
Ann Marie Rizzo

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THE AFTERMATH OF STATE STREET BANK & TRUST v. SIGNATURE FINANCIAL GROUP: EFFECTS OF UNITED STATES ELECTRONIC COMMERCE BUSINESS METHOD PATENTABILITY ON INTERNATIONAL LEGAL AND ECONOMIC SYSTEMS*

INTRODUCTION

“We are all bound together in a complex web of relations.”
— Charles Darwin, On the Origin of Species

While written to expand upon his theory of biodiversity, today Darwin’s statement applies equally to the fluctuating universe of electronic business existing on the Internet. Central to Darwin’s theory is the concept of Natural Selection: the differential success among organisms to perpetuate their genetic variability, based on one’s ability to adapt to environmental conditions. Individuals who were able to best adapt to their environments were considered the most fit, resulting in a capacity to produce a greater number of offspring, thereby passing adaptive characteristics to future generations. Although, Darwin’s theory was initially intended to apply to biological evolution, the term “survival of the fittest” became a popular explanation for societal evolution. Social Darwinism, as the movement soon came to be called, encompassed Darwin’s “natural selection” theory during

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2. Charles R. Darwin (1809-1882), a British naturalist, based his theories of evolution on observations of Galapagos Island finches. See id.


4. Id. at 437.

5. Herbert Spencer first documented the concept of societal evolution in 1852. Stephen F. Mason, A History of the Sciences 420-21 (1962). After the publication of Darwin’s Origin of the Species in 1859, Spencer applied Darwin’s natural selection theory to society. Id. at 421-2. Spencer’s Social Darwinism movement developed in response to his aversion to conflicts among nations. Id. at 422-23. Rather, Spencer believed that progress could not be accomplished through war, but rather through “peaceable and industrious competition of individual men.” Id. at 422.
the mid-Victorian, laissez-faire economic movement in England. According to Herbert Spencer, "free trade and economic competition were . . . the social forms of natural selection;" an alteration to either form would interfere with societal evolution and disrupt human progress.6

Almost 150 years later, Spencer's "Social Darwinism" movement still persists as an explanation for industrial and economic human development. While the theory applies in its most traditional sense to a social "survival of the fittest," neither Darwin nor Spencer could have imagined the novel application of their combined theory to a computerized marketplace: electronic commerce (e-commerce) on the Internet.7 While originally believed to be a system of free enterprise, today succeeding in business on the Internet involves the "survival of the fittest."8 Spurred by the substantial investments in e-commerce, the popularity and acceptance of the medium, and the shift from a developmental stage to a widely commercialized phase in Internet growth, the Web has flourished as the ultimate forum for free trade.9 However, commerce in all forms or mediums must be regulated to insure consumer protection as well as fair competition. Since e-commerce is a relatively new way of doing business, it remains to be seen exactly how a changing regulatory environment will effect survival of both small start-up companies, and large well-established business on the Internet.

Internet regulation in the United States encompasses a variety of e-commerce issues, including digital signatures, privacy protection, customs and taxation of e-commerce purchases, and free speech issues.10 Currently, the United States government has established a number of initiatives specifically geared toward effectively dealing with legal and policy issues arising from conducting business on the Internet.11

6. Id. at 421.
7. Although unbeknownst to Darwin at the time, his comment that we are all "bound together in a complex web of relations" could not more clearly apply to the current "survival of the fittest" model existing for e-commerce businesses on the Internet. Schwartz, supra note 2, at 3-4.
8. Using the Internet as a vehicle for commercial purposes originated in 1993, when the first commercial browser software was developed. World-Wide Web commerce truly began to flourish in 1995, after Netscape became a publicly held corporation. See id. at 5 (referring to the "Bit-Bang" that fostered this new form of commerce).
11. For a complete discussion on United States policy regarding the Internet see U.S. Government Working Group on Electronic Commerce: First Annual Report (1998); Wil-
While many of the current regulations center on policing e-commerce in favor of consumer Internet users, protection for industries doing business on the Internet has become increasingly prevalent. Similar to Darwin's "survival of the fittest" theory of biological evolution, businesses must also develop "adaptations" that will better enable them to compete in cyberspace.\(^{12}\)

Adapting to the Internet business environment involves creating a deterrent against unfair competition by securing intellectual property rights, such as trademark and copyright protection. Until recently, patents were seldom thought of as viable alternatives to copyright protection for software, Internet, or business applications. However, the Federal Circuit's reversal of a long-standing bright line rule that business methods and mathematical algorithms were per se unpatentable, has resulted in a surge of business method patent applications.\(^{14}\)

As a result, Internet business survival and success depends on adapting to yet another sudden but expected consideration, business method patentability.\(^{15}\)

While the United States Patent and Trademark Office (PTO) has witnessed a 70 percent increase in business method patents since the

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\(^{12}\) "Cyberspace" can be broken down into the "electronic highway" and the "electronic superhighway." See **Emerging Electronic Highways** 5 (Victor Bekkers et al. eds., 1996). Electronic highways are the minimal media for transmitting data, such as a single network or infrastructure. *Id.* Electronic superhighways denote the networks connecting a variety of local networks, like national, European, American, or global infrastructures. *Id.* See also **David R. Johnson & David G. Post, The Rise of Law in the Global Network, in Borders in Cyberspace: Information Policy and the Global Information Infrastructure** 3, 6-15 (Brian Kahin & Charles Nesson, eds., 1997) (discussing the absence of territorial borders in cyberspace and its effect on law enforcement).


14. See **State Street Bank & Trust Co. v. Signature Financial Group, Inc., 149 F.3d 1368, 1377 (Fed. Cir. 1998)** (holding that there is no business method or mathematical algorithm exception to patentable statutory subject matter).

Federal Circuit decided State Street Bank v. Signature Financial Group (State Street II) in early 1999, the European Patent office has refused to recognize business methods and software as patentable subject matter. However, a recent decision by the Technical Appeal Board of the European Patent Office indicates that the European Union may begin to follow U.S. precedent. Economic and competitive pressure from the United States to follow suit in patenting software led to the allowance of software patents by the European Patent Office Technical Appeal Board. Today, the question remains whether or not the European Union will allow business methods patents, thereby “adapting” to pressure from the United States to survive in a competitive global Internet market.

To resolve this inquiry, this Comment investigates the effects of the business method and software patentability within the U.S. on national legal and economic systems, as well as predicting legal consequences on the European Patent Board and economic repercussions on the European Union. Part I of this comment examines the recent United States Federal Circuit decision in State Street Bank v. Signature Financial Group, abrogating the per se exception to business methods as patentable statutory subject matter under section 101 of Title 35 of the United States Code (35 U.S.C.). Part I will briefly describe the legislative history and intent behind the statute governing patentability as amended in 1952, and will provide background on the common law development of the business method and algorithm exceptions. In addition, an in-depth analysis of the State Street II decision, and current applications of its holding in the United States,
will be discussed.\textsuperscript{23} Part II will explore current implications of the \textit{State Street II} decision on the global patentability of e-commerce business methods.\textsuperscript{24} This analysis is two fold: this part discusses the legal implications resulting from the \textit{State Street II} decision on issuance of patents in the United States,\textsuperscript{25} and examines how the patentability of e-commerce business methods within the U.S. affects patentability in European Union countries and Japan.\textsuperscript{26} In examining the economic impact of the \textit{State Street II} decision on the United States and Europe, Part III defines the patent and competitive theories of economics.\textsuperscript{27} This part also explores the factors contributing to a global and local monopolistic economy,\textsuperscript{28} and investigates the possible remedies for curtailing the negative effects of e-commerce patentability.\textsuperscript{29} Part IV will conclude that in order to maintain continued growth and competition on the Internet, the scope of allowed e-commerce business method claims will likely be reduced, thereby avoiding a global Internet monopoly market.\textsuperscript{30}

II. BACKGROUND

A. The Scope and Intent of Title 35 of the United States Code

A United States patent affords the patentee the right to exclude others from “making, using, offering for sale, or selling the invention throughout the United States or importing the invention into the United States” for a period of twenty years from the date of filing or priority.\textsuperscript{31} While Article I Section 8 of the United States Constitution

\begin{enumerate}
  \item See infra notes 106-94 and accompanying text.
  \item See infra notes 195-316 and accompanying text.
  \item See infra notes 195-244 and accompanying text.
  \item See infra notes 245-316 and accompanying text.
  \item See infra notes 317-35 and accompanying text.
  \item See infra notes 335-62 and accompanying text.
  \item See infra notes 362-74 and accompanying text.
  \item See infra notes 374-76 and accompanying text.
\end{enumerate}

