

Patentable subject matter in the US: past, present and future

The landmark *Bilski* decision has left commentators divided as to the fate of business method and software patents in the United States: some believe they will be harder to obtain and enforce, while others view the ruling as confirmation of their viability

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Over the past decade, the United States has seen a dramatic increase in the number of filings for business method patents relating to e-commerce, insurance, financial services and the like. They, like software patents in general, have become important and valuable IP assets. This increase in business method patents in particular may be attributable to the confluence of technological advances in communications and the timing of an important court decision.

First, the rise of the Internet as a viable – indeed, ubiquitous – portal for conducting business, and the availability of increasingly more powerful and affordable computer technology, have generated new and creative opportunities to facilitate business activities with great economic benefits; many say this has ushered a new information and electronic age economy. Second, while methods of doing business historically were not considered patentable, in 1998 the United States Court of Appeals for the Federal Circuit – which has exclusive first-instance appellate jurisdiction over patent cases from the lower federal trial courts – declared that business methods could indeed be patented. In the intervening

years, the United States Patent and Trademark Office (USPTO) has been flooded with patent applications from technology start-ups rushing to patent their core business models, from traditional brick-and-mortar entities recognising new patent asset opportunities to financial services firms seeking to protect profitable business schemes, to independent inventors and patent holding companies seeking lucrative licensing opportunities. Many of these entities conversely faced increased exposure to patent infringement allegations and have used these patents in a defensive mode.

The stunning rise in the number of business method patents in the United States and the concomitant increase in patent litigation also led to a vigorous early debate over the ability of the USPTO, with its limited resources (eg, adequate sources of prior art to search and knowledgeable examiners), to examine the growing volume of business method patent applications. In addition, courts had not provided a clear standard for determining which types of discovery may or may not be patented; nor had Congress clearly articulated its views as to the boundaries of patentable business method and software inventions. Many patent practitioners and business executives had criticised the USPTO and the courts for failing adequately to police business method patents and for unduly expanding the scope of patent-eligible subject matter.

Statutory and case law evolution

The relevant statutory framework in the United States under which patent eligibility is determined is set out in the Patent Act. Specifically, “whoever invents or discovers any new and useful process, machine, manufacture, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and

requirements of this title”. [Title 35 USC § 101]. Thus, while a patentable invention must have utility and be new and non-obvious under US law, a threshold barrier exists which permits only the patenting of particular subject matter, namely: (1) processes; (2) machines; (3) manufactures; and (4) compositions of matter. With regard to process patent eligibility – which generally applies to business method and software patents – the Patent Act gives a rather general definition of “process” as a “process, art, or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material”. [Title 35 USC § 100(b)]. Although the language of the statute appears to define a broad scope of patent-eligible subject matter, a number of judicially established limits, such as a prohibition against patenting laws of nature, physical phenomena and abstract ideas, have circumscribed its bounds. [*Diamond v Chakrabarty*, 447 US 303 (1980)].

At the dawn of the information age, the US Supreme Court decided three cases addressing the patent eligibility of computer-related processes involving mathematical algorithms. First, in *Gottschalk v Benson* [409 US 63 (1972)], the Supreme Court considered a process for converting binary-coded decimal numerals into binary numbers (which could be carried out on a general purpose computer). The court concluded that such a process could not be patented because it constituted an abstract idea, noting that the conversion process could be performed mentally using a mathematical table. In the court’s view, allowing such a patent would effectively foreclose all uses of the mathematical formula or algorithm at issue. The court explained that “[p]henomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work”. [*Id* at 67].

In the next case, *Parker v Flook* [437 US 584 (1978)], the Supreme Court was asked to determine whether a method of computing certain alarm limits in connection with a catalytic chemical conversion process could be patented. The only difference between the patented method and prior known processes was the use of a mathematical formula to calculate the alarm limits. The court decided that the method was not patentable because it did not include the use of any specific machine, did not explain how to select appropriate margins of safety and contained no explanation relating to the chemical processes being used, the

monitoring of process variables or the means of setting off or adjusting an alarm. Rather, the patented method was simply a formula or algorithm for computing an updated alarm limit. The court noted that although an inventive application of a mathematical algorithm or principle may be patented, patentability depends on the “inventive concept in its application”.

