware approach', the Federal Court of Justice concluded that 'a data processing device which is programmed in a certain manner has technical character and is therefore per se patentable. This applies if the device is performing text or language processing … a standard computer which is programmed in a defined manner to perform certain functions is a technical device and is therefore in principle patentable'[335][336]. One of the consequences

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[329] Felix Rummler, 'Computer Program Inventions before the German Courts – A review' (2005) *IIC* 225, 226.

[330] Stefan Schohe, Christian Appelt, and Heinz Goddar, 'Patenting software-related inventions in Europe' in (ed.) Toshiko Takenaka *Patent Law and Theory* (Edward Elgar, Cheltenham, 2008), 325, 330-31.

[331] Felix Rummler, 'Computer Program Inventions before the German Courts – A review' (2005) *IIC* 225, 226.

[332] Case No X ZB 15/98 11 May 2000, (2000) *GRUR* 1007, (2002) *IIC* 343.

[333] Felix Rummler, 'Computer Program Inventions before the German Courts – A review' (2005) *IIC* 225, 226.

[334] Felix Rummler, 'Computer Program Inventions before the German Courts – A review' (2005) *IIC* 225, 226.

[335] J. Ahmes, 'Patenting program-related Inventions' (Sept 2000) 102 *Managing Intellectual Property* 69.

[336] See *Electronic Payment System (Elektrnoscher Zahlungsverkehr)* Case No X ZB 20/03 24 May 2004; (2005) 36 *IIC* 243, 248 (comments by Ju:rgen Betten).

of this approach was that it meant that 'any software should "pass muster" for patentability under Sec. 1 of the German Patents Act, provided it is claimed in conjunction with hardware'[337]. The decision not only liberalised the practice with regard to computer-implemented inventions, it also shifted the focus of attention away from subject matter to inventive step. It also represents the approach that is currently used at the EPO.

While the approach outlined in the *Speech Analysis Device* decision may have been adopted at the EPO, it was largely jettisoned in subsequent decisions in Germany. The starting point for this partial return to the approach set out in the *Logic Verification* decision[338] was the *Search of Faulty Character Strings (Suche fehlerhafter Zeichenketten/Tippfehler)* decision from 2002[339]. The claim in question was for a 'Digital Storage medium, in particular a disc, with electronically readable control signals, which can interact with a programmable computer system'. The Patent Court upheld the rejection of this Beauregard-type claim on the basis that the application was for a computer program as such. The Federal Court of Justice held that the interpretation by the Patent Court was too narrow. More specifically, the Federal Court of Justice said that 'the determination had to be made in accordance with the intended purpose of the exclusion from patentability provision. To justify patentability, a computer program had to have a certain degree of "peculiarity"'.[340] In so doing, the Federal Court of Justice 'drew a distinction between claims directed to solving a concrete problem on conventional fields (engineering, physics, chemistry, biology) by performing methods steps on a computer were generally patentable. In other words "non-conventional" fields, an assessment was necessary of whether or not the invention was characterised by such "peculiarity" justifying patent protection'.[341] It has been said that in this decision, 'the exclusion of protection of software forms a requirement separate from the requirement of technical subject matter, that is, a subject matter may be technical, but nevertheless be excluded from patent protection'.[342] In order to be patentable subject matter, 'the prominent features of the subject matter of a claim have to serve the solution of a specific technical

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[337] Felix Rummler, 'Computer Program Inventions before the German Courts – A review' (2005) *IIC* 225, 226.

[338] See, for examples, Stefan Schohe, Christian Appelt, and Heinz Goddar, 'Patenting software-related inventions in Europe' in (ed.) Toshiko Takenaka, *Patent Law and Theory* (Edward Elgar, Cheltenham, 2008), 325, 327.

[339] Case No. X ZB 16/00 (2002) *GRUR* 143, (2002) 33 *IIC* 753.

[340] Felix Rummler, 'Computer Program Inventions before the German Courts – A review' (2005) IIC 225, 228.

[341] Felix Rummler, 'Computer Program Inventions before the German Courts – A review' (2005) *IIC* 225, 228.

[342] See, for examples, Stefan Schohe, Christian Appelt, and Heinz Goddar, 'Patenting software-related inventions in Europe' in (ed.) Toshiko Takenaka, *Patent Law and Theory* (Edward Elgar, Cheltenham, 2008), 325, 331-32.

problem'[343]. It has also been said that the decision was 'widely understood to overrule the *Speech Analysis Device* decision' which was subsequently adopted at the EPO, 'and to be a partial return to the core doctrine' as adopted in the *Logic Verification* decision[344].

In a series of subsequent decisions the Federal Court of Justice has clarified that to be excluded from patentability, 'the subject matter of a claim has to compromise the solution of a specific technical problem by technical means'[345]. More specifically it has been held that computer programs are patentable if they 'have a particularity that goes beyond the mere use of a computer'[346]. It has also been held that the requisite particularity is present if 'a concrete technical problem can be the secure transformation of data from one computer to another the computer program solves a concrete technical problem with technical means[347] and that only 'an inventive solution of a problem in a technical field is patentable, because only a contribution to technology justifies patent protection'.[348] Computer-related inventions deemed to be technical[349]:

- Software integrated in a technical process
- Methods forming part of the manufacture of a technical product (Logikvefrificaktion)
- Teachings relating to the way a computer operated as such
- New computer designs

Computer-related inventions deemed to be non-technical:

- inventions which determine the profitability of a medical apparatus, or to automatically determine and transmit data relevant to a desired business result[350]

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[343] See, for examples, Stefan Schohe, Christian Appelt, and Heinz Goddar, 'Patenting software-related inventions in Europe' in (ed.) Toshiko Takenaka, *Patent Law and Theory* (Edward Elgar, Cheltenham, 2008), 325, 332.

[344] See, for examples, Stefan Schohe, Christian Appelt, and Heinz Goddar, 'Patenting software-related inventions in Europe' in (ed.) Toshiko Takenaka, *Patent Law and Theory* (Edward Elgar, Cheltenham, 2008), 325, 332.

[345] Stefan Schohe, Christian Appelt, and Heinz Goddar, 'Patenting software-related inventions in Europe' in (ed.) Toshiko Takenaka, *Patent Law and Theory* (Edward Elgar, Cheltenham, 2008), 325, 332. Citing *Electronic Financial Transactions* (2004) *GRUR* 667; Determination of Profitability Rentalabilita sermittlung) (2005) GRUR 143; *Offering Interactive Help (Anbieten interaktiver Hilfe)* (2005) *GRUR* 141.

[346] *Search for Faulty Character Strings*, (2002) 33 *IIC* 753. See, 'Opinion on behalf of AIPPI in EPO Case G3/08' (29 April 2009), 9.

[347] *Electronic Payment System* 36 IIC 242. See, 'Opinion on behalf of AIPPI in EPO Case G3/08' (29 April 2009), 9.

[348] *Electronic Payment System* 36 IIC 242. See, 'Opinion on behalf of AIPPI in EPO Case G3/08' (29 April 2009), 9.

[349] Case No X ZB 16/00 (2002) *GRUR* 143, (2002) 33 *IIC* 753.

[350] *Profitability Determination* BGH, (2005) *GRUR* 143.

- an invention to 'supply to the offerer [sic] the information on time, so that he may offer the customer interactive help at his computer in the case he is not likely to place an order by himself'.[351]

The scope of the exclusion for computer programs was further clarified and extended by the Federal Court of Justice in the 2009 decision of *Steuerungseinrichtung für Untersuchungsmodalititäten*[352]   and in the 2010 decision of the in *Dynamic document generation.*[353] In the later case, the Federal Court of Justice confirmed that in situations where the claims were for the interworking of computer systems elements, that the invention was not excluded subject matter. The Federal Court of Justice also reconfirmed that a key factor was that the computer and computer program solved a technical problem.

While computer programs 'in and of themselves' are excluded subject matter in German patent law, computer related inventions are potentially patentable, so long as they are 'technical'[354]. The Federal Court of Justice 'still maintains that the presence of technical features in a claim is not sufficient to avoid the exclusions according to Section 1(2) PatG (corresponding to Article 52(2) EPC) and to this end applies a test as to whether there is a technical solution to a technical problem separate from the test of inventive step'.[355] It has been said that the gradually the degree of technicality required to ensure patentable subject matter was 'construed more generously[356]'. It has also been said that the approach of German law is 'generally in line with the decisions of the EPO, although the starting point of the argumentation might be slightly different'[357].

[3.28] Georgia

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[351] *Offereing Interactive Help* BGH, (2005) *GRUR* 141.

[352] (2009) *GRUR* 479 (20 Jan 2009).

[353] Case No Xa ZB 08/20 (22 April 2010).

[354] *Logikverifikation* BGH Case No X ZB 11/98: 'a process that involves – prior to the physical production – an intermediate step performed substantially with the aid of computers cannot be excluded from patentability on the grounds that it refrains from making direct use of controllable forces of nature if the solution seeks to promote the possibility of manufacturing technically workable products in a different manner by technical knowledge'. As cited in Daniel Closa, Alex Gardiner, Falk Giemsa, Jörg Machek, *Patent Law for Computer Scientists: Steps to Protect Computer-implemented inventions* , (Springer, 2010), 24 note 15.

[355] See, for examples, Stefan Schohe, Christian Appelt, and Heinz Goddar, 'Patenting software-related inventions in Europe' in (ed) Toshiko Takenaka, *Patent Law and Theory* (Edward Elgar, Cheltenham, 2008), 325, 333.

[356] See Joachim Weyand and Heiko Haase, 'Patenting Computer Programs: New Challenges' (2005) 36 *IIC* 647.

[357] 'Opinion on behalf of AIPPI in EPO Case G3/08' (29 April 2009), 9.

Patent law in Georgia is governed by Patent Law of February 4, 1999, in force as of May 24, 1999. Article 16 of the Patent law provides that the following shall not be regarded as an invention:

a) a discovery, scientific theory, or mathematical method;

b) a result of artistic design;

c) algorithms and programs for computers;

d) education, teaching method and system, grammatical system of language, also methods for performing mental acts, rules for games or doing business.

e) economical organization and managing method;

f) plan and scheme of structures, buildings, territories;

g) a presentation of the information;

This is subject to the proviso that 'the objects mentioned in sub-paragraphs "a-g" of the Article are presented as such.'

[3.29] Ghana

Section 1(3) of Ghana's Patent Law, 1992 provides that the following shall not be regarded as inventions within the meaning of subsection (1) of this section:

- discoveries, scientific and mathematical theories: section 1(3)(a)
- schemes, rules or methods for doing business, performing purely mental acts or playing games: section 1(3)(c)
- mere presentation of information: section 1(3) (e)
- computer programs: section 1(3) (f).

[3.30] Guiana

Guiana applies the Patents and Designs Act No. 9/1937 (Chapter. 90/03) of 1938, which is based on United Kingdom Patents Act of 1949 and the Patents Regulations (Reg. August 1937, 8/1951, O. 15/1970).

[3.31] Greece

Greece is a member of the EPC[358]. Patent law in Greece is regulated by Law 1733/87 (Technology transfer, inventions, and technological innovation) as amended. Article 5(1) of this law says that patents shall be granted for any inventions which are new, which involve an inventive step, and which are susceptible of industrial application. The invention may

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[358] 1 October 1986.

relate to a product, a process or an industrial application. This is qualified by Article 5(2) which provides that the following shall not be regarded as inventions within the meaning of paragraph :

(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)   presentation of information.

[3.32] Hungary

Hungary is a member of the EPC.[359] Patent law in Hungary is governed by *Act XXXIII of 1995 on the Protection of Inventions by Patents.*[360] Article 1(1) provides that patents shall be granted for any inventions in any field of technology that are new, involve an inventive step, and are susceptible of industrial application. Following Article 52(2) of the EPC, Article 1(2) of the 1995 Act the Protection of Inventions by patents provides that 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) presentation of information

Article 1(3) adds the rider that patentability under Article 1(2) is only excluded to the extent to which a patent application or the patent relates to subject matter as such.

[3.33] Iceland

Iceland is a member of the EPC.[361] Patent law in Iceland is governed by the 1991 Patents Act (as amended).[362] Article 1 of the Patent Act provides that 'any person who has made an invention which is susceptible of industrial application, or that person's successor in title, may, upon application, obtain a patent which gives the holder the exclusive right to exploit the invention commercially. Inventions are patentable in any field of technology. This is

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[359] 1 January 2003.

[360] Consolidated Text of 1 April 2010.

[361] 1 November 2004.

[362]   No. 17/1991, with amendments according to Acts No. 92/1991, No. 67/1993, No. 36/1996, No. 91/1996, No. 132/1997, No. 82/1998, No. 28/2002, No. 72/2003, No. 22/2004, No. 53/2004, No. 54/2004, No. 12/2005, No. 127/2005, No. 108/2006 and No. 167/2007.

subject to the qualification that the principal innovations which are not considered to be inventions are those which concern exclusively:

1. a discovery, scientific theory or mathematical method;

2. an aesthetic creation;

3. a scheme, rule or method for performing mental acts, for playing games or for doing business, or a programme for a computer;

4. the presentation of information.