\textsuperscript{23} See infra notes 106-94 and accompanying text.
\textsuperscript{24} See infra notes 195-316 and accompanying text.
\textsuperscript{25} See infra notes 195-244 and accompanying text.
\textsuperscript{26} See infra notes 245-316 and accompanying text.
\textsuperscript{27} See infra notes 317-35 and accompanying text.
\textsuperscript{28} See infra notes 335-62 and accompanying text.
\textsuperscript{29} See infra notes 362-74 and accompanying text.
\textsuperscript{30} See infra notes 374-76 and accompanying text.
\textsuperscript{31} 35 U.S.C. §154 (1994). The statute states:

(1) Contents — Every patent shall contain a short title of the invention and a grant to the patentee, his heirs or assigns, of the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States or importing the invention into the United States, and, if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States, or importing into the United States, products made by that process, referring to the specification for the particulars thereof. (2) Term — Subject to the payment of fees under this title, such grant shall be for a term beginning on the date on which the patent issues and ending 20 years from the date on which the application for the patent was filed in the United States or, if the application contains a specific reference to an earlier filed application or applications under sections 120, 121, or 365(c) of this title, from the date on which the earliest such application was filed.
appears to bestow broad patent rights, the patent statute confers nothing more that a right to exclude others from making, using, or selling the patented invention without the patentee's consent. The statute is based on the belief that the dissemination of knowledge and ideas is an essential element of societal evolution. A patentee is rewarded for his or her contribution to the public by receiving a limited term monopoly on the subject matter of the invention. In exchange for the monopoly, the subject matter of the invention must be delineated to the public and disseminated in the patent application.

Candidates seeking patentability must meet four basic requirements under 35 U.S.C.: the invention must be novel, contain an adequate

35 U.S.C. §154(a)(1)-(2). Prior to June 8, 1995, the effective date of the GATT-TRIPS legislation, the term for a United States patent was 17 years from the date of issuance rather than 20 years from the date of filing. Thus, the patent term for applications filed before the GATT-TRIPS effective date is 17 years from the date of issuance or 20 years from the filing date of the earliest reference application, whichever is greater. Patents filed on or after the filing date have a term of 20 years from the filing date. DONALD S. CHISUM, PRINCIPLES OF PATENT LAW 2 (1998).

32. The United States Constitution states that Congress has the power “to 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.” U.S. CONST. art. I, §8, cl. 8.

33. The interpretation of the Constitution that the patent right is nothing more than a right to exclude others has been upheld by case law. See Bloomer v. McQuewan, 55 U.S. (14 How.) 539, 548 (1852) (“The franchise which the patent grants, consists altogether in the right to exclude every one from making, using, or vending the thing patented, without the permission of the patentee. This is all that he obtains by the patent.”); Crown Die & Tool Co. v. Nye Tool & Machine Works, 261 U.S. 24, 36 (1923) (“the government is not granting the common-law right to make, use, and vend . . . ” but instead grants “exclusive ownership of that common-law right”).

34. CHISUM, supra note 31, at 6.

35. CHISUM, supra note 31, at 2.


A person shall be entitled to a patent unless — (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or (c) he has abandoned the invention, or (d) the invention was first patented or caused to be patented, or was the subject of an inventor’s certificate, by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application for patent or inventor’s certificate filed more than twelve months before the filing of the application in the United States, or (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title [35 U.S.C. §371(c)(1), (2), (4)] before the invention thereof by the applicant for patent, or (f) he did not himself invent the subject matter sought to be patented, or (g) before the applicant’s invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determin-
description,\textsuperscript{37} exhibit utility,\textsuperscript{38} and contain nonobvious subject matter, as set forth in 35 U.S.C. §§ 101, 102, and 103 respectively.\textsuperscript{39} With respect to inventions involving business methods and mathematical algorithms, a patentee must first overcome the statutory subject matter requirement detailed in 35 U.S.C. §101. According to section 101, the invention must fall within one of five statutory classifications: a process, machine, manufacture, composition of matter, or a new and useful improvement of an already existing process, machine, manufacture or composition of matter.\textsuperscript{40} Patent claims describing machines, modes of manufacture, and compositions of matter are further categorized as product claims,\textsuperscript{41} while claims directed toward processes are distinguished as process claims.\textsuperscript{42} Although a patent application need not designate the class of subject matter it is claiming, the subject matter of the patent must fall within one of the four permissible classes of statutory subject matter.\textsuperscript{43}

E-commerce business methods are normally claimed using process claims.\textsuperscript{44} 35 U.S.C. §100 defines a process as an art or method, or a
new use of a machine, manufacture or composition of matter. While this definition further limits the scope of permissible process claims, the statute exhibits a broad scope of possible processes that may be patentable under Title 35. The sweeping nature of the statute may be intentional. In 1952, 35 U.S.C. was amended to include means plus function claims, eliminate a broad reading of the misuse doctrine and contributory infringement, and replace the “flash of genius”

“it is of little relevance whether [a] claim . . . is directed to a ‘machine’ or a ‘process,’ as long as it falls within at least one of the four enumerated categories of patentable subject matter, ‘machine’ and ‘process’ being such categories.” Id. at 1372.

45. 35 U.S.C. §100 (1994). Section 100 states:

(a) The term “invention” means invention or discovery. (b) The term “process” means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material. (c) The terms “United States” and “this country” mean the United States of America, its territories and possessions. (d) The word “patentee” includes not only the patentee to whom the patent was issued but also the successors in title to the patentee.


46. Means plus function claims were added to Title 35 in 1952, defeating the synergism requirement under Great Atl. & Pac. Tea Co. v. Supermarket Equip. Corp., 340 U.S. 147, 152 (1950). Means plus function claims are defined as:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention. The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention. A claim may be written in independent or, if the nature of the case admits, in dependent or multiple dependent form. Subject to the following paragraph, a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers. A claim in multiple dependent form shall contain a reference, in the alternative only, to more than one claim previously set forth and then specify a further limitation of the subject matter claimed. A multiple dependent claim shall not serve as a basis for any other multiple dependent claim. A multiple claim shall be construed to incorporate by reference all the limitations of the particular claim in relation to which it is being considered.

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.


47. Title 35 was amended to state:

No patent owner otherwise entitled to relief for infringement or contributory infringement of a patent shall be denied relief or deemed guilty of misuse or illegal extension of the patent right by reason of his having done one or more of the following: (1) derived revenue from acts which if performed by another without his consent would constitute contributory infringement of the patent; (2) licensed or authorized another to perform acts which if performed without his consent would constitute contributory infringement of the patent; (3) sought to enforce his patent rights against infringement or contribu-
standard for invention with the current “nonobviousness” standard.\textsuperscript{48} Additionally, under the 1952 amendments, the drafters considered the intended scope of statutory subject matter. According to the 1952 Patent Act committee reports, the drafters intended statutory subject matter to “include anything under the sun made by man.”\textsuperscript{49} The repetitive use of the term “any” throughout 35 U.S.C. §101, also testifies to the framers’ intent to avoid additional limitations on statutory subject matter beyond the four classifications enumerated in section 101.\textsuperscript{50} However, despite the interpretation of legislative intent favoring a broad reading of section 101, common law notions on patentable statutory subject matter have acted to limit the scope of permissible inventions under the statute. While the legislature’s intent may have been to make almost everything patentable, case law has consciously limited the scope of what may constitute patentable subject matter.\textsuperscript{51}

\textbf{B. Common Law Interpretation of Section 101 of Title 35 of the United States Code}

Primarily, laws of nature, natural phenomena, and abstract ideas are excluded from statutory subject matter.\textsuperscript{52} While these exceptions were developed to prevent inventors from monopolizing non-novel, obvious concepts already found in the public domain, courts in the

\textsuperscript{48} See supra note 38. Originally, the test for an invention was the “flash of genius” test elucidated under Cuno Eng’g Corp. v. Automatic Devices Corp., 314 U.S. 84, 91 (1941). To be patentable, an invention had to arise from a flash of inventive genius by the patentee. \textit{Id}.

\textsuperscript{49} See S. Rep. No. 82-1979, at 5 (1952); H.R. Rep. No. 82-1923, at 6 (1952). The revolution resulting in the defeat of the mathematical algorithm and business method exceptions began in 1980 with \textit{Diamond v. Chakrabarty}, 447 U.S. 303 (1980). The case involved patenting live human-engineered microorganisms capable of breaking down multiple components of crude oil and used to aid in containing and removing environmental oil contamination. \textit{Id}. at 303. Quoting the 1952 Patent Act Committee reports, the Supreme Court accepted the microorganism as statutory subject matter, and recognized that the statutory framers intended patentable statutory subject matter to include anything “under the sun.” \textit{Id}. at 309.