In *Diamond v Diehr* [450 US 175 (1981)], the Supreme Court considered the patent eligibility of a process for curing synthetic rubber products in which temperature readings were taken and a computer using a well-known mathematical algorithm calculated the cure time. The court concluded that although several steps in the process involved the use of mathematical algorithms, the method as a whole was patentable because it involved the transformation of an object. Notably, the court stated that “[a] claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula, computer program, or digital computer”. Instead, “when a claim containing a mathematical formula implements or applies that formula in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect (e.g., transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of [the Patent Act]”. In an attempt to provide guidance in this area, and distill its prior decisions, the *Diehr* court announced that the “[t]ransformation and reduction of an article to a different state or thing is the clue to the patentability of a process claim that does not include particular machines”.

In one other Supreme Court case of note [*Diamond v Chakrabarty*, 447 US 303 (1980)], although not directly addressing the boundaries of process patents, the court stated that “Congress intended statutory subject matter to include anything under the sun that is made by man”. Following this Supreme Court statement, and considering the broad statutory language of the Patent Act, US courts slowly expanded the scope of patent-eligible process subject matter.

In the seminal case of *State Street Bank & Trust Co v Signature Financial Group, Inc* [149 F 3d 1368 (Fed Cir 1998)], the Federal Circuit analysed the patentability of a data processing system for implementing an investment structure. The patent involved a computer system that received various inputs of financial information and then performed certain calculations for managing



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a financial portfolio. The Federal Circuit decided that the claimed system was patentable and, using broad language to explain the permissible scope of patentable subject matter, stated that "the mere fact that a claimed invention involves inputting numbers, calculating numbers, outputting numbers, and storing numbers, in and of itself, would not render it [unpatentable], unless, of course, its operation does not produce a useful, concrete and tangible result". Interestingly, although the patent claim at issue explicitly recited a data processing system – not a method – the Federal Circuit used the occasion to address the so-called "business method exception" (said to preclude methods of conducting business from patent protection) and declared it "dead". The *State Street* decision thus became viewed as effectively lowering the patent-eligibility threshold by focusing the inquiry on whether a claimed method produces a useful, concrete and tangible result, and ushered in a new era of business method and software patents.

Following *State Street*, the number of business method patents increased significantly. Indeed, according to USPTO statistics, the number of patent applications relating to apparatus and methods for financial data processing increased from 974 in 1997 to 11,378 in 2007 and the number of issued patents in that field jumped from 120 in 1997 to 1,330 in 2007.

Bilski scales back method patents

On 30th October 2008 the Federal Circuit announced a bright-line test for determining the types of processes and methods that may be patented. In *In re Bilski* [545 F 3d 943 (Fed Cir 2008)], the Federal Circuit rejected a patent for a method of hedging risks in commodities trading by managing the consumption risk costs of a commodity sold at a fixed price. The *Bilski* case had been long awaited and closely watched by the patent bar and industry, with many companies, associations and institutions submitting friend-of-court briefs advocating various positions on the patentability of business methods and so-called non-technological process patents.

Effectively dismissing its prior "useful, concrete, and tangible result" test for process patent eligibility, the Federal Circuit declared that the definitive test for deciding whether a process may be patented is to determine whether: (1) the process is tied to a particular machine or apparatus, or (2) the process transforms a particular article into a different state or thing (the "machine-or-transformation" test). According to the

Federal Circuit, the machine-or-transformation test ensures that a method patent is tied to a particular application of a fundamental principle or idea rather than the principle or idea itself.

The Federal Circuit characterised the patent at issue in *Bilski* as a "non-transformative process that encompasses a purely mental process of performing requisite mathematical calculations without the aid of a computer or any other device, mentally identifying those transactions that the calculations have revealed would hedge each other's risks, and performing the post-solution step of consummating those transactions". Applying the machine-or-transformation test to the *Bilski* patent, the court observed that the patent did not include the use of any particular machine or apparatus. Regarding transformation, the court concluded that the matters transformed were mere public and private legal obligations, organisational relationships, business risks or similar abstractions, all of which were neither physical objects nor representations of physical objects such as electronic signals.

The Federal Circuit also stressed that although a method may be patent eligible even if it does not include sufficient "physical steps", a process in which every step may be performed entirely in the human mind is not patentable. In addition, patent eligibility must be determined by analysing the process invention as a whole and it is therefore irrelevant that any individual step of the process is by itself unpatentable. In other words, although a fundamental principle itself may not be patented, a method incorporating a fundamental principle is not automatically patent ineligible.