[3.34] India

Indian patent law is governed by The Patents Act, 1970 (Act 39 of 1970) (as amended). The scope of patentability of software in India is uncertain. In 2002, the Act was amended to provide in section 3(k) that mathematical methods, business methods, computer programs per se and algorithms were excluded from patentable subject matter. While complaints have been made about the lack of effective protection,[363] and the uncertain nature of the law in this area[364], it has been suggested that the section 3(k) amendments 'effectively incorporated software patents into Indian patent law through the back door'[365]. It should be noted that Indian courts have not interpreted this provision as yet. The Patent Office Manual attempted to do so and bring in the 'technical effect' norm. While this has been followed at some, but not all, of the four patent offices, it has been subject to widespread criticism.[366] The uncertainty is compounded by the fact that each of the four different patent offices takes differing interpretations on the question of computer programs as patentable subject matter. While some offices do not grant software patents, even if a 'technical' effect is shown, other offices have followed the approach outlined in the Patent Office Manual[367]. This seems to have been confirmed by subsequent practice at some of the Indian Patent Offices which have modelled themselves on the approach at the EPO[368]. As a result, a number of patents on 'technical effect of software have been granted in India'[369]. In these contexts, as in many

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[363] Ibid, 4 of 5. Cf Venkatesh Hariharan, 'Letter to the editor: Why India doesn't need software patents' (Sep 2009) *Managing Intellectual Property*

[364] Anon, 'Interpreting section 3(k)' (2009) 191 *Managing Intellectual Property* 59.

[365] Ron Fernando, 'Why India needs software patents' (July 2009) *Managing Intellectual Property*, 3 of 5. See also Satabdee Mohanty and Tanay Nandi, 'Implications of Software Patenting in India, (5 May 2010) SSRN, 1600578, 10.

[366] On this see Shamnad Basheer, 'A method to the madness' (4 Nov 2008) *Livemint.com* available at http://www.livemint.com/2008/11/05233957/A-method-to-the-madness.html.

[367] Unsurprisingly, applicants tend to file in offices that are more pro-software patents.

[368] Anon, 'Interpreting section 3(k)' (2009) 191 *Managing Intellectual Property* 59.

[369] Shardul Shroff and Dev Robinson, 'India's biotech and software renaissance' (2005) 151 *Managing Intellectual Property* 76, 77.

other jurisdictions, the key issue is what is meant by a technical effect[370]?   In this regard, it has been suggested that examiners are interpreting section 3(k) 'cautiously and have so far only granted software-related patents if the patent claims are directed to creating a specifically intended physical effect in specifically identified hardware'[371].

While computer programs per se are excluded subject matter, it seems that at least in some patent offices, computer-related inventions may be considered as patentable subject matter. Until the matter is considered judicially or revisited by Parliament, the law in this area remains uncertain. It should be noted that proposals to change the law to state that technical application to industry of mathematical or business methods, or computer programs was patentable; and that a combination of computer program and hardware was allowed, was rejected in April 2005.

[3.35] Indonesia

Article 2(1) of the Indonesian patent law provides that a patent shall be granted to an invention, which is novel, involves an inventive step and is susceptible of industrial application[372]. This is qualified by Article 7(c) which provides that patent shall not be granted to an invention of 'any theory and method in the field of science and mathematics.' It has been suggested that while Indonesian patent law does not specifically exclude computer software that applications for computer software 'might be refused'. This is because computer programs are protected under Indonesian copyright law[373]

[3.36] Italy

Italy is a Member of the EPC[374]. Italian patent law is governed by the 2005 Italian Industrial Property Code[375]. Article 45 of the Code, which reflects Article 52(2)(c) and (3) EPC, provides that any new invention involving an inventive step and susceptible of industrial application may form the subject matter of a patent. It also provides that the following in particular shall not be regarded as inventions within the meaning of the preceding paragraph.

(a) discoveries scientific theories and mathematical methods;

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[370] Shardul Shroff and Dev Robinson, 'India's biotech and software renaissance' (2005) 151 *Managing Intellectual Property* 76, 77.

[371] Anon, 'Interpreting section 3(k)' (2009) 191 *Managing Intellectual Property* 59.

[372] Law No. 14 year 2001 concerning Patent (August 1, 2001).

[373] Isandi Harahap, 'Some Aspects of Indonesian Patent Law' (University of technology Sydney Thesis, June 1992).

[374] 1 December 1978.

[375] Legislative Decree n. 30 of February 10, 2005.

(b) schemes, rules and methods for performing men acts, playing games or doing business and programs for computers

(c) presentations of information.

The provisions of the preceding paragraph shall exclude patentability or the subject matter referred to therein only to the extent to which the patent application or the patent relates to discoveries, theories, schemes, rules, methods, and programs as such.

[3.37] Ireland

Ireland is a member of the EPC.[376] Patent law in Ireland is governed by the Irish Patents Act, 1992. Section 9, which follows EPC Article 52, excludes the following subject matter .

- A discovery, a scientific theory or a mathematical method;
- An aesthetic creation;
- A scheme, rule or method for performing a mental act, playing a game or doing business, or a computer program; or
- The presentation of information.

According to the Irish Patent Office, while it is not possible to obtain a patent on software per se, patents may be granted for inventions requiring the use of software to achieve their purpose. This, however, is conditional on the software having a "technical effect" when the program is run. Such effect may, for example, be found in the control of an industrial process or in the internal functioning of the computer itself.[377]

[3.38] Japan

Patent law in Japan is governed by the Patent Act (Act No. 121 of 1959). Article 2(1) of the Patent Act defines an invention as 'the highly advanced creation of technical ideas by which a law of nature is utilized'. This is qualified by Article 29 which provides that 'any person who has made an industrially applicable invention may obtain a patent therefore'. This is taken to mean that an invention must (1) consist of statutory subject matter and (2) be industrially applicable. There is no legislative provisions that expressly exclude certain types of creations from patentable subject matter. The fact that invention is defined in section 2(1) to requires a law of nature has been taken to mean that protection is not available for 'natural phenomena, man-made rules such as the law of economics, business

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[376] 1 August 1992.
[377] Irish Patent Office, 'General Information Concerning Patents For Inventions' (2005).

schemes/methods[378], abstract ideas, pure mathematical algorithms, arbitrary arrangements, mental activity, mere presentations of information, and computer program listings'.[379] Following this the Examination Guidelines provide that the following types of subject matter are excluded[380]:

- Natural laws, as such

- Mere discoveries

- Ideas that are contrary to natural laws

- Ideas that do not use or exploit a natural law

- Ideas that are not technical

- Ideas for which it is clearly impossible to solve the problem to be solved by any means presented in the claim[381]

The Examination Guidelines allow that 'a computer program itself is one possible form of claim object. By these guidelines, programs themselves are treated as tangible entities'[382]. It has been said that since these guidelines came into effect, 'applicants have been able to make computer program claims'[383]. This position was confirmed in 2002 when the Patent Law was amended to 'allow that a computer program shall be deemed a tangible entity'.[384] 'Programme' is defined as 'an expression of combined instructions given to a computer so as to make it function and obtain a certain result'[385].

The touchstone for determining whether computer programs and computer related inventions are patentable subject matter is the definition of invention in Article 2(1). It has been suggested that the limitation imposed by section 2(1) has become less important 'due to

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[378]   Hideo Furuntani, 'Patentability of Business Method Inventions and Inventions with Non-Technical Features in Japan versus the US and Europe' (no date), 9. Therefore business method inventions are not statutory inventions, because business methods themselves do not have technical aspects but only economic aspects'.

[379] 'Opinion on behalf of AIPPI in EPO Case G3/08' (29 April 2009), 7.

[380] Taken from Gregory Stobbs, *Business Method Patents* (2009 Cumulative Supplement), 267.

[381] Part II: requirements for patentability, Chapter 1 Industrially Applicable Inventions, 1.1

[382] Part VII, chapter 1 (2000).

[383]   Hideo Furuntani, 'Patentability of Business Method Inventions and Inventions with Non-Technical Features in Japan versus the US and Europe' (no date), 4.

[384] Patent Law Amendments (2002). On this see Hideo Furuntani, 'Patentability of Business Method Inventions and Inventions with Non-Technical Features in Japan versus the US and Europe' (no date), 4. Section 2, para 3 defines working as 'Working of an invention in this Law means the following acts: (i) in the case of an invention of a product (including computer program or the like), acts of manufacturing, using, assigning or the like '. Cited in ibid.

[385]   JPO Examination Guidelines, part VII, chapter 1 (1996): 'these guidelines allowed a computer readable medium storing a program as one possible from of claim object. After these guidelines, applicants could make compute readable medium claims (Beauregard type claims)'. As cited in Hideo Furuntani, 'Patentability of Business Method Inventions and Inventions with Non-Technical Features in Japan versus the US and Europe' (no date), 3.

successive revisions of the examination guidelines, the definition of invention has been interpreted in a flexible manner'.[386] Article 2(1) ensures that computer related inventions may be patentable subject matter so long as there is a 'creation of technical ideas utilizing laws of nature'[387]. In order to determine whether laws of nature have been utilised, Japanese patent law looks at the invention as a whole[388] and asks whether there has been a concrete application of these laws of nature[389]. To be classified as 'a creation of technical ideas utilizing a law of nature', a claimed invention must be concrete enough to accomplish a certain purpose[390]. As the Intellectual Property High Court held, technology must possess sufficient concrete means to accomplish a certain purpose and can be practically used, … so that it is objective.[391] In relation to computer programs, this means that where information processing contains 'concrete means', the invention is patentable subject matter. As the Examination Guidelines state, where 'information processing by software is concretely realized by using hardware resources'[392] -- such as an arithmetic unit such as a CPU, or a storage means such as memory – 'the software invention is statutory subject matter'[393].

Examples of inventions which constitute 'a creation of technical ideas utilizing a law of nature' include inventions which concretely perform:

- control of an apparatus (rice cooker, washing machine, engine, hard disk drive, etc.), or processing with respect to the control; or

- information processing based on the physical or technical properties of an object (rotation rate of engine, rolling temperature, etc.)

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[386] IP Commitee of the Industrial Structure Council Report (2001), at 11-16, as cited in Nari Lee, 'Computer Program Patents and the Law and Policy of Patent Eligible Subject Matter: the Creation of a Private Social Contract?', 4 (at note 10)

[387] Part II: Chapter 1, 1.

[388] JPO Examination Guidelines 'clearly deny the Point of Novelty approach in which the judgement of the whether an invention was statutory subject matter was based only on the novel part of the invention'. Hideo Furuntani, 'Patentability of Business Method Inventions and Inventions with Non-Technical Features in Japan versus the US and Europe' (no date), 3.

[389] See 2007 (Gyo-Ke) 10369, 24 June 2008 (IP High Court, First Division) (concerning an 'interactive network for dental treatment').

[390] Subject matter is eligible if it is 'defined by specific means which link software and hardware; are adapted to process data according to the intended purpose; constitute an information processing apparatus or process of operating such an apparatus specific to the intended purpose'. Daniel Closa et al, 24.

[391] Hei 9 (Gyo Ke) 206 (Judgement: May 26, 1999). Cited in JPO Examination Guidelines.

[392] Hardware resources is defined as 'physical devices or physical elements used for processing, operation or realization of functions (i.e. a computer as a physical system and constituent elements thereof, such as a CPU, memory, an input device, an output device, or other physical devices connected to the computer)'. JPO Examination Guidelines, Part VII, chapter 1 (2000).

[393] Examination Guidelines for Inventions in Specific Fields (Computer Software-Related Inventions) in Japan, JPO Examination Guidelines, part VII, chapter 1 (2000) 2.2.1 (1). For discussion see Opinion on behalf of AIPPI in EPO Case G3/08 (29 April 2009), 7.

In these cases, the claimed invention constitutes 'a creation of technical ideas utilizing a law of nature' and is thus patentable subject matter[394].

Examples of 'inventions' which are not patentable subject matter:

- When a claimed invention is sought for 'a program language' so that it is deemed to be an artificial arrangement, it is not 'a creation of technical ideas utilizing a law of nature'.[395]

- When a claimed invention is sought for 'program listings' so that it is deemed to be a mere presentation of information, it is not a creation of technical ideas utilizing a law of nature.[396]

- A computer comprising an input means to input document data, a processing means to process the inputted document data and an output means to output the processed document data; wherein the said computer prepares a summary of the inputted document by using the said processing means.[397]

[3.39] Jordan

Patent law in Jordan is regulated by the Patents of Invention Law No. 32 of 1999, as amended by Temporary Law No. 71 of 2001. Section 4 provides that a patent shall not be granted for 'Discoveries, scientific theories and mathematical methods'.

[3.40] Kenya

Section 26 of the Industrial Property Act No 3 of 2001 provides that the following shall not be patentable:

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[394] In the Circuit Simulation method patent decision, the Tokyo - 'rejected [the] implication of hardware is not sufficient to make the claimed method an invention. The patent claims cited an example of a circuit which connects the mathematical algorithm model, but not how to construct the circuit where this mathematical model is used as a simulator. The court ruled that the 'claims did not cite the concrete and physical invention but only a mathematical model and thus [was] not an invention'. Tokyo High Court 2004, as cited in Nari Lee, 'Computer Program Patents and the Law and Policy of Patent Eligible Subject Matter: the Creation of a Private Social Contract?', 7 (at note 24). See also Point Management methods case. IP High Court, 26 Sept 2006, No 10698, as cited in Nari Lee, 'Computer Program Patents and the Law and Policy of Patent Eligible Subject Matter: the Creation of a Private Social Contract?', 7 (at note 25).

[395] See JPO Examination Guidelines Part II: Chapter 1, 1.1 (4).

[396] See JPO Examination Guidelines Part II: Chapter 1, 1.1 (5)(b).

[397] JPO Examination Guidelines Part VII. This is excluded on the basis that 'there exists a flow of information processing of document data on a computer in the order of input means, processing means and output means. However, since the said information processing to prepare a summary of the inputted document and the said processing means cannot be said to be cooperatively working, it cannot be said that the said information processing is concretely realized. Consequently, the claimed invention does not constitute "a creation of technical ideas utilizing a law of nature," since the information processing by software is not concretely realized by using hardware resources.

(a)   plant varieties as provided for in the Seeds and Plant Varieties Act, but not parts thereof or products of biotechnological processes; and

(b)   inventions contrary to public order, morality, public health and safety, principles of humanity and environmental conservation.