\textsuperscript{50} See supra note 20; \textit{State Street}, 149 F.3d at 1373 (“[I]t is improper to read limitations into §101 on the subject matter that may be patented where the legislative history indicates that Congress clearly did not intend such limitations.”).

\textsuperscript{51} See \textit{infra} notes 159-94 and accompanying text.

\textsuperscript{52} See \textit{Diamond v. Diehr}, 450 U.S. 175, 185 (1981) (finding that not every discovery is included under section 101 and exceptions include “laws of nature, natural phenomena, and abstract ideas”). According to the Supreme Court in \textit{Rubber-Tip Pencil Co. v. Howard}, “an idea of itself is not patentable, but a new device by which it may be made practically useful is.” 87 U.S. 498, 507 (1874).
past expanded this list to include mathematical algorithms and business methods. The business method exception to statutory subject matter is of particular importance to this Comment.


Since 1908, the decision in Hotel Security Checking Co. v. Lorraine Co. has made methods of doing business unpatentable in the United States. The patent at issue in Hotel Security described "a method of and means for cash-registering and account-checking designed to prevent fraud and ... [theft] by waiters and cashiers in hotels and restaurants." The court held that systems of transacting business were not considered an "art" unless the means were novel and adequately disclosed an invention.

However, while Hotel Security stood for the business method exclusion principle for over ninety years, the court did not explicitly rely on that exception to invalidate the patent at issue. Rather, the court in Hotel Security based its finding of invalidity on the invention's lack of novelty, not because the business method was improper subject matter for a patent. The Hotel Security court stated that if there had been no system of bookkeeping in restaurants at the time of the invention, then the business method would be evaluated for a new and useful purpose under the statute. Few cases have actually based findings of invalidity solely on the judicially imposed "business method" exception, however, courts often used Title 35 statutory grounds to deem patents invalid. Thus, from its inception, the busi-

53. A mathematical algorithm is "a mathematical formula." AT&T Corp. v. Excel Communications, Inc., 172 F.3d 1352, 1352 (Fed. Cir.1999). Mathematical algorithms have also been defined as "procedure[s] for solving a given type of mathematical problem." Gottschalk v. Benson, 409 U.S. 63, 65 (1972). See also Diehr, 450 U.S. at 175-76. Mathematical algorithms were originally excluded from statutory subject matter because the Court equated them to a form of abstract ideas. Id. at 175; Parker v. Flook, 437 U.S. 584, 589 (1978); Gottschalk, 409 U.S. at 67. For a complete discussion of the mathematical algorithm exception to statutory subject matter see Francise Marius Keeley-Domokos, State Street Bank & Trust Co. v. Signature Financial Group, Inc., 14 Berkeley Tech. L.J. 153, 155-56 (1999).

54. See Hotel Sec. Checking Co. v. Lorraine Co., 160 F. 467, 469 (2d Cir. 1908) (holding that a business method was non-patentable subject matter).

55. Id.

56. Id. at 467.

57. Id. at 469.

58. State Street, 149 F.3d at 1376.

59. See Hotel Sec., 160 F. at 472.

60. Since 1908, the validity of several patents has supposedly been decided against the patentee using the business method exception. However, the court in State Street found that the majority of such cases were decided on a failure to fulfill other statutory grounds rather than failure to qualify as statutory subject matter. See Dann v. Johnston, 425 U.S. 219, 220 (1976) (holding of invalidity based on 35 U.S.C. §103 obviousness grounds precluded a discussion of the 35 U.S.C.
ness method exception has rarely been invoked as the primary justifi-
cation for a finding of invalidity.

2. Elimination of the Mathematical Algorithm and Business Method
Exceptions to Statutory Subject Matter: Pre-State Street
Holdings

In response to growing developments in technology and industry,
the Supreme Court reconsidered the statutory exceptions regarding
mathematical algorithms.61 A trilogy of Supreme Court cases, Gott-
schalk v. Benson,62 Parker v. Flook,63 and Diamond v. Diehr,64 initi-
ated a retreat from the mathematical algorithm exception.65

Gottschalk v. Benson involved a patent for software which
converted binary coded decimals into pure binary form using a general-
purpose computer.66 At issue was whether or not the claims were
directed to statutory subject matter within the meaning of 35 U.S.C.
§101. The claims themselves were not limited to any specific technol-
ogy or end use.67 The Court found that since the process claim was
overly broad and included all present and future uses of the conver-
sion system, the patent was insufficiently drawn to non-statutory sub-
ject matter.68 Furthermore, the Court noted that “transformation and

§101 argument concerning the computerized financial record keeping system); In re Schrader, 22 F.3d 290, 295-96 (Fed. Cir. 1994) (basing a finding of invalidity on the fact that the claims recited an abstract idea in the form of a mathematical algorithm, although the court referred to the business method exception); In re Howard, 394 F.2d 869, 871-72 (C.C.P.A. 1968) (holding that while a claim for a method of doing business was “inherently unpatentable,” the patent at issue was invalid based on its lack of novelty); Loew’s Drive-In Theatres v. Park-In Theatres, 174 F.2d 547, 552 (1st Cir. 1949) (finding means of carrying out business system lacked an exercise of the “faculty of invention”); In re Patton, 127 F.2d 324, 327-28 (C.C.P.A. 1942) (holding claims inval-
id because they failed to define patentable subject matter over the references of record); In re Wait, 73 F.2d 982, 983 (C.C.P.A. 1934) (holding that while some methods of doing business may be patentable, the method in question in this case was unpatentable due to lack of novelty); Bernardini v. Tocci, 190 F. 329, 332 (C.C.S.D.N.Y. 1911). See also Rinaldo Del Gallo III, Are
“Methods of Doing Business” Finally out of Business as a Statutory Rejection?, 38 IDEA 403, 435 (1998) (concluding that the “Business Method” cases have been decided on other grounds rather than the business method exception).

61. CHISUM, supra note 31, at 754.
63. Parker, 437 U.S. 584.
64. Diehr, 450 U.S. 175 (1981).
65. The phrase, “Supreme Court Trilogy” was coined by the Federal district court of Massa-
66. Gottschalk, 409 U.S. at 64.
67. Id. at 64.
68. Id. at 67-68. The Court supports this finding by citing O’Reilly v. Morse, 56 U.S. (15 How.)
62 (1853). The Morse patent claimed a process for using electromagnetism to produce distin-
guishable telegraph signals. Id. at 76-78. The O’Reilly Court rejected claim eight of the patent
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. Thus, while the Court explicitly did not hold that computer programs were unpatentable, the patent for the program at issue was invalid because the patent wholly preempted the mathematical formula used to perform the conversions.

The second case in the Supreme Court's trilogy of statutory subject matter cases, *Parker v. Flook*, involved the patentability of a method for updating alarm limits with only a mathematical formula as its novel feature. Again, the Court addressed the patentability of mathematical algorithms within the context of post-solution activity. While the patent examiner and the PTO Board of Appeals rejected the application on the grounds that the mathematical formula preempted the invention, the Court of Customs and Patent Appeals reversed, finding that the mathematical formula was focused on the post-solution activity of updating the alarm limits and did not entirely preempt the patent. The Supreme Court, however, decided the case as if the mathematical formula was part of the public domain. Thus, the Court found that since the patentee claimed the prior art algorithm, the application as a whole did not contain a patentable invention.