The Federal Circuit did, however, reject a categorical exclusion of business method and software subject matter from patentable inventions as long as they satisfy the machine-or-transformation test. The court also rejected a so-called "technological arts test", which would have limited patent protection to inventions tied to the classical fields of science and technology, because according to the court, terms such as "technological arts" and "technology" are ambiguous and constantly evolving. Notably, although the European Union and Japanese patent offices require that computer-implemented inventions demonstrate a "technical contribution" to be patent eligible, many have criticised the tests employed in these jurisdictions as failing to provide certainty about the patentability of business method and software patents.

While articulating an apparent bright-line test, the Federal Circuit provided little guidance for applying it beyond the limited facts of *Bilski*. For example, the court did not specifically address the first part of the machine-or-transformation test, which requires that a method be tied to a particular machine. Thus, an open question may be whether a general purpose computer utilised to execute the steps of a software program or business method would *per se* qualify as a “particular machine”.

Concerning “transformation”, the court observed that today’s “raw materials” often include “electronic signals” and “electronically-manipulated data”. Therefore, in cases involving electronic data, the data ought to represent a concrete physical object that is being transformed. However, beyond concluding that the legal obligations and business risks at issue in *Bilski* did not qualify as “transformed” articles, the court provided little guidance as to types of articles, or representations of articles, that would satisfy the “transformation” prong. Thus, as courts often do, the Federal Circuit left it for subsequent cases to develop more precisely the contours of the machine-or-transformation test and its application to information age innovations. Indeed, recognising the continuing evolution in science, the court explicitly left open the possibility of a future modification of the machine-or-transformation test in light of new technological developments.

The losing party in *Bilski* has already petitioned the Supreme Court to review and overturn the Federal Circuit’s decision. Many third parties with an interest in the *Bilski* decision have submitted friend-of-court briefs urging the court to accept the petition – some arguing that the Federal Circuit has unduly restricted the scope of patentable process subject matter and others contending that the machine-or-transformation test does not go far enough in curtailing the patenting of software and business methods. A decision on whether the Supreme Court will accept the case is expected by June of this year.

Outlook

As the dust settles following the *Bilski* decision, some commentators believe that business method and software patents will be harder to obtain and enforce, while others view the Federal Circuit’s decision as confirmation of the viability of such patents. Although both software and business method patents have survived, the patent-eligibility landscape of process patents in

general – and software and business method patents in particular – has shifted, and patent practitioners and business executives will need to analyse carefully method/process patent applications under the machine-or-transformation test. Furthermore, it should be remembered that the only issue decided in *Bilski* was how to determine whether a method or process qualifies as proper subject matter for patentability. After overcoming the threshold patent-eligibility hurdle, a process must still be shown to have utility and to be novel and non-obvious, among other patentability requirements.

Concerning software patents, while computer programs *per se* may not be patented, various implementations remain patentable – such as software that is connected to a particular machine or that constitutes an integral part of a method in which a physical transformation takes place. Similarly, a computer whose actions are directed by software should remain a patentable “machine” because programming a general-purpose computer to perform particular functions according to instructions from program software effectively creates a special-purpose computer. (*In re Alappat* [33 F 3d 1526 (1994)]). Further, computer-readable media, such as computer memory and compact discs that embody executable programs which direct a computer to perform in a specific manner, likely also remain patentable. (*In re Beauregard* [53 F 3d 1583 (1995)]).

Regarding business methods, *Bilski* ultimately may render some existing issued financial services industry patents of questionable validity and make it more difficult to obtain patents on methods of investing, structuring loans, dealing with customers, hedging business risks and the like. As with software patents, directing a business method to a particular machine or apparatus such that it does not essentially amount to a mere abstract intellectual concept may well result in patentable subject matter. However, merely directing a business method to a particular field of use such as commodities trading, or including some insubstantial post-solution activity such as the consummation of a transaction, likely may not be patentable.

In addition, while the inclusion of hardware components may suffice to render software or a business method patent eligible, it may be advisable that the hardware be programmed to implement a fundamental aspect of the invention rather than merely functioning as a device to store, display or retrieve data. For



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inventions that are not implemented in a particular machine, it may be helpful to identify a tangible physical object that is being transformed or the representation of such a transformed object. Where electronic data is the object being transformed – a typical circumstance in the context of software and business method patents – the patent ought to identify the tangible physical object being represented by the electronic data.

Considering the number of questions still to be resolved following the *Bilski* decision, US patent practitioners and the courts will have to grapple with application of the machine-or-transformation test – or even seek to modify the test – as US patent law attempts to keep pace with developments in technology and to strike a balance between protecting inventions and encouraging innovation, without unduly restricting various fields of endeavour. ■

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