[3.41] Latvia

Latvia is a member of the EPC.[398] Section 4 of the Latvian Patent Act 2007[399] provides that an invention shall be protected with a patent in any field of technology, if the invention is new, it has an inventive step and it is susceptible of industrial application. This is qualified by section 9(2) which says that within the meaning of this Law, the following shall not be considered as inventions:

(1) discoveries, scientific theories and mathematical methods;

(2) aesthetic creations;

(3) schemes, methods of performing mental acts, playing games or doing business, as well as computer programs; and

(4) presentation of information.

This is subject to the proviso in section 9(3) which says that the patenting of the subject-matter referred to in Paragraph two of this Section shall be excluded only to the extent to which patent protection is sought for these subject-matters as such.

[3.42] Malaysia

Section 12(1) of the Malaysian Patent Act provides that 'an invention means an idea of an inventor which permits in practice the solution to a specific problem in the field of technology'[400]. This is qualified by section 13(1) which provides that the following inventions (inter alia) are not patentable:

- discoveries, scientific theories and mathematical methods;
- schemes, rules or methods for doing business, performing purely mental acts or playing games.

The exclusions in section 13(1) only apply to the extent that the application applies to the excluded subject matter as such.

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[398] As of 1 July 2005.
[399] Adopted: Entered info Force: Published: 15.02.2007 01.03.2007 Vēstnesis, 27.02.2007, Nr. 34.
[400] Act 291 of 1983 as amended by Act A1196 of 2003.

The Patent Office Guidelines for Examination treat a computer program as 'a set of instructions for controlling a sequence of operations of a data-processing system'[401]. In this sense, a computer program is said to closely resemble a mathematical method, which can be presented in many forms. According to the Guidelines, a computer program claimed by itself or as a record on a carrier is not patentable, irrespective of its content: a situation which is not normally changed when a program is loaded into a known computer[402].

According to the Patent Regulations and the Guidelines for patent examination, inventions must be of 'technical character', meaning that it must 'relate to a technical field, and must have technical features in terms of which the matter for which protection is sought can be defined in the claim or claims.[403] The situation changes, however, where the invention as claimed makes a technical contribution to the prior art. The mere fact that the invention includes a computer program is not, in itself, enough to exclude the invention as a whole. According to the patent office Guidelines for Examination, when deciding whether an invention is excluded under section 13(1), it is necessary to identify and assess the real contribution which the subject-matter claimed, considered as a whole, adds to the prior art'[404]. If the contribution is abstract or intellectual and not of a technical character, then there is no invention under section 12(1). Thus, if a computer program is claimed in the form of a physical record, eg on a conventional tape or disc, the contribution is regarded as a computer program per se as 'as such of a purely intellectual character'. However, if an invention consists of a computer program in combination with a computer, and it causes the computer 'to operate in a different way forma technical point of view, the combination might be patentable'.[405] This would also be the case in relation to program controlled machines and manufacturing. The Guidelines also suggest that where the claimed subject matter is only concerned with the program-controlled internal workings of a known computer, the subject matter is not excluded, so long as it provides a technical effect. This

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[401] Intellectual Property Corporation of Malaysia, Guidelines for Patent Examination (22 March 2004), 3.6, p 24.

[402] Intellectual Property Corporation of Malaysia, Guidelines for Patent Examination (22 March 2004), 3.6, p 24.

[403] Regulation 13(5); Intellectual Property Corporation of Malaysia, Guidelines for Patent Examination (22 March 2004), 1.2(ii), p 19.

[404] Intellectual Property Corporation of Malaysia, Guidelines for Patent Examination (22 March 2004), 2.2, p 20.

[405] Intellectual Property Corporation of Malaysia, Guidelines for Patent Examination (22 March 2004), 2.2, p 20.

would be the case, for example, where an invention extended the working memory of a known-data processing system.[406]

[3.43] Mexico

Patent law in Mexico is governed by the Industrial Property Law. This provides, in Article 16, that patents shall be granted for 'Inventions that are new, the result of an inventive step and industrially applicable under the terms of this Law shall be patentable'. Article 19 provides that the following shall not be considered inventions for the purposes of this Law:

I. theoretical or scientific principles;

II. discoveries that consist in making known or revealing something that already existed in nature, even though it was previously unknown to man;

III. schemes, plans, rules and methods for carrying out mental processes, playing games or doing business, and mathematical methods

IV. computer programs

V. forms of presentation of information.

While computer programs per se may be excluded, it has been said that '[p]rotection is available for software which is part of an invention'[407] and that 'several patent applications involving computer programs ... have been filed each year in Mexico, especially since the end of the 1990s'[408]. While 'pure' software inventions are excluded, computer-related inventions are said to be patentable. This is on the condition that an applicant is able to show a 'technical, concrete and tangible effect is obtained by using the invention'[409].

[3.44] Morocco

Article 23(3) of Law No. 17-97 Concerning Protection of Industrial Property (Dahir No. 1-00-91 of 15 February 2000 (9 Kaada 1420) excludes computer programs from the definition of an invention as such. Article 23 provides that the following are not regarded as inventions under Article 22:

(1)   discoveries, scientific theories and mathematical methods[410]

(2)   aesthetic creations[411]

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[406] Intellectual Property Corporation of Malaysia, Guidelines for Patent Examination (22 March 2004), 3.6, p 25. .

[407]   Luis C Schmidt and Cesar Ramos, AIPPI Report Q 158: The patentability of business methods – Mexico, (2004), 2.

[408]   Victor Garrido, 'Get you business methods past the IMPI' (2009) 194 *Managing Intellectual Property* 67.

[409] Ibid.

[410] Les découvertes ainsi que les théories scientifiques et les méthodes mathématiques.

(3)   schemes, rules and methods for performing mental acts, and playing games, or in the field of economic activities, and computer programs[412]

(4)   presentations of information[413].

The provisions of this Article shall exclude the patentability of the items under that provision only to the extent that the patent application or patent relates to one of these elements considered as such[414].

[3.45] Mozambique

Mozambique: Article 30(1)*(d)* exclude computer programs from the definition of an invention. The excluded subject matter is set out on Article 30(1) of the Industrial Property Code Decree No. 04/2006 of 12th April 2006. This provides that the following shall not be considered inventions for the purposes of this Law:

(a)   Scientific theories and mathematical methods;

(b)   Discoveries aimed at making known or revealing something which already exists in nature, notwithstanding that it was heretofore unknown to man;

(c)   Systems, plans, rules and methods for the performance of purely intellectual activities, playing games or economic activities;

(d)   Computer programs;

(e)   Aesthetic creations and artistic or literary works;

(f)   Presentation of information;

[3.46] Netherlands

The Netherlands is a member of the EPC[415]. Article 2.1 of the Patent Act 1995 provides that patents are granted for 'inventions which are new, inventive and which are susceptible of industrial application'. This is qualified by Article 2.2 which adds that the following are not regarded as inventions in the sense of paragraph 1:

• discoveries, as well as theories of natural science and mathematical methods

• aesthetic designs

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[411] Les créations esthétiques.

[412] Les plans, principes et méthodes dans l'exercice d'activités intellectuelles, en matière de jeu ou dans le domaine des activités économiques, ainsi que les programmes d'ordinateurs.

[413] Les présentations d'informations.

[414] Les dispositions du présent article n'excluent la brevetabilité des éléments énumérés aux dites dispositions que dans la mesure où la demande de brevet ou le brevet ne concerne que l'un de ces éléments considéré en tant que tel.

[415] As of 7 October 1977.

- systems, rules and methods for the performance of spiritual labour, for playing or for doing business, as well as computer programs

- presentation of data

Article 2.3 of the Patent Act 1995 provides that paragraph 2 only applies insofar it relates to the subjects of activities mentioned therein as such.

[3.47] New Zealand

Patent law in New Zealand is currently governed by the Patents Act 1953 No 64 (as amended). It should be noted that the New Zealand government has proposed to replace this law with a new statute. To this end the Patents Bill 2008 was introduced into Parliament on 9 July 2008. On 5 May 2009, the Bill was sent to a Select Committee for comment.

Under the 1953 Patents Act invention is defined as 'any manner of new manufacture the subject of letters patent and grant of privilege within section 6 of the Statute of Monopolies and any new method or process of testing applicable to the improvement or control of manufacture; and includes an alleged invention'. The 1953 Act does not contain a list of excluded subject matter. As such, the fate of computer programs has been decided judicially. Under this provision, computer programs per se were excluded under the 1953 Act to the extent that they were mathematical algorithms as such. At the same time, however, it has been said that computer programs can be patented provided they produce a commercially useful effect.[416]

One of the changes proposed by Patents Bill (as revised) is the introduction of negative restrictions on patentable subject matter. In particular it has been proposed that computer programs be expressly excluded from protection[417]. The revised Bill excludes 'computer software' from a patentable invention. Following the approach in other jurisdictions this is not meant to mean that computer related inventions would also be excluded from patentable subject matter. According to the Committee that reviewed the Bill, this would not

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[416] Under the Patents Act 1953 mathematical algorithms as such are not patentable. They may be patented under the Patents Act when used in a computer, so long as they produce a commercially useful effect.

[417] Clause 15. The Committee recommended 'amending clause 15 to include computer programs among inventions that may not be patented. We received many submissions concerning the patentability of computer programs. Open source, or free, software has grown in popularity since the 1980s. Protecting software by patenting is inconsistent with the open source model, and its proponents oppose it. A number of submitters argued that there is no "inventive step" in software development, as "new" software invariably builds on existing software. They felt that computer software should be excluded from patent protection as software patents can stifle innovation and competition, and can be granted for trivial or existing techniques. In general we accept this position.'

mean that computer implemented inventions (embedded software would also be excluded). As the Committee said, this would be the case where computer software plays an integral role in the electronics it is supplied with (e.g. cars, pacemakers, telephones, and washing machines).

One of the problems identified by the Committee was the question of how excluded computer programs were to be distinguished from computer-related inventions. When discussing this change, the Committee said that 'After careful consideration we concluded that developing a clear and definitive distinction between embedded and other types of software is not a simple matter; and that, for the sake of clarity, a simple approach would be best. We received advice that our recommendation to include computer programs among the inventions that may not be patented would be unlikely to prevent the granting of patents for inventions involving embedded software. We recommend that the Intellectual Property Office of New Zealand develop guidelines for inventions containing embedded software'.

[3.48] Nigeria

Article 1(5) of the Patents and Designs Act Cap. 344 Laws of the Federation of Nigeria 1990 provides that 'principles and discoveries of a scientific nature are not inventions for the purposes of this Act'.

[3.49] Norway

Norway is a member of the EPC[418]. Patent law in Norway is governed by Act No. 9 of December 15, 1967 on patents (The Norwegian Patents Act). Section 1 of the Patents Act provides that within any technical field, any person who has made an invention which is susceptible of industrial application, or his successor in title, shall, in accordance with this Act, have the right on application to be granted a patent for the invention and thereby obtain the exclusive right to exploit the invention commercially or operationally. This is subject to the qualification that subject matters not regarded as inventions include anything which merely consists of:

1. discoveries, scientific theories and mathematical methods;
2. aesthetic creations;
3. schemes, rules or methods for performing mental acts, playing games or doing business, or programs for computers;
4. presentations of information.

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[418] As of 1 January 2008.

[3.50] Pakistan

Article 7(2) of the Patents Ordinance, 2000, provides that the following are not regarded as inventions and therefore, not patentable:

- a discovery, scientific theory or mathematical method;

- a literary, dramatic, musical or artistic work or any other creation of purely aesthetic character whatsoever;

- a scheme, rule or method for performing a mental act, playing a game or doing business;

- the presentation of information; and

- substances that exist in nature or if isolated therefrom.

[3.51] Paraguay

Article 3 of Law 1.630/00 (Paraguay), provides that 'new products and procedures that imply in an inventive activity and are subject to industrial application are patentable.[419] This is qualified by Article 4 which states that the following subject matter is not considered as inventions:

- mere discoveries, scientific theories, mathematical methods,

- purely aesthetic creations;

- economic, business, advertising or publicity or those purely mental or intellectual methods, schemes, plans, principles;

- computer programs considered separately;

- diagnosis, therapeutic and surgery (for people and animal treatments) methods and

- the different manners of reproducing information.[420]

[3.52] Peru

After the revocation of the *Decreto Legislativo* 823 of 1996, the prior Intellectual Property Law, by the *Legislative Decree Nº 1075*, on June 28, 2008[421], Peru is essentially ruled by the Andean

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[419] Ley 1.630/00 (Paraguay): 'Artículo 3°.- De la materia patentable. Serán patentables las invenciones nuevas de productos o procedimientos que impliquen una actividad inventiva y sean susceptibles de aplicación industrial'.

[420] Ley 1.630/00 (Paraguay): Artículo 4°.- De las materias excluidas como invención. No se considerarán invenciones, entre otros, los siguientes: a) los simples descubrimientos, las teorías científicas y los métodos matemáticos; b) las creaciones puramente estéticas; c) los esquemas, planes, principios o métodos económicos, de negocios, de anuncios o de publicidad y los referidos a actividades puramente mentales o intelectuales o a materia de juego; d) los programas de computación aisladamente considerados; e) los métodos de diagnósticos, terapéuticos, quirúrgicos para el tratamiento de personas o animales; y,f) las diferentes formas de reproducir informaciones'.

rules, as modified by the 2008 legislation and by Law 29316 of January 14, 2009 [422], amended as a result of the Free Trade Agreement with the United States [423].

The new legal environment provides that all fields of technology must be patentable, even though not diverging from the Andean text.[424] Peruvian law also provides that the following are not inventions:

- discoveries, scientific theories, and mathematical methods;
- plans, rules, and methods for the pursuit of intellectual activities, playing of games, or economic and business activities;
- computer programs or the logical support, as such
- methods for presenting information.