The third case in the Supreme Court trilogy was *Diamond v. Diehr*. The patent at issue in *Diehr* involved a process for curing synthetic rubber, using a mathematical algorithm and a digital com-

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69. *Gottschalk*, 409 U.S. at 70.
70. *Id.* at 71-73.
71. *Parker*, 437 U.S. at 585. The invention used a mathematical formula to calculate alarm limits used to monitor operating conditions such as "temperature, pressure, and flow rates" during catalytic conversion processes. *Id.* When any of the conditions exceeds a predetermined level, the alarm sounds to acknowledge an abnormal condition. *Id.* Patentee's invention measured the present value of the variable in question. *Id.* That value is then plugged into a mathematical equation to calculate an updated alarm limit, which is subsequently used to adjust the actual alarm limit to this updated value. *Id.*
72. *Id.* at 590.
73. *Id.* at 587.
74. *Id.* at 594-95.
75. *Diehr*, 450 U.S. 175.
puter to calculate alarm limits.\textsuperscript{76} Specifically, in order to obtain the perfect cure, the computer continuously calculated the temperature component of the process using the well-known Arrhenius Equation.\textsuperscript{77} Due to the instability of the temperature variable, the computer would constantly recalculate the cure time, signaling the press to open once the optimal cure time was achieved.\textsuperscript{78} The Court held that the physical and chemical process for producing synthetic rubber products was patentable statutory subject matter under 35 U.S.C. §101.\textsuperscript{79} Since the patentee did not wish to foreclose others from using the Arrhenius Equation itself, but rather to prevent others from using the equation in conjunction with all other steps of his claimed process, the patent was held to claim statutory subject matter under 35 U.S.C. §101.\textsuperscript{80}

The Federal Circuit responded to the Supreme Court trilogy of cases in Arrhythmia Research Technology v. Corazonix Corp., Inc.\textsuperscript{81} and In re Alappat.\textsuperscript{82} Primarily, Arrhythmia involved a process for manipulating electrocardiograph signals to provide a clearer image.\textsuperscript{83} The court employed a two-part Freeman-Walter-Abele Test, developed by the Federal Circuit to first determine whether a mathematical algorithm was recited directly or indirectly in the claim.\textsuperscript{84} If the first part of the test was met, the claims were then examined to determine if the algorithm was preempted. Alternatively, if the algorithm was applied to some kind of post-solution activity,\textsuperscript{85} the claim would be found to meet the requirements of 35 U.S.C. §101.\textsuperscript{86} The Arrhythmia court found that although the claims transformed one physical electrical signal into another using the algorithm, the algorithm was not wholly preempted.\textsuperscript{87} In Arrhythmia, the court found that “the use of mathematical formulae or relationships to describe the electronic structure and operation of an apparatus did not make it nonstata-

\textsuperscript{76} Id. at 177-79.
\textsuperscript{77} Id. at 178.
\textsuperscript{78} Id.
\textsuperscript{79} Id. at 184. The Court based this finding on the fact that industrial processes of the type at issue had historically been patentable. Id.
\textsuperscript{80} Id. at 187.
\textsuperscript{81} Arrhythmia Research Tech., Inc. v. Corazonix Corp., 958 F.2d 1053 (Fed. Cir. 1992).
\textsuperscript{82} In re Alappat, 33 F.3d 1526 (Fed. Cir. 1994).
\textsuperscript{83} 958 F.2d at 1054.
\textsuperscript{84} Id. at 1057-58. See also infra notes 138-153, 169-171 (stating “claims to a specific process or apparatus that is implemented in accordance with a mathematical algorithm will generally satisfy section 101”) and accompanying text.
\textsuperscript{85} Id. at 1057.
\textsuperscript{86} Id. at 1058.
\textsuperscript{87} Id. at 1059.
Since the claims were "directed to a specific apparatus of practical utility and specified application," they were not barred by the mathematical algorithm exception to section 101.

In Alappat, the claims at issue involved a method for creating a smooth waveform display in a digital oscilloscope. The patentee's process was found to be novel because it overcame the noise and discontinuity of the pixel image which created the waveform. The claims, written in means plus function language, were deemed to meet statutory requirements because they recited a machine, or apparatus made up of known electronic circuitry elements. Since the rasterizer claim was found to recite a machine, and thus statutory subject matter under section 101, the fact that it contained a mathematical algorithm did not make it non-statutory. The court held that in order to be patentable, a mathematical algorithm, which standing alone represents nothing more than a law of nature, must be reduced to some type of practical application. In conclusion, the court held that "a computer operating pursuant to software may represent patentable subject matter, provided, of course, that the claimed subject matter meets all of the other requirements of Title 35. . . . [I]n any case, a computer, like a rasterizer, is [an] apparatus[, not] mathematics."

Prior to the State Street decision, neither the Supreme Court nor the Federal Circuit ruled on the viability of the business method exception, only the mathematical algorithm exception. However, the Delaware District Court in Paine Webber v. Merrill Lynch significantly contributed to the erosion of the business method exception. The patent at issue in Paine Webber involved a cash management account program (CMA). The patent claimed a method by which security accounts, money market accounts, and Visa accounts were combined, thus allowing for investment of idle cash from a securities account to be deposited directly into a money market account. Furthermore, cash balances in the securities account, shares in the money market

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88. Id. at 1060 (citing In re Iwahashi, 888 F.2d 1370, 1375 (Fed. Cir. 1989)).
89. 958 F.2d at 1061.
90. In re Alappat, 33 F.3d at 1537-38.
91. Id. at 1536-37.
92. See supra note 46, and infra notes 123, 161 and accompanying text.
93. 33 F.3d at 1542 (Archer, C.J., concurring in part and dissenting in part).
94. Id. at 1565.
95. Id. at 1544.
96. Id. at 1545.
98. Id.
99. Id. at 1362.
fund, and available marginal loan value of the securities in the securities account were calculated to determine the amount of credit available for the Visa account. Thus, each component of the CMA system worked in conjunction with other elements of the system to function as a whole.

Paine Webber requested both declaratory and summary judgments against Merrill Lynch for invalidity and noninfringement of Merrill Lynch's CMA patent, while Merrill Lynch claimed infringement and contributory infringement against Paine Webber and Dean Witter. Refusing to consider whether the claims in question were related to a business method, the court analyzed the claims based as a mathematical algorithm under 35 U.S.C. § 101. Under the case law for mathematical algorithms at the time, mathematical algorithms were merely considered to be unpatentable ideas, unless the claims applied the algorithm to a new and useful end. In this regard, the court held that Merrill Lynch's CMA patent neither recited, nor preempted, an algorithm because it reproduced a method of operation on a computer which effectuated a business activity.

Thus, while the courts in Alappat and Paine Webber upheld the validity of the patents at issue based on findings that the claims did not encompass pure mathematical algorithms, neither case explicitly overruled the per se mathematical algorithm or business method exceptions to statutory subject matter. Instead, the respective courts worked around the exceptions to uphold the validity of the patents at issue.

C. Mathematical Algorithm and Business Method Exceptions to Statutory Subject Matter Reconsidered: State Street Bank & Trust, Co. v. Signature Financial Group, Inc. ("State Street I")

At the district court level, State Street I diminished the impact of the mathematical algorithm exception, however, it ultimately left the business method exception in tact. At issue in State Street I was Signature's patent entitled "Data Processing System for Hub and Spoke".

100. Id.
101. Id.
102. Id. at 1361.
103. 564 F. Supp. at 1366.
104. Id.
105. Id. at 1369.
Financial Services Configuration” (the ‘056 patent), which described an accounting system designed to facilitate a process by which mutual funds (Spokes) pooled their assets in an investment portfolio (Hub) organized as a partnership. The system allowed for the consolidation of the costs of administering the funds combined with the tax advantages of a partnership. Also noted as a “multi-tiered fund complex,” the hub portfolio assessed all economic gains and losses in relation to the spoke mutual funds on a pro rata basis.

The “Hub and Spoke” portfolio system was created in response to costly traditional investment methods used to manage mutual funds. While enlarging the fund asset base, the “Hub and Spoke” system produced a lower operating cost ratio of expenses (such as fees) to assets, thus increasing the productivity and performance of the mutual fund. Additionally, combining the assets of two or more mutual funds effectively reduced the operating cost ratio. Nonetheless, legal restrictions limited the commingling of assets. In order to avoid illegalities, Signature developed the “Hub and Spoke” configuration involving either a mutual fund, a pension fund, a common trust fund, an insurance company separate account, or a non-U.S. Domiciled Investment Fund. These “Spokes” were then pooled into a partnership portfolio, where each “Spoke” was an investor in the portfolio “Hub.” Investors were prohibited from investing di-

107. State Street, 927 F. Supp. at 504-06. To examine the claims and specification at issue in greater detail, see U.S. Patent No. 5,193,056, supra note 106.
108. State Street, 149 F.3d at 1370.
109. State Street, 927 F. Supp. at 504 (noting that the novel financial service at issue was noted as a “multi-tiered fund complex” by State Street, while Signature Financial designated it a “Hub and Spoke” configuration).
110. Id. at 505.
111. See Description, U.S. Patent No. 5,193,056, supra note 106. According to Signature’s ‘056 patent, traditional investment management vehicles involved additional expenses such as advisory fees, custodian fees, portfolio accounting fees, shareholder servicing fees, audit fees, and legal expenses. Id.
112. Id. Ordinarily, a mutual fund with few assets would not be a viable fund because it would result in a high operating cost ratio. However, using the “Hub and Spoke” method of portfolio management, the assets of such a fund can be invested in the portfolio, not only making the fund more profitable but also providing a little known fund with an investment history, thereby making it more attractive to investors. Id.
113. Id.
114. Id. Mutual funds are designated as those that comply with the Investment Company Act of 1940 (15 U.S.C.A. §80) or the Securities Act of 1933 (38 U.S.C.A. §77).
115. Id. (claiming that pension funds are subject to regulation under ERISA, the Employee Retirement Income Security Act, 29 U.S.C. §1132 (1994 & Supp. IV. 1998)).
116. Id.
117. See Description, U.S. Patent No. 5,193,056, supra note 106. The partnership portfolio is registered under the Investment Company Act of 1940, but its shares are not registered under the Securities Act of 1933. Id.
rectly into the portfolio, and the "Hub's" only investors were the funds, which contributed 100 percent of their assets to the portfolio. Additionally, because the portfolio was considered a partnership, it was not taxable. Therefore, the "Hub" enjoyed a "flow-through" tax treatment, where tax liability "flows" to the constituent "Spoke" mutual funds with other economic gains and losses.

The "Hub and Spoke" structure was complicated by the fact that each spoke was an investment vehicle subject to continuous market fluctuations, as well as the individual financial decisions made by each "Spoke's" investor. Thus, daily allocations into the investment system depended on the percentage share of each spoke in the total assets of the "Hub" portfolio. The overall purpose of the "Hub and Spoke" configuration was to avoid economic distortions and inequalities subject to mutual fund methods of actual distributions by making daily allocations. Furthermore, the system allocated the appropriate economic benefit or loss to each shareholder on the same day, rather than making a distribution to the shareholders present on any arbitrary date, resulting in a more accurate matching of economic and taxable income.

In order to accommodate the various aspects of the invention, Signature's '056 patent claimed both a data processing system for administering the "Hub and Spoke" financial system, as well as method claims for calculating the system's allocation ratio using "means plus function" language. Specifically, the claim language was directed toward a system that operated by means of a "personal computer, software capable of performing the various functions described in the claims and detailed in the preferred embodiment and flowcharts, data storage means such as a floppy disk, and display means such as printed output to a computer screen." Through the use of these means, the system functioned by calculating and storing data representing

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118. Id.
119. Id.
120. Id.
121. Id.
122. Id.
123. Means plus function language can be used to claim an invention as an apparatus or machine rather than a method or process. 35 U.S.C. §112 states:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

124. State Street, 927 F. Supp. at 505.
the percentage share that each Spoke fund holds in the Hub portfolio; any daily activity affecting the portfolio's assets; allocations of gains, losses and expenses to each of the Spoke member funds; and tracking and updating data that are used to determine aggregate year-end income, gains, losses, and expenses for accounting and tax purposes.125

State Street Bank, an administrator and accounting agent for multi-tiered mutual fund systems, negotiated with Signature for a license to use the “Hub and Spoke” method.126 However, when negotiations broke down, State Street Bank brought a declaratory judgment action against Signature, claiming the patent was invalid and unenforceable due to its mathematical algorithm and business method content.127 The district court invalidated the patent and granted summary judgment for State Street Bank based on the long-standing business method exception to statutory subject matter.128

The district court framed the issue by determining whether or not “computer software that essentially performs mathematical accounting functions and is configured to run on a general purpose . . . computer is patentable under 35 U.S.C. §101.”129 The court resolved this question by first examining [t]he “Supreme Court trilogy” of opinions that specifically addressed the scope of patent protection afforded to computer software.130 The district court in State Street cited Gottschalk v. Benson,131 Parker v. Flook,132 and Diamond v. Diehr133 as

125. Id. at 505.
126. Id. at 506.
127. Id.
128. Id. at 515-16.
129. Id. at 506.
130. State Street, 927 F. Supp. at 508-10.
131. In Gottschalk, the Court held that the patentee’s invention for a method of programming a general-purpose digital computer to convert signals from binary-coded decimals into pure binary form was not patentable statutory subject matter. Id. Because the mathematical formula used by the invention had no substantial practical application except in connection with a digital computer, the patent “wholly pre-empt[ed] the mathematical formula and in practical effect would be a patent on the algorithm itself.” Id. at 72. Thus, the Court found that allowing a patent on a computer program that converted numbers from one form to another would wholly preempt the mathematical formula upon which it was based, thereby holding the patent invalid. Id. at 71. In order for a mathematical algorithm to be patentable, the patent has to claim “transformation and reduction of an article to a ‘different state or thing.’” Id. at 70 (internal citations omitted). See also supra notes 66-70 and accompanying text (detailing the facts and holding of the Gottschalk Court).
132. 437 U.S. at 595. In Parker, the Court found that the patentee’s process for updating alarm limits used to time hydrocarbon catalytic conversion reactions was unpatentable. Id. Although the patentee’s mathematical algorithm performed the post-solution activity of adjusting the alarm limits at which chemical reactions became unstable, the Court found that claims containing mathematical algorithms would not be found valid simply by stating that the formula could be applied to an already existing technique. Id. at 594-95. Thus, “if a claim is directed essentially to a method of calculating, using a mathematical formula, even if the solution is for a
establishing two requirements for software patentability: preemption and transformation. Together these cases held that in order to be patentable, an invention could not wholly preempt any mathematical formula used to perform its function. Furthermore, the trilogy stood for the requirement that the claimed use of the algorithm be a transformation or reduction of a particular entity to a different state, rather than a process with a product, or an abstract idea.

The district court in State Street I also examined the applicability of the Freeman-Walter-Abele Test to Signature’s ’056 patent. Developed by the Court of Customs and Patent Appeals, and followed by the Federal Circuit, the Freeman-Walter-Abele Test first considers whether the claims in question recite a mathematical algorithm. Thus, if a mathematical algorithm is recited, one must consider whether the algorithm preempts the patent. If the patent is preempted, the claimed invention is non-statutory. The first part of the test is also known as the Mathematical Algorithm Test. However, if the algorithm is merely applied to elements that are considered patentable, the invention passes the statutory subject matter requirement under 35 U.S.C. §101. Known as the Physical Transformation Test, the second part of the test requires that the invention embody

specific purpose, the claimed method is nonstatutory.” Id. at 595 (quoting In re Richman, 563 F.2d 1026, 1030 (C.C.P.A. 1977)). Thus, improved methods of calculation are non-statutory subject matter under 35 U.S.C. §101, even if they are directed toward a specific post-solution activity. Id. at 595. See also supra notes 71-74 and accompanying text (detailing the facts and holding of the Parker Court).

133. Diehr, 450 U.S. 175. In Diehr, the Court held that a process for curing synthetic rubber involving an alarm limit coupled with the opening of the molding device was patentable. Id. The Court found that patent did more than successively calculate the temperature at which the rubber was optimally cured; the invention transformed raw rubber into a synthesized product. Id. Thus, because the patentee used a mathematical algorithm to perform a physical transformation, the patent was held viable despite its use of a mathematical algorithm. Id. at 187. See also supra notes 75-80 and accompanying text (detailing the facts and holding of the Diehr Court).

135. Id. at 508.
136. Id.
137. Id. at 510-12. This test is a two-part test devised by the Court of Customs and Patent Appeals (C.C.P.A.) and followed by the Federal Circuit. Id. at 510.
138. Id. at 510. For an explanation of the development of this two-part test see the three cases from which it developed: In re Abele, 684 F.2d 902 (C.C.P.A. 1982); In re Walter, 618 F.2d 758 (C.C.P.A. 1980); In re Freeman, 573 F.2d 1237 (C.C.P.A. 1978).
139. 927 F. Supp. at 510.
140. Id. at 513.
141. Id. at 513-16. For a complete explanation of the Freeman-Walter-Abele Test see In re Schrader, 22 F.3d at 292; Arrhythmia, 958 F.2d at 1058.
a statutory process, where the mathematical algorithm is applied only to the process' physical steps.\textsuperscript{143}

Signature tried to avoid the \textit{Freeman-Walter-Abele} Test by averring that since its claims were written in means-plus-function language, it was claiming a machine rather than a process. However, the district court found that claiming an invention as either an apparatus or process was not a determining factor.\textsuperscript{144} Rather, the district court held that the patentability of the subject matter did not “hinge on whether the claim is drafted in means-plus-function language.”\textsuperscript{145} Thus, the district court held that the Mathematical Algorithm/Physical Transformation Test (\textit{Freeman-Walter-Abele} Test) was best suited for determining patentability.\textsuperscript{146}