[3.53] Philippines

Section 21 of the Intellectual Property Code of the Philippines provides that 'any technical solution of a problem in any field of human activity which is new, involves an inventive step and is industrially applicable shall be patentable'. This is qualified by section 22 which states that the following shall be excluded from patent protection:

(1) Discoveries, scientific theories and mathematical methods;

(2) Schemes, rules and methods of performing mental acts, playing games or doing business, and programs for computers.

Section 22.2 of the Patent Office's *Manual for Substantive Procedure* provides that a 'computer program claimed by itself or as a record on a carrier, is not patentable irrespective of its content. The situation is not normally changed when the computer program is loaded into a known computer. If however 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. This means, for example, that program-controlled machines and program-controlled manufacturing and control processes should normally be regarded as patentable subject-matter. It follows also that, where the claimed subject-matter is concerned only with the program-controlled internal working of a known computer, the subject-matter could be patentable if it provides a technical effect'.

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[421]   http://www.indecopi.gob.pe/repositorioaps/0/10/par/leg_nornacio/decretolegislativo1075-c.pdf

[422] http://www.indecopi.gob.pe/repositorioaps/0/10/par/leg_nornacio/Ley29316.pdf

[423] 'Ley que modifica, incorpora y regula diversas disposiciones a fin implementar el Acuerdo de Promoción Comercial suscrito entre el Perú y los Estados Unidos de América.Publicada en el diario oficial El Peruano el 14 de enero de 2009.'

[424] Art.25A Patentabilidad. Sera patentable toda invención, ya sea de producto o de procedimiento, en todos los campos de la tecnología, siempre que sea nueva, tenga nivel inventivo y sea suceptible de aplicación industrial.

[3.54] Poland

Poland is a member of the EPC[425]. Patent law in the Republic of Poland is governed by Industrial Property Law (Journal of Laws of 2003, No 119, text 1117 and of 2004, No 33 text 286). Article 24 of this Law provides that 'Patents shall be granted – regardless of the field of technology – for any inventions, which are new, which involve an inventive step and are susceptible of industrial application'. This is qualified by Article 28 which states that the 'following in particular shall not be regarded as inventions within the meaning of Article 24:

(i) discoveries, scientific theories, and mathematical methods

(iii) schemes, rules and methods of performing mental acts, doing business or playing games

(v) programs for computers

(vi) presentations of information'.

While computer programs are treated as excluded subject matter, it is possible for computer-related inventions to qualify as patentable subject matter. The test used by Polish Patent Office to determine whether an invention is patentable subject matter is similar to the approach outlined in the UK in the decision of *Aerotel*[426] (discussed below). In particular, 'in order for the application to contain an invention the very solution [that the invention solves] has to be of technical character'[427] According to the Polish Patent Office, technical character is determined by reference to 'controllable natural forces' (which is similar to notion used in German jurisprudence). This explains 'why a claimed subject matter, which consists only of instructions performed by a conventional hardware for data processing, also called a computer program or a computer implemented solution, is not an invention in the sense of the patent law, irrespective of the from in which it is claimed'[428]

[3.55] Portugal

Portugal is a member of the EPC[429]. Article 52 of the Intellectual Property Code[430] provides that the following are not inventions:

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[425] As of 1 March 2004.

[426] Case G/08, 'Amicus Curiae Submission of the Patent Office of the Republic of Poland', 8 May 2009, 2.

[427] Case G/08, 'Amicus Curiae Submission of the Patent Office of the Republic of Poland', 8 May 2009, 3.

[428] Case G/08, 'Amicus Curiae Submission of the Patent Office of the Republic of Poland', 8 May 2009, 3.

[429] As of 1 January 1992.

[430] Approved by Decree-Law 36/2003 of 5 March and amended by Decree-Law 318/2007 of 26 September, Decree-Law 360/2007 of 2 November, Decree-Law 143/2008 of 25 July and Law 16/2008 of 1 April).

(a) Discoveries, scientific theories and mathematical methods;

(b) Materials or substances already existing in nature and nuclear materials;

(c) Aesthetic creations;

(d) Schemes, rules or methods for intellectual acts, playing a game or doing business and computer programs, as such, with no contributions;

(e) Presentations of information.

While computer programs, as such, without any technical contribution, are excluded from patentable subject matter under Article 52, a computer implemented invention may be patentable subject matter if it is 'a technical solution to a technical problem and has to involve technical considerations or represent a technical contribution in a technological domain'. An invention that shows technical character is an invention in any field of technology. According to the Portuguese Patent Office, this is take to mean that 'for technology, knowledge is the use of tools in all the practical services (trade services, craft services), as such with the capacity for adaptation or modification to the environment'. A technical problem is, therefore, a problem that appears in one or more technological areas, as a technical solution to the relevant problem a solution framed by the relevant areas. The technical considerations are the arguments, in the midst of the technical areas in question tending to show the relevance of the invention which presents a technical solution to a technical problem'. Following on from this, the Portuguese Patent Office uses 'the expression technical contribution to qualify an invention that presents a technical solution to a technical problem that goes beyond the general knowledge for the technical area in question'.

Where an application merely discloses the mere presentation of a programming code, in a specific programming language, it will be treated as a computer program as such. However, the written form of a claim can include the presentation of a computer program written in natural language or algorithm, which is essential to the functioning of the invention in question. On the basis that technical and non-technical characteristics can coexist in an invention, the Portuguese Patent Office says that a 'computer program can be claimed and patented, as long as it is not claimed as such and it presents technical character'. The key factor used to distinguish between computer programs as such and potentially patentable inventions that include a computer program is the presence of technical character. A computer program is said to have technical character 'if, when the computer is running, it produces or could produce an additional technical effect that goes beyond the mere physical effects (e.g. electrical currents in the computer) inherent in its execution. Additional technical effects are, for example, the control of a machine or an industrial process, as well as

the management of the resources of a computing system or the regulation of the transfer rate of data in a communication network'. Examples of technical characteristics in a computer-related invention include 'the processor, permanent physical support for data and programs (hard disc, CD), volatile memory (RAM), BUS and motherboard'. Thus, 'an executable program that only produces the expression of an idea, for example a mathematical theory would be non-patentable'. In contrast, 'a program to coordinate two memories, one small but fast and the other large but slow, so that if a process needs more space for addressing than the fast memory, it can be executed with the same speed as if the processed data were loaded entirely in the fast memory; in virtually increasing the used memory, the effect of the program is the necessary additional technical effect' would be patentable.

[3.56] Qatar

Article 4*(a)* of the Patents' Law, issued under Decree Law No (30) for the Year 2006 to Issue Patents' Law, provides that subject to the law hereby, patentability shall not include:

> (a) Scientific theories, mathematical methods, computer programs, exercise of pure intellectual activities, or practice of a specific game;

[3.57] Romania

Romania is a member of the EPC.[431] Patent Law in Romania is governed by the Patent Law No 64/1991 (amended in 2002 by Law No 203/2003, inter alia to take account of EPC). Article 7 of the Patent Law provides that a 'patent shall be granted for any invention having as a subject-matter a product or a process, in all technological fields, provided that it is new, involves an inventive step and is susceptible of industrial application'.[432]. This is qualified by Article 8 which says that the following in particular shall not be considered as inventions, within the meaning of Art. 7:

> (a) discoveries, scientific theories and mathematic methods;
>
> (b) aesthetic creations;
>
> (c) schemes, rules and methods for performing mental acts, playing games or
>
> doing business, as well as computer programs;
>
> (d) presentations of information.

The provisions of paragraph 1 shall exclude the patentability of the subject matters or activities referred to therein, only to the extent to which the patent application or patent relates to such subject-matter or activities as such.

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[431] As of 1 March 2003.

[432] See Marius Petroiu, 'Recent Developments in the Romanian Intellectual Property Legal Regime' (Sep 2003) Vol 10: 3 *E-Law* 1.

[3.58] Serbia

Patent law in Serbia is governed by the 2004 Patent Law[433]. Article 5 of the Patent Law provides that the following, in particular, shall not be regarded as inventions, within the meaning of this Law:

(1) discoveries, scientific theories and mathematical methods;

(2) aesthetic creations;

(3) schemes, rules and methods for performing mental acts, playing games or doing business;

(4) computer programs, and

(5) presentations of information.

This is subject to the proviso that the excluded activities are only excluded 'to the extent to which the application for a patent relates to the subject matter or activity as such'.

[3.59] Slovak Republic

Slovakia is a Member of the EPC.[434] Article 5(1) of the Patent Act provides that patents shall be granted for inventions from all fields of technology, which are new, involve inventive activity and are industrially applicable. [435] This is subject to Article 5(3) which says that the following shall not be regarded as inventions pursuant to paragraph 1:

(a) discoveries, scientific theories and mathematical methods,

(b) aesthetic creations,

(c) schemes, rules and methods for performing intellectual acts, games or business,

(d) computer programmes,

(e) presentation of information.

The exclusion set out in Article 5(3) is qualified in Article 5(4) which says that 'Subject-matters or activities stated in paragraph 3 shall be excluded from patentability only to the extent to which a patent application relates to these subject matters or activities'.

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[433] Official Gazette of Serbia and Montenegro, No. 15, 2 July 2004. Entered into force 10 July 2004.
[434] As of 1 July 2002.
[435]Act No. 435/2001 Coll. on Patents, Supplementary Protection Certificates and on Amendment of Some Acts in wording of the Act No. 402/2002 Coll.

[3.60] Slovenia

Slovenia is a member of the EPC. [436] Article 10(1) of the Industrial Property Act[437] provides that patents shall be granted for any inventions, in all fields of technology, which are new, involve an inventive step and are susceptible of industrial application. Article 10(2) provides that 'detailed conditions for the grant of patents in respect of individual fields of technology with certain technical or technological characteristics shall be defined by a decree issued by the Government of the Republic of Slovenia'. The scope of patentable subject matter is limited by Article 11(1) which states that 'Discoveries, scientific theories, mathematical methods, and other rules, schemes, methods and processes for performing mental acts as such shall not be considered inventions within the meaning of Article 10'.

[3.61] Singapore

Patent law in Singapore is governed by the Patents Act (chapter 221), which was enacted in 1994. When the Act was first passed, it included a list of excluded subject matter:

(a) a discovery, scientific theory or mathematical method;

(b) a literary, dramatic, musical or artistic work or any other aesthetic creation whatsoever;

(c) a 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.

These exclusions only related to subject matter "as such".

In 1995, the Patents Act was amended to remove the exclusion of computer programs from the types of subject matter that was excluded in the Act[438]. As a result of these changes, which came into force on 1 January 1996, computer programs are no longer explicitly excluded from patentable subject matter. While there has been some litigation in relation to computer related inventions, this did not consider the fate of computer programs as subject matter in the revised law.[439] While it might be assumed that in this situation Singaporean law in relation to computer programs would be decided judicially on the basis of common law rules, the position may be different given that the Legislature expressly removed the exclusion from the Patents Act in 1995.

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[436] As of 1 December 2002.
[437] Official Gazette RS, No 51/2006.
[438] Patents (Amendment) Act 1995. The changes were prompted, in part, by the United States of America-Singapore free-trade agreement (USSFTA).
[439] See *First Currency Choice v Main-Line Corporation Holdings* [2008] 1 *SLR* 335.

[3.62] South Africa

The subject matter exclusions in South Africa are set out in section 25(2) of the Patents Act 57 of 1978. This provides that anything which consists of:

(a)   a discovery;

(b)   a scientific theory;

(c)   a mathematical method;

(d)   a literary, dramatic, musical or artistic work or any other aesthetic creation;

(e)   a scheme, rule or method for performing a mental act, playing a game or doing business;

(f)   a program for a computer; or

(g)   the presentation of information,

shall not be an invention for the purposes of this Act.

The operation of section 25(2) is qualified by section 25(3) which adds that the provisions of subsection (2) shall prevent, only to the extent to which a patent or an application for a patent relates to that thing as such, anything from being treated as an invention for the purposes of this Act. It has been suggested that in some situations computer-related inventions may be patentable

[3.63] South Korea

Patent law in Korea is governed by the Patents Act[440]. According to Article 2(1), the term 'invention' means the highly advanced creation of technical ideas utilizing rules of nature. Thus, anything that does not fall under the definition of invention is non-patentable. According to the Examination Guidelines 'a computer program is a mere list of instructions to operate a computer. Therefore, a computer program is not considered as a statutory invention'. [441] While computer programs are not patentable subject matter, the Examination Guidelines suggest that computer implemented inventions may be patentable subject matter. In 'the case of an invention where a data processing process by a computer program is specifically executed using a hardware, a data processing unit (machine) operating in association with the computer program, its operating method, and a computer readable medium carrying the computer program thereon are viewed as statutory inventions. [442] In

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[440] Amended May 31, 2005.
[441] The Korean Intellectual Property Office, *Examination Guidelines: Requirements for Patentability* (January 2010), para 4.1.8, p 4.
[442] The Korean Intellectual Property Office, *Examination Guidelines: Requirements for Patentability* (January 2010), para 4.1.8, p 4.

line with this, it as been suggested that 'many patents directed towards "computer programs" have been issued'.[443]

[3.64] Spain

Spain is a member of the EPC[444]. Article 4 (2) of the Spanish Patent Law (Law 11/1986) provides that the following are deemed not to be inventions:

- Discoveries, scientific theories and mathematical methods
- Literature or artistic works or any other aesthetic creation as well as scientific works
- Plans, rules, and methods for carrying out intellectual activities, for games or for economic-commercial activities as well as computer programs
- Forms of presenting information

This is qualified by Article 4(3) which says that the provisions of the preceding section only excludes the therein mentioned inventions from patentability only as far as the subject matter for which a patent is being applied comprises on thereof.