Under the first part of the \textit{Freeman-Walter-Abele} Test, the district court held that while Signature’s ‘056 patent did not directly recite a mathematical formula, the claims did recite a formula indirectly.\textsuperscript{147}

\begin{footnotesize}
\begin{enumerate}
\item 143. \textit{Id.}
\item 144. \textit{Id. at} 510-11. The district court in \textit{State Street I} based this finding on the Federal Circuit’s decision in \textit{In re Alappat}, 33 F.3d at 1542. The \textit{Alappat} court held that “labels are not determinative in §101 inquiries. ‘Benson applies equally whether an invention is claimed as an apparatus or process, because the form of the claim is often an exercise in drafting.’” \textit{In re Alappat}, 33 F.3d at 1542 (quoting \textit{In re Johnson}, 589 F.2d at 1077). The \textit{Alappat} court also held that “the claimed computing system may be a ‘machine’ within the ordinary sense of the word,’ . . . is irrelevant.” \textit{In re Alappat}, 33 F.3d at 1542 (quoting \textit{In re Maucorps}, 609 F.2d 481, 485 (C.C.P.A. 1979)).
\item 145. \textit{Id.} The non-determinative nature of the semantics of claim language in deciding the statutory nature of a claim was further buttressed by the district court’s analysis of the USPTO’s 1996 “Examination Guidelines for Computer-Related Inventions.” While the Guidelines do not have the effect of law, they are considered persuasive authority. \textit{Id. at} 512. See \textit{Examination Guidelines for Computer-Related Inventions}, 61 Fed. Reg. 7478, 7479 (1996) [hereinafter Examination Guidelines] (stating that guidelines are designed to assist patent examiners in determining the patentability of inventions and are considered consistent with Supreme Court and Federal Circuit precedent). \textit{See also In re Trovato}, 60 F.3d 807, 808 (Fed. Cir. 1995) (suggesting that the Federal Guidelines may be used as persuasive authority). In light of the guidelines, the district court again held that the manner in which the invention is claimed is not determinative of the subject matter. \textit{See Examination Guidelines}, 61 Fed. Reg. at 7479; \textit{State Street}, 927 F. Supp. at 512. The Guidelines state that “if a product claim encompasses any and every computer implementation of a process, when read in light of the specification, it should be examined on the basis of the underlying process.” \textit{Id. at} 7482. Further, the Guidelines support the Physical Transformation Test, where a claimed process is not statutory subject matter if it consists solely of a mathematical calculation, regardless of whether or not it is performed on a computer. \textit{Id. at} 7484. The Guidelines state that “if the ‘acts’ of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to the appropriate subject matter. ‘Thus, a process consisting solely of mathematical operations, i.e., converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter and thus cannot constitute a statutory process.’” \textit{Id. However, if the mathematical algorithm claimed is used in a practical application in the technical arts, where a physical transformation occurs, it is patentable subject matter. \textit{Id. at} 7479-80.
\item 147. \textit{Id. at} 513. The finding that the ‘056 patent contained a mathematical algorithm was supported by language in the patent’s specification stating that “[t]he present invention provides
\end{enumerate}
\end{footnotesize}
Thereafter, the court evaluated the '056 patent under the second part of the Freeman-Walter-Abele Test; the Physical Transformation Test. The court determined whether the mathematical algorithm claimed by the patentee "transforms or reduces subject matter to a different state or thing," and found that the invention was in fact designed to manipulate and record numbers. This was inconsistent with the court's precedent in finding patentable statutory subject matter. Further, the district court stated that the '056 patent did nothing more than recite and solve a mathematical formula using data "gleaned from pre-solution activity," storing the data, and displaying the results. Finally, the court found that the '056 patented invention involved no physical transformation or reduction other than inputting, calculating, outputting, and storing numbers.

The district court also rejected the '056 patent on the grounds that it claimed a business method. Based on the long-standing business method exception to section 101 statutory subject matter, the court held that business methods were considered unpatentable abstract ideas. Furthermore, allowing Signature to patent its multi-tiered method of conducting its financial business would allow Signature to hold an inequitable monopoly over all related multi-tiered mutual fund systems. Thus, the district court in State Street found Signature's '056 patent invalid due to lack of statutory subject matter under the Freeman-Walter-Abele Test, and the business method exception. The court thereby granted State Street Bank's motion for summary judgment.

a data processing system and method for monitoring and recording the information flow and data, and making all calculations, necessary for maintaining a partnership portfolio and partner hub financial services configuration (Hub and Spoke)." See U.S. Patent No. 5,193,056, col. 4, supra note 106. Further, the court supported its finding of use of a mathematical algorithm in patent claims three through six. See id. at col. 13-15.

149. Id. at 513.
150. Id. at 514.
151. Id. at 514-15. The court cited In re Alappat, 33 F.3d 1526; In re Schrader, 22 F.3d 290; Arrhythmia, 958 F.2d 1053; In re Abele, 684 F.2d 902; and In re Maucorps, 609 F.2d 481 as examples of statutory subject matter.
152. State Street, 927 F. Supp. at 514.
153. Id. at 515.
154. See supra notes 52-60 and accompanying text.
155. State Street, 927 F. Supp. at 516.
156. Id.
157. Id.
158. Id. at 517.
D. Revocation of the Business Method Exception to Statutory Subject Matter: State Street Bank & Trust Co. v. Signature Financial Group, Inc. (State Street II)

In State Street Bank v. Signature Financial Group, the Federal Circuit laid the "ill-conceived" business method exception to rest. On appeal, the Federal Circuit reversed and remanded the district court's decision in State Street I by holding that Signature's claims, as written in a means-plus-function format, conformed to the requirements of paragraph six of 35 U.S.C. §112. Thus, the court found that the patentee properly claimed a machine (a data processing system) for managing mutual fund financial configurations established as a partnership. However, agreeing with the district court, the Federal Circuit found that as long as the invention fell into one of the four classes of statutory subject matter, the fact that it was claimed as a machine was immaterial.

The Federal Circuit next examined the two grounds upon which the district court held the '056 patent invalid, the mathematical algorithm and business method exceptions. Primarily, the court looked to the legislative intent behind Congress' use of the word "any" in describing patentable subject matter in the 1952 Patent Act. The court cited 35 U.S.C. §101, as well as the committee hearings on the 1952 amendments, to find that the legislature did not intend to limit the scope of what could be considered patentable. With this in mind, the Federal Circuit reviewed the district court's refusal to accept the '056 patent for lack of statutory subject matter based on the mathematical algorithm exception. In doing so, the Federal Circuit stated that while mathematical algorithms were not patentable subject matter to the extent that they were merely non-useful abstract ideas, the inventions in Arrhythmia and Alappat were found to possess statutory subject matter. Unlike the district court, the Federal Circuit found that the patents in these cases were similar to the '056 patent. Particularly, the Federal Circuit found that Signature's '056 patent recited an invention which used a mathematical algorithm to produce "a useful, concrete and tangible result"—a final share price monetarily fixed for

159. State Street, 149 F.3d at 1375.
160. Id. at 1377.
161. 35 U.S.C. §112 (1984); see supra note 46 and accompanying text.
162. State Street, 149 F.3d at 1372.
163. 35 U.S.C. §101 (1984); see supra note 20 and accompanying text.
164. Id. See supra notes 20, 49 and accompanying text.
165. Id. at 1371-73. See supra notes 20, 49 and accompanying text.
166. Id. at 1373-74. See supra notes 81, 82 and accompanying text.
167. Id.
recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades.\textsuperscript{168}

In support of its holding, the Federal Circuit struck down the use of the \textit{Freeman-Walter-Abele} Test for determining the patentability of inventions using mathematical algorithms.\textsuperscript{169} Primarily, the Federal Circuit held that the \textit{Freeman-Walter-Abele} Test was not appropriate for determining the presence of statutory subject matter. Relying chiefly on \textit{Alappat} and \textit{Diehr}, the court held that the test was misleading because it excluded processes, machines, modes of manufacture, or compositions of matter containing mathematical algorithms from statutory subject matter.\textsuperscript{170} Further, if an invention produced a "useful, concrete and tangible result," it could not be rendered non-statutory simply because it contained a mathematical algorithm.\textsuperscript{171} The Federal Circuit held that the invention recited in the claims fell into one of the four categories for statutory subject matter.

Most relevant to this Comment, however, was the court's explicit refusal to further recognize a per se business method exclusion to statutory subject matter. Most likely based on a prior statutory requirement for invention, which was later eliminated by section 103,\textsuperscript{172} the court stated that all cases basing patent invalidity on the exception, actually based such findings on the algorithm exception, a lack of novelty, or nonobviousness.\textsuperscript{173} Although the '056 patent recited an unpatentable business method because it broadly claimed that allowing such a patent would essentially permit a monopoly on all multi-tiered mu-

\textsuperscript{168} \textit{State Street}, 149 F.3d at 1373.

\textsuperscript{169} \textit{Id.} at 1373-74. \textit{State Street} has since seemingly made the "Safe Harbors" test for patentability outlined by the USPTO's 1996 Guidelines for Software Patentability obsolete. Modeled after the \textit{Freeman-Walter-Abele} Test designed by the Court of Customs and Patent Appeals, the test has very little applicability after the decisions in \textit{Diamond v. Chakrabarty} and \textit{Diamond v. Diehr}. \textit{Id.} at 1374. \textit{See} Examination Guidelines, 61 Fed. Reg. 7478, 7479 (1996). Originally formulated to extract and identify unpatentable mathematical algorithms, the \textit{Freeman-Walter-Abele} Test: (1) analyzed the claim in question to determine whether a mathematical algorithm was directly or indirectly recited; and (2) if a mathematical algorithm was found, the claim was further analyzed to determine whether it was applied "in any manner to physical elements or process steps." \textit{State Street}, 149 F.3d at 1374. While the test determines whether a claim contains a mathematical algorithm, today, the mere fact that a claim involves an algorithm would not, in and of itself, qualify the claim as non-statutory subject matter. \textit{Id.} Thus, in light of the Court's rejection of the use of the \textit{Freeman-Walter-Abele} Test in \textit{State Street}, it is unlikely that the USPTO's "Safe Harbors" test will be implemented as a test for patentability for electronic commerce methods. \textit{Id.}

\textsuperscript{170} \textit{Id.} at 1374. The court, citing \textit{Diehr}, held that "a claim drawn to subject matter otherwise statutory does not become non-statutory simply because it uses a mathematical formula, computer program or digital computer." \textit{Id.}

\textsuperscript{171} \textit{Id.} at 1374 (quoting \textit{In re Alappat}, 33 F.3d at 1544).


\textsuperscript{173} \textit{State Street}, 149 F.3d at 1375. \textit{See supra} note 60 and accompanying text.
tual fund configurations, the Federal Circuit found this argument unpersuasive, noting that the breadth of claims is viewed in light of sections 102, 103, and 112; not section 101.

The court concluded that State Street Bank was not entitled to summary judgment against Signature because the patent’s disputed claim qualified as statutory subject matter under 35 U.S.C. §101. The court held that the transformation of data by a machine through a series of mathematical calculations into a final share price constituted a practical application of a mathematical algorithm because it produced a useful, concrete, and tangible result. In addition, the court also found that the business method exception no longer existed. The patentability of a process depended solely on whether or not it satisfied one of the statutory classes. Thus, patentability no longer turns on whether a claimed method “does business,” but rather, on whether the method, when viewed as a whole, meets the statutory requirements of patentability.

E. Business Methods and Mathematical Algorithms After State Street

Due to the recent nature of the State Street II decision, the Federal Circuit has not yet enforced the ban on the business method exception against potentially invalid patents. However, it is unlikely that such a challenge would be considered by an infringing party. Claims of invalidity will now have to be defended upon other grounds, such as lack of novelty, utility, non-enabling specification, best mode, or obviousness. While severely limiting its scope, State Street II did not completely eliminate the mathematical algorithm exception. Therefore, defendants may still be able to apply the mathematical algorithm exception to invalidate a patent because it lacks statutory

174. Id. at 1376.
176. State Street, 149 F.3d at 1374-75.
177. Id. at 1375.
178. Id. at 1376 (“[W]hether the claims are directed to subject matter within §101 should not turn on whether the claimed subject matter does ‘business’ instead of something else.”).
179. In re Schrader, 22 F.3d at 298 (Newman, J., dissenting).
180. See supra notes 20, 36, 38 and accompanying text.
181. State Street, 149 F.3d at 1373; see infra note 241, at 386.
subject matter where the algorithm wholly preempts the invention. However, while it is conceivable that patents may be invalidated due to mathematical algorithms, a patentee need only show that his or her invention extends the mathematical formula beyond an abstract idea by reducing it to a practical application, which results in a useful, concrete, and tangible product.  

The first case to be decided after State Street II was AT&T Corp. v. Excel Communications, Inc. In AT&T, the patent at issue involved a method of call message recording for telephone systems. The invention enhanced the message record for long-distance calls by adding a primary interchange carrier indicator. The indicator aided long-distance carriers in providing differential billing treatments for subscribers, depending on whether a subscriber called someone with the same or a different long-distance carrier. The district court granted summary judgment to Excel Communications, holding that AT&T's patent was invalid under 35 U.S.C. §101 for failure to claim statutory subject matter. The lower court stated that the patent implicitly recited a mathematical algorithm, where the only physical step claimed was to gather information for the algorithm. Since the algorithm did not substantively change the data's format, it failed to convert non-patentable subject matter into patentable subject matter.

The Federal Circuit, however, disagreed. Citing State Street II, the court reiterated that "any step-by-step process, be it electric, chemical or mechanical, involves an 'algorithm' in the broad sense of the term." Since 35 U.S.C. §101 included processes as a category of patentable subject matter, the judicially defined proscription against patenting a mathematical algorithm, if such an exception still existed, was narrowly limited to abstract mathematical algorithms. Therefore, the court held that computer-based programs constituted patentable subject matter if the basic requirements under section 101 were met.

182. Id.
184. Id. at 1353-55.
185. Id. at 1354.
186. Id. at 1353.
188. Id. at 6.
189. Id. at 7.
190. AT&T v. Excel, 172 F.3d at 1356; State Street, 149 F.3d at 1374-75.
191. AT&T v. Excel, 172 F.3d at 1356.
192. Id. at 1360.
The Federal Circuit reversed the lower court’s grant of summary judgment, finding that since the claimed process applied the Boolean principle to produce a “useful, concrete, and tangible” result without preempting other uses of the mathematical principle, it fell within the scope of section 101.193 While Excel argued that a process or method claim containing a mathematical algorithm could be patentable only if it facilitated a physical transformation of subject matter from one physical state to another, the Federal Circuit disagreed. Rather, the Federal Circuit distinguished the “physical transformation” language of Diehr by noting that the Diehr court used the signal “e.g.” when describing how a physical transformation brought on by a mathematical algorithm could result in a useful application of the algorithm. Thus, because “e.g.” denoted an example, rather than an exclusive requirement, a physical transformation was not a required element of patentability.194

III. Analysis

While the State Street II decision has resulted in an increase in conventional business method patents, it has also allowed for the patentability of business processes used to conduct Internet transactions and e-commerce. The Internet has changed from a progressive developmental phase to a highly dynamic, commercialization phase.195 With the recent possibility of patenting business methods, substantial financial investments in e-commerce, new rules on software patentability, and the shift toward commercializing Internet development, the patenting of e-commerce methods and processes has become more beneficial for protecting property rights and fostering competition.196

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193. Id. at 1361.
194. Id. at 1359.
195. See Laurie & Yang, supra note 9, at 243-47.
196. The State Street decision is not solely responsible for the patentability of e-commerce methods. Increased popularity and commercialization of the Internet as a business and marketing tool have also contributed to the popularity of patenting business methods used for online applications. For example, exponential growth of the Internet industry during the early developmental phase of the Internet has resulted in an increased utilization of patent protection for Internet applications. Another factor in the increase in e-commerce patent applications has been the development, standardization, and widespread availability of platform-independent, networked-computer programming tools for creating and distributing executable content, such as Sun Microsystems’ Java. See supra note 9, at 243-47.
A. United States Legal Developments Resulting From the State Street II Decision

State Street II has resulted in a surge of e-commerce process patents, and the fate of e-commerce patentability rests solely at the discretion of the courts. Decisions regarding the validity of e-commerce process patents will ultimately resolve the question of how effective e-commerce patentability will be as a means of protecting property rights, and increasing the global, legal, and economic systems.

1. Post-State Street Requirements for Business Method Patentability in the United States

Rather than applying the Freeman-Walter-Abele Test or the USPTO's "Safe Harbors" test to decide whether a patented business method was valid, State Street II established that both the PTO and the courts must complete a two-tiered inquiry, much like the USPTO's alternative test for patentability. Primarily, the PTO must decide whether the invention recites statutory subject matter.