While, following the EPC, computer programs as such are explicitly excluded from patentability, it has been said that 'computer-related inventions may be patentable provided they lead to a sufficient technical result'. In line with this it has been reported that the Spanish Patents and Trademarks Office has been 'granting domestic patents for subject matter becoming closer and closer to computer software'.[445]

[3.65] Suriname

Suriname applies the Patent Act in force in the Netherlands.

[3.66] Sweden

Sweden is a member of the EPC. [446] The Swedish Patents Act[447] excludes from patentable subject matter the following:

1. a discovery, a scientific theory or a mathematical method,
2. an aesthetic creation,
3. a scheme, rule or method for performing mental acts, for playing games or for doing business, or a computer program,

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[443] EPO, Patent Information East Asian Patent Information, FAQ, Korea.
[444] 1 October 1986.
[445] Spanish Group, 'AIPPI Report Q 158: The Patentability of Business Method Patents' (2004), 2.
[446] As of 1 May 1978.
[447] Act No. 837 of 1967, as amended by Acts Nos. 149 of 1978, 433 of 1983, 937 of 1984, 233, 1156 of 1986, 1330 of 1987, 296 of 1991, 1688 of 1992 and 1406 of 1993.

4. a presentation of information

According to the Swedish Patent Office while computer programs (as program code or algorithm) are captured by the exclusion, the exclusion does not apply to the procedure of operating a computer (that is, the procedure involved in the execution of the program in a computer). This means that it is possible to 'obtain a patent on the link of a computer program to a technical solution, i.e. the function, method or process that is the result of the program being run on the computer'.

As Swedish Patent Office says, while program code cannot be patented in Sweden, an invention of a technical nature that is/can be performed by a computer program may be patentable. More specifically, inventions, such as mobile phones, GPS navigation systems and various types of consumer electronics that use a computer, a computer network or other programmable device, and the invention has one or more distinctive features that are enabled wholly or partly by a computer program are not excluded.

This means that a program that controls physical processes, or processes physical signals, may be patentable. This would be the case where an invention uses a machine that is linked to a computer program that controls a process for making two differently coloured pills. If the function of the technical process is described in the patent application, the process is potentially patentable. In this situation the applicant would not only obtain protection for the specific computer program, but also for the use of other programs that would give the same result.

Some examples of technical solutions that utilise computer programs given by the Swedish Patent Office are 'reliable transfer of information through encryption, storing data according to a compression algorithm allowing for more information to be stored per unit of memory, a data transfer protocol that uses less bandwidth, a computer program that regulates the temperature in a building, and a computer program that enables a telephone switchboard to put through a phone call'.

[3.67] Switzerland

Switzerland is a member of the EPC. Patent law in Switzerland is governed by the *Federal Act on Patents for Inventions* and the *Ordinance on Patents for Invention*s. Article 1 of the Patent Act states that patents for inventions shall be granted for new inventions applicable in industry. This is qualified by the fact that the patent law excludes computer programs 'as

such'. As is common in EPC countries, however, computer programs integral to an invention can be patented (e.g., electronic control system) if they exhibit technical features and solve a technical problem.

[3.68] Taiwan

Patent law in Taiwan is governed by the 2003 Patent Act[448]. Article 21 of the Patent Act defines 'invention' as 'any creation of technical concepts by utilizing the rules of nature'. According to the Patent Office examination guidelines, laws of nature per se, pure discoveries, inventions violating the laws of nature, mere presentation of information, and mere processing by use of computers, do not fall within the definition of invention. The Guidelines also state that computer program works that protect the source or object codes of the relevant programs are protected by copyright, not patents. A computer-related invention will be patentable subject matter provided that 'the implementation of its algorithms, viewed as a whole, involves technical means of certain technical field'.[449] Inventions must have technical character; that is 'the means for resolving the problem must be technical means related to a certain technical field'.

[3.69] Thailand

Section 9 of the Patent Act B.E. 2522 (of 1979 (amended by the Patent Act (No 2) of 1992) excludes from protection:

- scientific or mathematical rules or theories: section 9(2)
- computer programs: section 9(3)

Given that the exclusion of computer programs is not qualified or limited to computer programs as such, questions have arisen as to whether section 9(3) also excludes computer-related inventions. Commentators have suggested that it does not.[450] It appears that while computer programs per se are excluded, that software-related inventions (such as a business method implemented in a computer) will be considered as patentable subject matter.[451]

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[448] Amended and Promulgated on 6 Feb 2003 by Presidential Decree Order No Hua-Tzung-1-YI-TZU-0920017760.

[449] Part II Substantive Examination of Invention Patent, Chapter 9, Computer Software Guidelines, 2-9-1.

[450] See Saravuth Pitiyasak, 'Thailand Debates software patents' (2002) *Managing Intellectual Property* 62.

[451] Chavalit Uttasart, 'AIPI Report Q 158: The patentability of Business Methods (Report of the Thai Group) (2004), 2.

[3.70] Tunisia

Article 2(c) of the Tunisian Law No. 2000-84 of August 24, 2000, on Patents provides that the following in particular shall not be considered inventions within the meaning of the first paragraph of this Article:

    (a)   …

    (b)   discoveries, scientific theories and mathematical methods;

    (c)   schemes, rules and methods intended for use:

        - in the performance of purely mental acts,

        - in games,

        - in the field of economic activity,

        - in connection with software;

    (d)   …

    (e)   presentations of information;

The exceptions to the provisions of the second paragraph of this Article with regard to the patentability of the subject matter listed shall apply only to that subject matter as such.

[3.71] Turkey

Turkey is a member of the EPC[452]. Article 6 of Decree Law No 551 Pertaining to the Protection of Patent Rights, excludes from patentability (inter alia):

(a) discoveries , scientific theories and mathematical methods

(b) plans, methods, schemes/rules and methods for performing mental acts, for conduting business/trading activity, and for playing games

(c) Literary and artistic works, scientific works, creations having an aesthetic characteristic, computer programs, and

(d) Methods involving no technical aspect, for collecting, arranging, offering/presenting and transmitting information/data

This is on the basis of them 'not being inventions as of their nature'. It has been suggested that the attitude within Turkey to the patentability of computer programs is very similar to that of the EU [EPC]'.[453]

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[452] 1 November 2000.

[453] Talat Kaya, 'Patantability of Computer Software under the TRIPS Agreement and its applications in the US, the EU and Turkey', (nd), 6.

[3.72] Uganda

Section 7(2) of the Patents Act Cap 216 of the Law of Uganda provides that the following (inter alia) shall not be regarded as inventions within the meaning of subsection (1) -

- discoveries and scientific and mathematical theories
- schemes, rules or methods for doing business, performing purely mental acts or playing game
- mere presentation of information.

[3.73] United Kingdom

The United Kingdom is a member of the EPC[454]. Patent law in the UK is governed by the 1977 Patents Act as amended. The 1977 Patents Act contains a non-exhaustive list[455] of creations which were deemed *not* to be inventions.[456] To this end section 1(2) (which is the equivalent of Article 52(2) EPC 2000) provides:

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

(a) a discovery, scientific theory or mathematical method[457];

(b) a literary, dramatic, musical or artistic work or any other aesthetic creation whatsoever;

(c) a 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 provisions shall not 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.

Over time, a number of different approaches have been taken towards computer programs as patentable subject matter. In the UK, the approach that is adopted when considering whether an invention falls within the scope of section 1(2)/Article 52(2) was set out by the Court of Appeal in the decision of *Aerotel v Telco Holdings*[458]. In this case, the Court of

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[454] As of 7 October 1977.

[455] See *Lux Traffic v. Pike Signals* [1993] *RPC* 107, 137ff.; *Christian Franceries/Traffic regulations*, T16/83 [1988] *EPOR* 65.

[456] G. Kolle, 'The Patentable Invention in the EPC' (1974) 5 *IIC* 140, 144.

[457] For a discussion of 'mathematical methods' see *Citibank v Comptroller General of Patents* [2006] *EWHC* 1676 (Ch), para 19 (concept did not merely operate at the rarefied atmosphere of calculus but also extended to 'lower levels': para 21).

[458] *Aerotel v Telco Holdings* [2007] 1 *ALL ER* 225, para 40.

Appeal said that to determine whether an invention falls within one of the excluded categories of subject matter, it was necessary to undertake four separate tasks. These are:

(1) Construe the claim,

(2) Identify the contribution,

(3) Ask whether the contribution falls within one of the excluded categories, and

(4) Check to see whether the invention is technical.

We will look at each of these in turn.

Step 1: Construe the claim

The first task that needs to be undertaken under the four-step test is that the claims need to be construed to determine the scope of the patented invention. While this may appear to be relatively inconsequential, it has proved to be crucially important in determining the validity of many patents. One of the first questions that arose in relation to section 1(2) was what happens if an application contains a mixture of both excluded and permitted features? What should be done, for example, if an invention includes as one of its elements a discovery or a computer program which is expressly excluded under section 1(2)/Article 52(2) as well as other non-excluded elements? Initially, discussions in this area focused on the meaning that should be given to the proviso to section 1(2)/Article 52(2) which states that the listed exclusions only apply to the extent that the alleged invention relates to that thing *as such*. Given the ambiguous nature of the proviso, it is not surprising that it lent itself to a number of different and sometimes conflicting styles of interpretation.[459] Despite initial doubts, courts in the UK have come down in favour of what is known as the 'whole-contents' approach to interpretation.[460] This means that when considering whether an invention falls foul of section 1(2), the courts disregard the fact that the invention has as one of its elements say a computer program or a discovery and focuses instead on the invention *as a whole*. In so doing the courts have reinforced the fact when determining whether an invention is patentable it is not necessary to compare the non-technical and the technical elements of the invention. That is, it is irrelevant that an invention is made up of a mixture of technical and non-technical elements.[461]

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459 It was initially suggested that when determining whether an invention falls within PA s. 1(2)/EPC Art. 52, the courts should separate the excluded and non-excluded elements of the application and focus only upon the non-excluded components. *Merrill Lynch's Application* [1988] *RPC* 1.

460 In the UK see *Merrill Lynch Application* [1989] *RPC* 561 (CA); *Genentech v. Wellcome* [1989] *RPC* 147, 204–14, 224 ff. At the EPO see *Vicom/Computer-related invention*, T208/84 [1987] *OJEPO* 14; [1987] *EPOR* 74; *Kock & Sterzel/X-ray apparatus*, T26/86 [1988] *EPOR* 72; [1988] *OJEPO* 19.

461 *Kock & Sterzel/X-ray apparatus*, T26/86 [1988] *EPOR* 72; [1988] *OJEPO* 1; *Pension Benefit Systems Partnership*, T931/95 [2001] *OJEPO* 441, 450 (TBA); Cf. *IBM/Text clarity processing*, T38/86 [1990] *EPOR* 606.

Step 2: Identify the contribution

While the whole-contents approach offers guidance where a patent is made up of a mixture of excluded and non-excluded elements, it offers little assistance on the more general question as to how the invention ought to be interpreted. In thinking about the nature of the invention a number of different approaches could have been adopted. The courts could, for example, have attempted to distil the essence or kernel of the invention from the claims themselves. One of the interesting features of the way the invention has been interpreted by courts in the UK and the EPO (pre-*Pension Benefits*) is that rather than attempting to identify the essential nature of the invention, they have focused on what the invention does. That is, when determining whether an invention falls within section 1(2)/Article 52(2) the courts have concentrated upon the *contribution* or *effect* that the invention has upon the known art (or knowledge in the area in question). This is now set out in the second step in the *Aerotel* test, where the court is required to identify the contribution made by the invention.

One of the problems that needs to be confronted when identifying the contribution made by an invention is that applicants may attempt to describe an invention which prima facie falls foul of section 1(2) in such a way that it appears to fall outside the scope of the excluded categories. Faced with the possibility of applicants dressing non-patentable inventions up in a way that makes them appear as if they are patentable, the courts have responded by ignoring the *form* of the claims and focusing instead on the *substance* of the invention.[462] In *Aerotel*, the Court of Appeal accepted that the test is an exercise in judgement, involving the problem to be solved, how the invention works, what its advantages are. They also said that the second step was best summed up by the question: what has the inventor really added to human knowledge?[463]

Step 3: Determine whether the contribution falls within the excluded subject matter

Once the contribution made by an invention has been identified, the court then needs to consider whether that contribution falls within any of the categories of excluded subject matter set out in section 1(2). The way that that this question is answered largely depends on the way that the specific forms of subject matter listed in section 1(2) are interpreted.

The first point to note about the third-stage test is that because of the uncertainty that existed about the rationales behind the excluded categories, the Court of Appeal said that

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462 Ibid. (Fox LJ); *IBM/Document abstracting and retrieving*, T22/85 [1990] *OJEPO* 12; [1990] *EPOR* 98, 105.
463 *Aerotel v Telco Holdings* [2007] 1 *ALL ER* 225, para 43-44.

the third step should be carried out without bias either in favour of or against exclusion. Instead, the task was simply to try and make sense of the provisions using the language used in the legislation.[464]

In many cases it will be relatively easy to ascertain whether an invention falls within one of the excluded categories of subject matter. In some cases, however, it is difficult to predict whether a particular invention will fall within the ambit of section 1(2). It was this problem that led the courts to use 'technical effect' as a de facto test for deciding this aspect of patentability in the first place. Prior to the *Aerotel,* British courts followed the approach at the EPO and used physical change as a way of determining whether an invention was 'technical' and thus whether it fell within excluded subject matter. One of the questions that arises post-*Aerotel* is whether a similar approach will now be followed when deciding the third step. Given the Court of Appeal's statement that it was merely reformulating rather than changing the existing law, it may be safe to assume that technical effect and physical change would still be used to decide whether an invention is excluded by section 1(2)/Article 52(2). Against this, however, is the fact that in reformulating the law the Court of Appeal downplayed the role that 'technical character' plays in determining whether an application is excluded. Instead of being used as a way of deciding whether an invention was excluded, technical character has been relegated to the role of a final cross-check in the four step test[465]. The downplaying of 'technical effect' as a tool for determining whether an invention complied with section 1(2)/Article 52(2) coincided with the argument, initially made by Pumfrey J, but followed by others, that the technical contribution test needed to be qualified. In part, this was prompted by the realisation that the word 'technical' was inherently vague (which is not surprising given that it is meant to act as a proxy for the equally vague 'invention').[466] The potential change in the law was highlighted by Warren J. in *IGT v Comptroller of Patents* who said that after *Aerotel* 'the issue of what is "technical" is of much less importance than in the past since that aspect ought to have been dealt with in looking at the third step. The ultimate question in each of the present application is not whether a contribution is technical, but whether it lies in an excluded area'[467]. This view also found favour with Kitchin J in *Astron Clinica v Comptroller General of Patents* who said that

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[464] *Aerotel v Telco Holdings* [2007] 1 *ALL ER* 225, para 21.

[465] As Pumphrey J noted, although the test is sometimes called the 'technical effect approach', the word 'technical' does not appear until the fourth and final stage: *IGT v Comptroller of Patents* [2007] *EWHC* 134, para 13.

[466] See, eg, *IGT v Comptroller of Patents* [2007] *EWHC* 134, para 13; *CFPH LLC v Comptroller-General of Patents, Designs, and Trade Marks* [2006] *RPC* 259 ('technical is ' a useful servant but a dangerous master'; *Aerotel v Telco Holdings* [2007] 1 *All ER* 225, para 121-24.

[467] [2007] *EWHC* 134, para 39. See also *Re Oneida Indian Nation's Application* [2007] *EWHC* 954 (Pat), para 9.

'[t]aken together, the first three steps should provide the answer' as to whether an invention fell within the scope of section 1(2) 'with the important benefit that they avoid the vexed question of what is a relevant "technical" contribution'[468]. The idea that the technical character test and the corresponding use of physical change are not as important after *Aerotel* is also supported by Jacob LJ's argument in the case that the various forms of excluded subject matter are not united by the common theme that they are abstract and intellectual in nature which, as we saw above, was used to justify the technical contribution test in the first place.

Despite this, one of the notable features of the way that British courts have answered the third question in *Aerotel* – namely, does the contribution fall within section 1(2) -- is that they have resorted to some, but not all, of the practices that had been used previously. In particular, while the courts have been careful not to ask does the invention exhibit 'technical character', they have relied upon physical change as a way of helping to determine whether an invention falls within one of the excluded categories. That is, the courts have skipped 'technical character' and gone directly to 'physical change' as a way of determining whether an invention falls within section 1(2)/Article 52(2). This can be seen, for example, in *Aerotel* where one of the factors that seemed to sway the Court of Appeal in finding that the application for a new system for making of telephone calls was not a method of doing business was that the invention consisted of a 'new physical combination of hardware'[469]. A similar approach was adopted in *IGT v Comptroller of Patents*, where the Warren J rejected the application on the basis that there was no new physical combination of hardware: instead, the 'novelty lay in the computer program'[470]. Another example of the way that physical change has been used to help decide whether an invention falls within section 1(2)/Article 52(2) is *Cappellini v Comptroller of Patents.* While Pumfrey J. stressed that he did not think that 'every result must be a physical article before the claim is allowed', he did reject a claim in the application in question on the basis that it was the 'pure manipulation of data without the production of any physical or real world effect'[471]. Pumfrey J highlighted the important role that physical change plays in answering the third Aerotel question when he said: while a claim to an algorithm standing alone may be objectionable, this would not be the case if the claim was tethered to a physical article. Using the language of *Aerotel*,

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[468] *Astron Clinica v Comptroller General of Patents* [2008] *EWHC* 85, para 45. (Pat)

[469] *Aerotel v Telco Holdings* [2007] 1 *ALL ER* 225, para 40, 53. The fact that the invention involved the use of an apparatus was taken to show that the invention was technical. Ibid. *IGT v Comptroller of Patents* [2007] *EWHC* 134, para 35.

[470] *IGT v Comptroller of Patents* [2007] *EWHC* 134, para 35.

[471] Cappellini v Comptroller of Patents [2007] EWHC 476, para 18. See also Re Oneida Indian Nation's Application [2007] EWHC 954 (Pat), para 9.

Pumfrey J said that 'there is no contribution lying outside excluded matter until the claim also covers the result of performing the claimed algorithm'[472].

While the British courts post-*Aerotel* have embraced physical change as a guide to determine whether an invention falls within section 1(2), they have been careful to distance themselves from some of the more liberal readings at the EPO (which we discussed above). For example, in *Shopolotto.com's Application*, Pumfrey J. cast doubt over the Technical Board's decision in *IBM/Computer Program II*[473], which held that material technical effect was found 'only in computer once programmed with the claimed software'.[474] In so doing, Pumfrey J. reinforced a more traditional (empirical) understanding of the invention that has long dominated in British patent law.

Step 4: Check whether the contribution is technical in nature

The fourth and final step that needs to undertaken under the *Aerotel* test is that the court needs to ask whether the contribution is technical in nature. Prior to *Aerotel,* technical effect was an integral part of any determination of whether an invention fell within one of the excluded categories. It was something that went hand-in-hand with the examination, rather than something which was undertaken after the event. In explaining the operation of the four-step test, the Court of Appeal in *Aerotel* said that the fourth step may not be necessary because it should have already been covered by the third step (lending credence to the view that (relevant) 'technical' effect has a place to play in construing the meaning of the excluded categories). While some of the decisions applying *Aerotel* seemed to have slipped back into the 'old' approach whereby the third and fourth steps were integrated (or simply paid lip service to the final task), it is too early to suggest that the third and fourth steps should be merged into a single test. In the meantime, it seems as if the approach that was adopted prior to *Aerotel* is still relevant. The only qualification that may need to be kept in mind is that the courts have begun to talk about the need for an invention to show *relevant* technical effect. This has been promoted by the realisation that as most computer-related inventions are technical in nature, if technical character was used as a shorthand for determining whether an invention fell within one of the excluded categories this would have meant that most inventions would have satisfied the subject matter requirement. Faced with this problem, Pumfrey J. suggested that not all technical effects are relevant, and in particular that where computer programs are under consideration, the fact that a computer with

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[472] *Cappellini v Comptroller of Patents* [2007] *EWHC* 476, para 8.
[473] T0935/97
[474] *Shopolotto.com's Application* [2006] *RPC* 29, para 11.

ex hypothesi new program will be a new machine and so have a technical effect … the technical effect to be identified had to be technical effect over and above that to expected from the mere loading of a program into a computer'.[475] In a similar vein, it was also said that in 'one sense computer programs are 'technical' but they are also excluded from being inventions'[476]. The attempt to qualify the *type* of technical character needed to ensure that an invention does not fall within section 1(2)/Article 52(2) is an interesting development that needs to be watched in the future. While the EPO has taken a different course (to achieve a similar result), Pumfrey J's approach deals directly with the issue that has driven a lot of the law in this area, namely how to reconcile the fact that computer-related inventions are an essential form of technology with the fact that computer programs *as such* are explicitly excluded from the scope of protection.

While the Court of Appeal expressly said that it was reformulating rather than changing the law in this area, nonetheless following *Aerotel,* in November 2007 the UK Intellectual Property Office changed its practice in relation to the patenting of computer programs , and reverted back to its old practice of rejecting all computer program claims[477]. The question of whether the Intellectual Property Office's reading of *Aerotel* was correct was raised in the first instance decision on *Astron Clinica v Comptroller General of Patents.* In this case, *Kitchin* J. considered whether *Aerotel* prohibited the patenting of all computer programs and in particular those which would have been considered under the old approach to make a conventional computer operate in a new way so as to deliver a relevant technical contribution[478]. For various reasons, Kitchin J said that he thought that the approach that had been adopted at the Intellectual Property Office after *Aerotel* was incorrect: instead, he inclined more to the approach that had been set out in the 1999 Practice Notice.

Kitchin J noted that the Court of Appeal in *Aerotel* had been critical of the EPOs adoption of the 'any hardware approach'. The Court of Appeal had also been critical of the practice of focusing on form rather than substance that had developed at the EPO (particularly in relation to the distinction that had been drawn between a program as a set of instructions

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[475] *Shopolotto.com's Application* [2006] *RPC* 29, para 9. See also *Cappellini v Comptroller of Patents* [2007] *EWHC* 476, para 5 (noting that the Court of Appeal did not disprove of this statement). In *Re Oneida Indian Nation's Application* [2007] *EWHC* 954 (Pat), para 13, it was said that Pumfrey J's statements were entirely consistent with the judgement in *Aerotel*.

[476] *Re Oneida Indian Nation's Application* [2007] *EWHC* 954 (Pat), para 12 (it does not follow, just because [a] system of gaming machines is technical, that everything they do (eg tracking and controlling the operation of the system) is technical *in the sense required'*.

[477] Intellectual Property, *Practice Notice* (2 Nov 2006). On this see *Astron Clinica v Comptroller General of Patents* [2008] *EWHC* 85, para 46.

[478] *Astron Clinica v Comptroller General of Patents* [2008] *EWHC* 85, para 46.

and a program on a carrier). Nonetheless, Kitchin J. did not see anything in the judgement that suggested that all computer programs were necessarily excluded. In particular, he said that there was nothing to suggest that the Court of Appeal had any doubts about the earlier *IBM* decisions. As Kitchin J. said, the approach outlined in *Aerotel* was consistent with the reasoning of the Board of Appeal in the IBM decisions.[479] On the basis that the Court of Appeal had set out to re-order rather than change the test in *Merrill Lynch*, Kitchin J also said that the new approach should produce the same result as had been obtained under the old approach.[480] Applying the *Aerotel* test to a computer-related invention which produces a substantive technical contribution, Kitchin J said that the application of the second stage in *Aerotel* will identify that contribution, while the application of the third step will lead to the answer that the invention does not fall wholly within excluded matter. Importantly, Kitchin J said that the way that the Aerotel tests are answered would be the same 'irrespective of whether the invention is claimed in the form of a programmed computer, a method involving the use of that programmed computer, or the program itself'[481]. As Kitchin J said, the court in *Aerotel* concluded, as it had done in *Merrill Lynch* and *Gale,* 'that a computer program remained just that, whether in abstract form or embodied in a storage medium or in a computer'[482]. This meant that if 'a conventional computer programmed with … a new program is patentable because it is no longer a computer program as such then … the same reasoning must apply to the program itself. It is in the program that the technical advance truly lies'[483]. From this basis, Kitchin J concluded that 'where claims to a method performed by running a suitably programmed computer or to a computer programmed to carry out the method are allowable, then, in principle, a claim to the program itself should also be allowable'[484].

Following the clear statements by Kitchin J. in *Astron Clinica,* in February 2008 the Intellectual Office issued a statement saying that it was going to replace aspects of the Practice Notice issued in November 2007[485]. While the original 2007 Practice Notice said that claims to computer programs or to programs on a carrier were not patentable, the 2008

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[479] They had also been followed by the 2007 Board of Appeal decision of *Tao Group Limited* (2007) T121/06.

[480] *Astron Clinica v Comptroller General of Patents* [2008] *EWHC* 85, para 49. Kitchin J. also said that the question of the patenting of computer programs did not arise in either Aerotel or Macrosson's inventions (para 47).

[481] Ibid para 49.

[482] *Astron Clinica v Comptroller General of Patents* [2008] *EWHC* 85, para 41. (Pat)

[483] Ibid.

[484] Ibid, para 50. Kitchin J said that he thought that the decision was consistent with *Oneida Indian Nation's Application* [2007] *EWHC* Civ 0954 (pat)

[485] Director of Patents, 'Patents Act 1977: Patentable Subject Matter' (7 February 2008)

revision, which came in operation on 7 February 2008, follows the approach in *Astron Clinica.* As a result of the 2008 revisions, the 2007 Practice Notice now says: so long as a claim to a computer program is drawn to reflect the features of the invention which would ensure the patentability of the method which the program is intended to carry out when it is run, examiners will no longer reject to claims to a computer program or a program on a carrier. In so doing the changes made to the 2007 Practice Notice not only applies the decision of Kitchin J., it also re-opens the door to the patenting of computer programs per se in the UK[486].

The status of computer programs as patentable subject matter was revisited by the Court of Appeal in 2008 in the decision of *Symbian Ltd's Application*.[487] The invention in question related to how a library of functions useable by multiple application programs running on a computer is accessed. Specifically, the invention 'provides a way of indexing the library functions so that the computer will continue to work reliably after changes are made to the library'. In considering whether these claims fell foul of section 1(2), the Court of Appeal in Symbian applied the 4-step test set out in *Aerotel* (but stressed that the test needed to be applied in the circumstance as relevant). While the Court of Appeal noted the uncertainty that surrounded the meaning of technology, they stressed that the patentable subject matter was to be determined on the basis of whether the application made a technical contribution to the state of the art. Applying this test the Court of Appeal held that the contribution was not a computer program as such. More specifically, the Court of Appeal held that the invention did not fall within excluded subject matter 'because it the knock-on effect if the computer working better as a matter of practical reality'. As well as reinforcing the importance of the *Aerotel* test, the Symbian decision is also important because it further clarified what British patent law means by 'technical'. It had previously been accepted that an invention which solves a technical problem external to a computer or solves a technical problem within a computer were not excluded[488]. The Court of Appeal extended the scope of protection when they said that a 'computer running faster or more reliably may be considered to provide a 'technical contribution' even if the invention solely addressed a problem in the programming'.[489]

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[486]   For a summary of the recent law and an example of a situation where claims were rejected see:
    Autonomy Corporation v Comptroller General [2008] EWHC 146 (Pat).
[487] [2008] EWCA Civ 166.
[488]   IP Office 'Patents Act 1977: Patentability of Computer Programs' Practice Notice (8 Dec 2008),
    para 5.
[489]   Symbian Ltd v Comptroller General of Patents [2008] EWCA Civ 1066, para 55. See also Opinion
    on behalf of AIPPI in EPO Case G3/08 (29 April 2009), 11.

A further Practice Notice was issued on 8 December 2008 following the Court of Appeal decision in *Symbian*. This notice, which is to be read in conjunction with the Notices from November 2007 and 7 February 2008, clarifies that IP Office will continue to apply the 4 step *Aerotel* test. The Notice also reiterated that while an invention involving a computer is undoubtedly technical, in law the mere presence of conventional computing hardware does not of itself mean an invention makes a technical contribution and so avoids the computer program exclusion' [490]

Although British courts have adopted a more liberal approach to the patenting of computer programs than might have been envisaged when the 1977 Act was passed, nonetheless there are still some important limitations. While the extent to which computer-related inventions will be patentable always depends on the particular application in question, it can safely be said that in the UK an ordinary computer program used in a general-purpose computer would normally be unpatentable. The reason for this is that while the implementation of the program in a computer transforms mathematical values into electrical signals, the electrical signals amount to no more than a reproduction of information which would not be regarded as bringing about a technical effect.[491] It also seems clear that the mere inclusion of a program on a carrier is not enough to circumvent the exclusion: more is needed such as a change in speed with which the processor works[492]. This was reinforced in another post-*Aerotel* decision which concerned an invention for inventory management (that consisted of databases that contained both textual and pictorial information). In rejecting the application, the court said that 'the result is not a new combination of hardware as in *Aerotel*. Nor is an improved computer or an improved display as in *Vicom*. The result is a computer of a known type operating according to a new program, albeit one which reduces the load on the processor and makes an economical use of the computer memory'[493]. On this basis the application was held to be a computer program and as such excluded under section 1(2).

While decisions such as Symbian have brought the UK closer into line with EPO (at least in terms of subject matter), there still remains an important difference in the approach that is taken to subject matter questions. While initial reactions in the United Kingdom to the

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[490] IP Office 'Patents Act 1977: Patentability of Computer Programs' Practice Notice (8 Dec 2008), para 6.
[491] *Kock & Sterzel/X-ray apparatus*, T26/86 [1988] *EPOR* 72.
[492] Ibid para 54. see also Aerotel para 92.
[493] *Raytheon v Comptroller of Patents, Designs and Trade Marks* [2007] *EWHC* 1230.

'hardware approach' currently used at the EPO were mixed[494], in *Aerotel* the Court of Appeal clearly rejected the any hardware approach, suggesting that it 'must be wrong' and that it was 'not intellectually honest'[495]. Jacob LJ also said that *Pension Benefits*, and like-minded decisions at the EPO, were based on the mistaken assumption that the various categories of excluded subject matter were all limited to something abstract or intangible[496]. This reflects earlier criticisms of *Pension Benefits* that it runs contrary to a number of Court of Appeal decisions in the United Kingdom that had held that claims directed to a system (hardware or apparatus) did not avoid the terms of section 1(2).[497] The Board's decision was also criticized because it contradicts the established British view that questions of patentability should be decided as a matter of substance and not according to the actual form of the words[498]. Given that many of the applications excluded under section 1(2) via the *Aerotel* approach would be excluded under the any hardware approach because they lack inventive step, it is unlikely that the new approach will lead to different results[499]. This was reflected in Pumfrey J's

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[494] In one Patent Office decision, the *Pension Benefits* approach was used to decide whether an application for 'behaviour modification' fell within section 1(2). *John Edward Rose*, O/075/01 (14 Feb. 2001) (As in *Pension Benefits*, the application was eventually excluded on the basis that it lacked inventive step). *cf Pintos Global Service's Application*, O/171/01 (6 Apr. 2001) (Patent Office); *Hutchins' Application* [2002] *RPC* 8; *James Shanley*, O/422/02 (16 Oct. 2002) (Patent Office) which expressly rejected the *Pension Benefits* approach.

[495] *Aerotel v Telco Holdings* [2007] 1 *ALL ER* 225, para 27 -29. Jacob LJ's argument in this regard are far from convincing. In particular, it is difficult to imagine an application for an iPod loaded with a new piece of music being non-obvious. Interestingly, most of the criticisms of the EPO decisions are in relation to the way that they applied inventive step, rather than how they approach excluded subject matter.

[496] Ibid, para 30. Jacob LJ continued saying 'We have already observed that the categories are disparate with differing policies behind each. There is no reason to suppose there is some common factor (particularly abstractness) linking them. The travaux prepatoires at least confirm this'. Ibid.

[497] *Merrill Lynch's Application* [1989] *RPC* 561 (CA) (not possible to patent under the guise of an article which contains that item); *Fujitsu's Application* [1997] *RPC* 608 ('the fact that the invention was claimed as a method, a way of manufacture or an apparatus was irrelevant when the only invention claimed revolved around the use of a computer program'). Cf. 'A computer system suitably programmed for use in a particular field, even if that use, for example, the field of business and economy, has the character of a concrete apparatus, in the sense of a physical entity or product and is thus an invention within the meaning of Article 52(1)'. EPO Guidelines C-IV, 2.3.

[498] This has led the Patent Office to conclude on a number of occasions that it is bound to follow the contribution approach set out in UK courts, and not the approach advocated in *Pension Benefits* See, e.g. *Hutchins' Application* [2002] *RPC* 264, 270 (Patent Office); *Pintos Global Application*, O/171/01 (6 Apr. 2001), paras. 20–29.

[499] The nature of the change brought about by *Pension Benefit*, and the impact it has on the way a patent is examined, can be seen in the Patent Office decision of *James Shanley*, where the contribution approach and the *Pension Benefits* approach were applied to the same facts. *James Shanley*, O/422/02 (16 Oct. 2002), (Patent Office.[499] The invention in question was for demountable partitions for buildings (that included both flat and curved panels). Using the contribution approach, the Hearing Officer said that the contribution made by the invention was wholly aesthetic insofar as it was solely directed 'to altering appearances'. As the invention neither solved a technical problem nor made a contribution in a non-excluded field, the application was excluded by section 1(2)(b). The Hearing Officer then went on to consider how the invention would have fared under the *Pension Benefits* approach. After reviewing the Technical Board's decision, the Hearing Officer said that 'what is claimed is a partition for buildings, and since this, taken as a whole and without regard to whether or

comment that *Pension Benefits* was the correct result, but by the wrong approach[500]. Given that any hope that there might have been of the Enlarged Board of Appeal at the EPO resolving this issue has not eventuated, it seems that the divergence is set to continue.

[3.74] United States

The fate of computer programs and computer related inventions has changed in the United States[501]. Over the last three decades US Courts, along with the US Patent and Trade Mark Office, have changed the way that they approach patentable subject matter: both in terms of what is excluded and also in terms of the test that is used to determine what is excluded.

Patent statutes in the United States are based on U.S. Constitution Art. I, § 8, cl. 8. This states that 'Congress shall have power ... [t]o promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries.' US patent law provides that 'Whoever invents or discovers any new and useful process, machine, manufacture of composition of matter … may obtain a patent thereof'[502]. Three categories of invention are said to arise under this definition: (1) material elements (2) processes and (3) improvements thereof. There is no express legislative exclusion of computer programs from patentable subject matter in America patent legislation. Instead, the fate of computer programs as patentable subject matter is dealt with on the basis of a mixture of statute and case law.

When computer software was first considered in the United States, it was widely said not to be patentable. This was on the basis that computer software is often abstract, 'being little more than an algorithmic representation of basic mathematical principles'.[503] This was based on the longstanding view that abstract ideas are not patentable The exclusion of computer programs from patentable subject matter was adopted in the 1965 Presidential Commission on the Patent System which recommended against patent protection for computer

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not any technical contribution is involved, manifestly has a technical character . . . I would have to find that what is claimed . . . is an invention under section 1(2)'. As the Officer was bound by UK decisions, he did not follow the *Pension Benefits* approach: Ibid., para. 22. The interesting question here is whether the application would have satisfied the requirements of inventive step.

[500] *Cappellini v Comptroller of Patents* [2007] *EWHC* 476, para 9.

[501] For overview see *Patent Law Fundamentals* (second edition), (West, 2010) Volume 2, section 7-5 (7-21-7-34-14).

[502] 35 USC §101.

[503]   James Bessen and Robert M. Hunt, 'An Empirical Look at Software Patents' (2007) 16:1 *Journal of Economics and Management Strategy* 157, 157-58.

programs[504]. This view was reinforced in the 1970s when 'the Patent Office and the courts applied very restrictive rules towards granting and upholding patents that included computer programs'.[505] This is reflected in the 1972 Supreme Court decision of *Gottschalk v. Benson*[506], which held that computer program implemented a mathematical algorithm. By granting a patent the algorithm would effectively be monopolized.[507] As we will see, the importance of the exclusion of abstract ideas was reconfirmed in the 2010 Supreme Court decision of *Bilski v Kappos* which rejected the patent in question on the basis that it claimed an abstract idea.[508]

While computer programs per se were regarded as non-patentable subject matter, American patent law took a different approach to computer-implemented inventions. Indeed as the US Supreme Court said in the 1981 decision of *Diamond v. Diehr*[509], while software per se is not patentable, in certain situations a process that incorporates software can be patented. More specifically the Court said that 'the mere use of a mathematical algorithm or computer program would not prevent an invention from being patented. The decisive test is whether the invention involves the "transformation and reduction of an article into a different state or thing"'. While the distinction that was drawn between computer programs qua algorithms as excluded subject matter and inventions that incorporate or utilize a computer program as potentially patentable subject matter remains in place, the way that the line is drawn between has changed.

One of the important early tests used to determine patentable subject matter for computer related inventions was the so-called Freeman-Walter-Abele test, which was developed in the early 1980s[510]. Under this test, the court asked two questions:

(i) Is a *mathematical algorithm* recited or indirectly in the claim? *and*

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[504] The Presidents Commission on the patent System: To Promote the Progress of ... Useful Arts in an age of Exploding Technology' (1966), 13.

[505] James Bessen and Robert M. Hunt, 'An Empirical Look at Software Patents' (2007) 16:1 *Journal of Economics and Management Strategy* 157, 158. See P. Samuelson, 'Benson Revisited: The case against patent protection for algorithms and other Computer Program related inventions' (1990) 39 *Emory Law Journal* 1025.

[506] 409 U.S. 63, (1972).

[507] See P. Samuelson, 'Benson Revisited: The case against patent protection for algorithms and other Computer Program related inventions' (1990) 39 *Emory Law Journal* 1025, 1093-4. While Benson is sometimes cited to support the idea that software was not patentable, the court expressly said: "It is said that the decision precludes a patent for any program servicing a computer. We do not so hold' (409 US 63, 71).

[508] *Bilski v Kappos* 561 US (2010), page 13.

[509] 450 U.S. 175 (1981).

[510] See *In re Freeman*, 573 F.2d 1237 (C.C.P.A. 1978); *In re Walter*, 618 F.2d 758 (C.C.P.A. 1980); In re Abele, 684 F.2d 902 (C.C.P.A. 1982).

(ii) If so: is the claimed invention as a whole no more than the algorithm itself, i.e. is the algorithm not applied to *physical* elements of process steps?

If both of these questions were answered affirmatively, the subject matter was excluded.

After finding favour for a period of time, the Freeman-Walter-Abele test began to be criticized; often on the basis that the criteria of physicality embodied in the test discriminated against information technology-related inventions. The criticisms made of the Freeman-Walter-Abele test were echoed in the 1994 decision of *In re Alappat*[511], which marked the beginning of a more liberal approach towards excluded subject matter in the United States. The invention in question in this case was for a 'smooth display of data on an oscilloscope screen, so that there are no 'physical elements or process steps'. In considering the standing of the invention, the Court of Appeal of the Federal Circuit said that the key test for distinguishing between excluded subject matter and inventions that include excluded computer programs per se and inventions that happened to include computer programs per se was whether 'an invention as a whole concerns a disembodied mathematical concept'. If so, then subject matter is excluded. However, if the invention produces a 'useful, concrete and tangible result' there is no objection against patentability.

The test set out in *In re Alappat* was applied in the 1998 *State Street Bank* decision (which concerned a computer-based system for the pooling of mutual funds into a common investment fund which produced economies of scale and tax benefits)[512]. The Court, again, rejected the Freeman-Walter-Abele test and instead applied the test set out *in re* Alappat. While *State Street Bank* was limited to apparatus claims the standing of the 'useful, concrete and tangible result' was subsequently extended and reinforced in *AT & T v Excel Communications* when the Court applied the test to process claims. Several subsequent decisions expanded on this holding and on the ability to patent processes in which the only inventive component is software.

For a period of time, the decisions of *In re Alappat* and *State Street Bank* acted as a benchmark for the way that computer programs and computer-related inventions were not only dealt with in the United States, but also in many other jurisdictions around the world. While the approach set out in these decisions may still be followed in some jurisdictions outside of the United States, there have been important changes in the way that American patent law decides patentable subject matter.

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[511] 33 F 3d 1526 (Fed Cir 1994).
[512] *State Street Bank v. Signature Financial Group*, Inc., 149 F.3d 1368 (Fed. Cir. 1998).

The standing of the machine-or-transformation test outlined in the *State Street Bank* decision was called into question in 2008 by the Court of Appeals for the Federal Circuit decision of *In re Bilski*.[513] In this case, which concerned an application for a risk-management method, the United States Court of Appeals for the Federal Circuit rejected the 'useful, concrete and tangible result' test. Instead the court utilized the machine-or-transformation test and said that 'A claimed process is surely patent-eligible under §101 if: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing'. The decision, which has been reaffirmed and extended in subsequent decisions,[514] went on appeal to Supreme Court of the United States, which handed down its long awaited decision of *Bilski v Kappos* in June 2010[515]. While the Supreme Court affirmed the Federal Circuit's finding that the risk-management method was not patentable subject matter, they did so on different grounds. In particular, rather than using the machine-or-transformation test, all of the members of the Supreme Court agreed that 'the patent application at issue' fell 'outside of §101 because it claims an abstract idea'.[516]

Initial comments on the decision have been critical, particularly in so far as it fails to provide the guidance so many had hoped for in relation to patentable subject matter[517]. This can be seen in the Justice Kennedy's comment that the 'patent application here can be rejected under our precedents on the unpatentability of abstract ideas. The Court, therefore, need not define further what constitutes a patentable "process," beyond pointing to the definition of that term provided in §100(b) and looking to the guideposts in *Benson*, *Flook*, and *Diehr*'.[518] As Justice Stevens added, the 'mode of analysis (or lack thereof) may have led to the correct outcome in this case, but it also means that the Court's musings on this issue stand for very little'[519].

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[513] 545 F.3d 943 (Fed. Cir. 2008).

[514] See *AT&T Corp. v. Excel Communications*, 172 F.3d 1352 (Fed. Cir. 1999); and *State Street Bank v. Signature Financial Group*, Inc., 149 F.3d 1368 (Fed. Cir. 1998).

[515] 561 US _ (2010).

[516] *Bilski v Kappos* 561 US (2010), page 13.

[517] '[i]n general, the opinion offers no clarity or aid for those tasked with determining whether a particular innovation falls within Section 101. The opinion provides no new lines to be avoided. Rather, the outcome from the decision might best stated as "business as usual'. Dennis Crouch, 'Bilski v Kappos' (28 June 2010), Patently-O. Available at:
http://www.patentlyo.com/patent/2010/06/bilski -v -kappos-business-methods-out-software

[518] *Bilski v Kappos* 561 US __ (2010), page 16.

[519] *Bilski v Kappos* 561 US __ (2010), page 9. JUSTICE STEVENS, with whom JUSTICE GINSBURG, JUSTICE BREYER, and JUSTICE SOTOMAYOR join, concurring in the judgment.

Whatever truth there might be in these remarks, the Supreme Court decision did provide guidance in relation to the way that patentable subject matter is to be determined in the US in two respects. The first concerns the relevance of the 'useful, concrete, and tangible result' test (and the *State Street Bank* decision). While the court did not directly overturn the *State Street* decision, the upshot of the Supreme Court decision read as a whole is that the 'useful, concrete, and tangible result' outlined in *State Street* will no longer be used as a test to determine patentable subject matter[520]. As Justice Breyer said, 'the "useful, concrete, and tangible result" approach to patentability, associated with the Federal Circuit's *State Street* decision, preceded the granting of patents that "ranged from the somewhat ridiculous to the truly absurd."'[521] ... 'To the extent that the Federal Circuit's decision in [Bilski] rejected that approach, nothing in today's decision should be taken as disapproving of that determination'.[522]

The second notable aspect of the decision relates to the relative standing of the machine-or-transformation test that had been endorsed by the Federal Circuit in *Bilski*. While the Supreme Court rejected the 'useful, concrete, and tangible result' test, it did give its stamp of approval to the machine-or-transformation test, noting that the Supreme Court's 'precedents establish that the machine-or-transformation test is a useful and important clue, an investigative tool, for determining whether some claimed inventions are processes under §101'[523]. While the Court endorsed the use of the machine-or-transformation test, at the same time, the Court stressed that the machine-or-transformation test was *not* the sole test for deciding whether an invention is a patent- eligible process. [524] This was on the basis that while the machine-or-transformation test has always been a "useful and important clue," it has never been the "sole test" for determining patentability'[525] ... 'The machine-or-

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[520] 'nothing in today's opinion should be read as endorsing interpretations of §101 that the Court of Appeals for the Federal Circuit has used in the past. See, e.g., State Street, 149 F. 3d, at 1373; AT&T Corp., 172 F. 3d, at 1357'. *Bilski v Kappos* 561 US __ (2010), page 16. 'although the machine-or-transformation test is not the only test for patentability, this by no means indicates that anything which produces a "'useful, concrete, and tangible result,'" *State Street Bank & Trust Co.* v. *Signature Financial Group, Inc.,* 149 F. 3d 1368, 1373 (CA Fed. 1998), is patentable. "[T]his Court has never made such a statement and, if taken literally, ... would cover instances where this Court has held the contrary." *Laboratory Corp. of America Holdings* v. *Metabolite Laboratories, Inc.*, 548 U. S. 124, 136 (2006)' *Bilski v Kappos* 561 US __ (2010), page 3. JUSTICE BREYER, with whom JUSTICE SCALIA joins as to Part II, concurring in the judgment.

[521] *Bilski v Kappos* 561 US __(2010), page 3. JUSTICE BREYER, with whom JUSTICE SCALIA joins as to Part II, concurring in the judgment.

[522] *Bilski v Kappos* 561 US __ (2010), page 4. JUSTICE BREYER, with whom JUSTICE SCALIA joins as to Part II, concurring in the judgment.

[523] *Bilski v Kappos* 561 US __ (2010), page 8.

[524] *Bilski v Kappos* 561 US __ (2010), page 8. *Bilski v Kappos* 561 US __ (2010), page 16

[525] *Bilski v Kappos* 561 US__ (2010), page 3. JUSTICE BREYER, with whom JUSTICE SCALIA joins as to Part II, concurring in the judgment..

transformation test is ... an *important example* of how a court can determine patentability under §101, but the Federal Circuit erred in this case by treating it as the *exclusive test*.'[526]

The Supreme Court also responded to criticisms that had been made about the antiquated nature of the machine-or-transformation test. As Justice Kennedy wrote, 'The machine-or-transformation test may well provide a sufficient basis for evaluating processes similar to those in the Industrial Age—for example, inventions grounded in a physical or other tangible form. But there are reasons to doubt whether the test should be the sole criterion for determining the patentability of inventions in the Information Age. As numerous *amicus* briefs argue, the machine-or-transformation test would create uncertainty as to the patentability of software, advanced diagnostic medicine techniques, and inventions based on linear programming, data compression, and the manipulation of digital signals'.[527] In explaining that the machine-or-transformation test was not to be used as exclusive test, the Supreme Court also made it clear that they did not 'foreclose the Federal Circuit's development of other limiting criteria that further the purposes of the Patent Act and are not inconsistent with its text'[528]. It is not clear, however, what this might be.

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[526] *Bilski v Kappos* 561 US __ (2010), page 3. JUSTICE BREYER, with whom JUSTICE SCALIA joins as to Part II, concurring in the judgment. 'Adopting the machine-or-transformation test as the sole test for what constitutes a "process" (as opposed to just an important and useful clue) violates [the] statutory interpretation principles. that are used to interpreter section 101 *Bilski v Kappos* 561 US __ (2010), page 6-7. 'Adopting the machine-or-transformation test as the sole test for what constitutes a "process" (as opposed to just an important and useful clue) violates [the] statutory interpretation principles. that are used to interpreter section 101 *Bilski v Kappos* 561 US __ (2010), page 6-7. 'The Court correctly holds that the machine-or-transformation test is not the sole test for what constitutes a patentable process; rather, it is a critical clue' *Bilski v Kappos* 561 US __ (2010), page 1. JUSTICE STEVENS, with whom JUSTICE GINSBURG, JUSTICE BREYER, and JUSTICE SOTOMAYOR join, concurring in the judgment. A footnote to the text reads '[1]Even if the machine-or-transformation test may not define the scope of a patentable process, it would be a grave mistake to assume thatanything with a " 'useful, concrete and tangible result,' " *State Street Bank & Trust* v. *Signature Financial Group, Inc.*, 149 F. 3d 1368, 1373 (CA Fed. 1998), may be patented'. Indeed in explaining the decision of the court, it was said that 'I understand the Court's opinion to hold only that the machine-or-transformation test remains an important test for patentability' *Bilski v Kappos* 561 US __ (2010), page 8. JUSTICE STEVENS, with whom JUSTICE GINSBURG, JUSTICE BREYER, and JUSTICE SOTOMAYOR join, concurring in the judgment.

[527] *Bilski v Kappos* 561 US __ (2010), page 9. 'It is true that patents for inventions that did not satisfy the machine-or-transformation test were rarely granted in earlier eras, especially in the Industrial Age ... But times change.' *Bilski v Kappos* 561 US __ (2010), page 8.

[528] 'For example, it was once forcefully argued that until recent times, "well-established principles of patent law probably would have prevented the issuance of a valid patent on almost any conceivable computer program."' *Diehr*, 450 U. S., at 195 (STEVENS, J., dissenting). But this fact does not mean that unforeseen innovations such as computer programs are always unpatentable. See *id.*, at 192–193 (majority opinion) (holding a procedure for molding rubber that included a computer program is within patentable subject matter)' *Bilski v Kappos* 561 US __ (2010), page 8.

It has been suggested that following the Supreme Court's decision, that the US Patent and Trade Mark Office 'will continue to use the machine-or-transformation test as a "tool" for determining whether particular process claims fit within Section 101'[529]. It has also been suggested that a recent Post-Bilski notice to examiners will also continue to apply. This provides that:

'Examiners should continue to examine patent applications for compliance with section 101 using the existing guidance concerning the machine-or-transformation test as a tool for determining whether the claimed invention is a process under section 101. If a claimed method meets the machine-or-transformation test, the method is likely patent eligible under section 101 unless there is a clear indication that the method is directed to an abstract idea. If a claimed method does not meet the machine-or-transformation test, the examiner should reject the claim under section 101 unless there is a clear indication that the method is not directed to an abstract idea. If a claim is rejected under section 101 on the basis that it is drawn to an abstract idea, the applicant then has the opportunity to explain why the claimed method is not drawn to an abstract idea'[530].

One question that needs to be considered is the impact that the Supreme Court's decision will have in relation to computer programs as patentable subject matter. This is all the more pressing given that the Supreme Court decision was based on the vague notion that abstract ideas are not patentable. Indeed as Justice Stevens noted: 'The Court ... never provides a satisfying account of what constitutes an unpatentable abstract idea. Indeed, the Court does not even explain if it is using the machine-or-transformation criteria. The Court essentially asserts its conclusion that petitioners' application claims an abstract idea. This mode of analysis (or lack thereof) may have led to the correct outcome in this case, but it also means that the Court's musings on this issue stand for very little'[531]. While the Supreme Court stressed that it was 'not commenting on the patentability of any particular invention, let alone holding that any of the above-mentioned technologies from the Information Age should or should not receive patent protection',[532] it seems that the Supreme Court decision will not change the standing of computer programs as patentable subject matter in the United States from what it was after the Federal Circuit decision in *Bilski*.

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[529] Dennis Crouch, 'Bilski v Kappos and the Anti-Street-State-Majority' ' (28 June 2010), Patently-O. Available at http://www.patentlyo.com/patent/2010/06/bilski-v-kappos-and-the-anti-street-state-majority'

[530] Dennis Crouch, 'Bilski v Kappos and the Anti-Street-State-Majority' ' (28 June 2010), Patently-O. Available at http://www.patentlyo.com/patent/2010/06/bilski-v-kappos-and-the-anti-street-state-majority'

[531] *Bilski v Kappos* 561 US __ (2010), page 9. JUSTICE STEVENS, with whom JUSTICE GINSBURG, JUSTICE BREYER, and JUSTICE SOTOMAYOR join, concurring in the judgment.

[532] *Bilski v Kappos* 561 US (2010), page 9-10.

[3.75] Uruguay

Article 8 of Law 17.164 (Uruguay) provides that 'new products and procedures that imply in an inventive activity and are subject to industrial application are patentable'[533]. This is qualified by Article 13 which excludes from protection, inter alia:

- discoveries, scientific theories, mathematical methods,
- commercial, accounting, financial, education, advertising, inspection or raffle schemes, plans, game rules, principles or methods;
- literary or artistic works, or any other aesthetic creation, as well as scientific works, computer programs considered as isolated items;
- the different manners of reproducing information[534]

[3.76] Venezuela

Venezuela withdrew from the Andean block in 2006, having been a member since 1973. As a result, Venezuelan patent law is governed by the 1955 Law on Industrial Property. Article 5 provides that Venezuelan patents are issued for inventions, improvements and the introduction of foreign patents not yet in public domain. Article 14 lists the allowable inventions. Article 15 has a series of exclusions to patentability, including both areas that more recent South American laws deem to be not inventions

[Annex III follows]

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[533] Law 17.164 (Uruguay) 'Article 8, 'New inventions of products or proceedings entailing an inventive activity and having industrial applicability are deemed patentable inventions'.
[534] Law 17.164 (Uruguay) Article 13, 'The following shall not be deemed inventions under the provisions hereof: Discoveries, scientific theories and mathematical methods. Plants and animals, with the exception of microorganisms, as well as essentially biologic processes for the production of plants or animals, with the exception of non-biologic or microbiologic processes. Schedules, plans and rules of the game as well as commercial, accounting, financial, educational, advertising, draw and supervision principles or methods. Literary or artistic works or any other aesthetic creation as well as scientific works. Computing programs considered as isolated items. Different manners of reproducing information Biological and genetic material, as found in Nature'.