197. Because e-commerce methods are based on software applications applied toward operating on-line services, the USPTO Guidelines play an integral role in the review of e-commerce applications. Overall, the Guidelines are divided into regulations for descriptive material, product claims, and process claims. See Examination Guidelines, 61 Fed. Reg. at 7482-86 (1996). Within the process claims category, the USPTO has devised two tests for patentability. The first is the "Safe Harbors Test" which states that in order to meet the statutory requirements for computer-related processes, a process claim must belong to one of two "safe-harbor" categories involving some physical activity or transformation outside the computer for which a practical technological explanation is disclosed in the specification. Id. at 7483-84. The first "Safe Harbor" category is post-computer process activity, where the invention performs physical acts outside the computer independent of and after any steps to be performed by the computer, such as in Diamond v. Diehr. Id. at 7483-84. See also supra note 75-80 and accompanying text (explaining the decision in this case). In such a case, the physical acts required involve manipulating a tangible physical object to change its physical attributes or structure. See Laurie & Yang, supra note 9, at 263. The second "Safe Harbor" category involves pre-computer physical process activity, where a process claim transforms measurements or characteristics of physical objects or activities external to the computer into electrical signals or data. The signals or data are then processed within the computer. See Examination Guidelines, 61 Fed. Reg. at 7484.

198. An alternative test to the "Safe Harbors" test also exists. Under this alternative test, the invention in question must be limited by the language of its claims to a practical technological invention, for example, as in Arhythmia Research v. Corazonix. See Examination Guidelines, 61 Fed. Reg. at 7484-85. See supra notes 81-89 and accompanying text. Furthermore, the claims must recite a practical technological application in addition to disclosing that practical application of the invention within the specification as required under 35 U.S.C. §112. Id. at 7484-85. See also supra note 46 (discussing 35 U.S.C. §112 and use of means plus function language). A claimed process is considered statutory under the alternative test if it is explicitly limited to a practical technological application of the abstract idea or mathematical algorithm. See Laurie & Yang, supra note 9, at 263.

199. Under U.S. law, an invention is patentable if it is a process, machine, manufacture, or composition of matter. 35 U.S.C. §101 (1994). However, the statutory subject matter inquiry should not focus on whether the claimed invention falls into one of these four categories.
In addition to satisfying the statutory subject matter requirement, an invention must also generate a "useful, concrete and tangible result." Since e-commerce methods inherently contain computer algorithms that are instrumental to the functioning of the invention's process, the patentability of on-line business methods must be judged based on a method's production of a useful result. Thus, like the "Safe Harbors" Test outlined by the USPTO, a claimed process must entail a practical and useful technological application in order to qualify as statutory material under 35 U.S.C.

To prove that an e-commerce process invention results in a useful, concrete, and material result, the company seeking to patent its process may need to show that the new business method decreases operating costs, the invention increases productivity, or the method achieves some other tangible economic benefit. Due to the speculative nature of predicting the results of these factors, the likelihood that companies will attempt to patent general business operating systems may decrease. Instead, business methods that are likely to be patented will involve computer software and will qualify as machines via means-plus-function claims, as they have before the State Street II decision.

In response to the State Street II decision, and the resulting increase of e-commerce business method patents issued by the USPTO, patentees are now seeking to enforce their rights against alleged infringers. While smaller, start-up internet companies are also suing their

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200. State Street, 149 F.3d at 1373. This requirement was generated by the court's response in State Street to the mathematical algorithm exception to statutory subject matter. Initiated by the Supreme Court in Diehr, the mathematical algorithm exception developed in response to the Supreme Court's rejection of laws of nature, natural phenomena, and abstract ideas. 450 U.S. at 185. Accordingly, merely abstract mathematical algorithms were not patentable unless they were applied in a useful way. State Street, 149 F.3d at 1373. In State Street, the transformation of data by a machine through a series of mathematical calculations into a final share price constituted a mathematical algorithm because it produced a useful, concrete and tangible result. Id.


202. See Keeley-Domokos, supra note 53, at 168.

203. The first suit raising a claim of infringement of an electronic commerce business method was Netword LCC v. Centraal Corp., No. 98-1023-A, 1999 U.S. Dist. LEXIS 1957 at 1 (E.D. Vir. Jan. 12, 1999). The patent at issue in Netword entailed a system for finding an Internet address when only words or phrases were entered into an Internet browser. Id. at 1-2. Plaintiff alleged that defendant infringed, contributorily infringed and continued to infringe its patent. Id. at 1. Defendant's "RealNames" system was also Internet-based, where the user typed in an alias for a
competitors for infringement of their on-line business method patents, the questions surrounding the validity of recently issued e-commerce patents are likely to be decided by the current litigation between Amazon.com (Amazon) and Barnesandnoble.com (Barnesandnoble), as well as the overabundance of other pending lawsuits.

2. Pending United States Litigation Regarding E-Commerce Patentability: Amazon.com v. Barnesandnoble.com

Amazon, an Internet leader in on-line book sales, filed a complaint on October 21, 1999, against its on-line competitor Barnesandnoble, alleging infringement of United States Patent No. 5,960,411 ('411 patent), entitled, "Method and System for Placing a Purchase Order Via a Communications Network." Amazon alleged that Barnesandnoble's "Express Lane" feature violated its patented "one-click" method, a signature feature of the Amazon site used to differentiate Amazon from its competitors. In addition to the complaint, Amazon's website and the system located the appropriate homepage. Id. The court granted defendant's motion for summary judgment, holding that in light of its claim construction and undisputed evidence regarding the structure of the defendant's system, the plaintiff was unable to support its infringement claims under a theory of literal infringement or the doctrine of equivalents. Id. at 22. Because invalidity of the patent at issue was not raised as a defense against infringement, the Netword decision gives little guidance regarding how future cases involving e-commerce business methods will be adjudicated.

204. See Jane Martinson, Silicon Alley Turns Nasty, THE GUARDIAN (LONDON), Oct. 30, 1999, at 28 (noting that small start-up New York internet companies such as Kozmo.com are following behind Amazon.com and Priceline.com in enforcing their patents on electronic-commerce business methods). In addition to the widely publicized suits brought by Amazon.com and Priceline.com, LinkShare Corp., recently was granted a patent for creating links from search engines and home pages to online stores. See Hansell, supra note 16. Yahoo! has also been sued by an inventor who claims ownership of a shopping cart feature used on the search engine's site. Id. Additionally, DoubleClick, Inc., an Internet advertising company, has filed suit against two smaller corporations for infringement of its patent on ad-targeting technology. Id.

205. Although a decision has already been handed down on Amazon's motion for a preliminary injunction against Barnesandnoble.com, the litigation initiated by Priceline.com against Expedia.com remains in discovery. See Saul Hansell, Amazon Wins Court Ruling to Protect Patent on Ordering System, N. Y. TIMES, Dec. 3, 1999, §3 at 24.


207. Id. 1232-33. See Kaufman, infra note 237. Amazon's patented “one-click” technology allows returning customers to place new orders without having to re-enter their shipping and billing information. Id. at 16. The Amazon “one-click” shopping method is based upon U.S. Patent No. 5,960,411, entitled “Method and system for placing a purchase order via a communications network.” The patent, assigned by its inventors to Amazon.com, claims:
zon also filed for a preliminary injunction, requesting that Barnesandnoble discontinue its use of the “Express Lane” feature.\textsuperscript{208}

In response to Amazon’s infringement claim, Barnesandnoble alleged that the ‘411 patent was invalid due to obviousness\textsuperscript{209} and anticipation.\textsuperscript{210} In support of its claims, Barnesandnoble offered evidence of prior art references categorized either as systems for ordering tangible items online, or electronic document delivery systems.\textsuperscript{211} Addi-

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

See U.S. Patent No. 5,960,411, Abstract. \textit{See also} Amazon.com <http://www.amazon.com/> (visited Jan. 31, 2000) (website using the “one-click” checkout method for processing shipping and payment information for return users); Barnesandnoble.com, <http://www.bn.com/> (visited Jan. 31, 2000) (website utilizing alleged infringing “Express Lane” method which also loads return user’s shipping and payment information with one click, and below the “Express Lane” button reads “Buy it now with just 1 click!”).

\textsuperscript{208}Amazon.com, 73 F. Supp.2d at 1231.
\textsuperscript{209}According to 35 U.S.C. §103,

\begin{itemize}
  \item a patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.
\end{itemize}

35 U.S.C. §103 (1994). \textit{See supra} note 38 and accompanying text. Unlike the test for novelty/anticipation where the invention must be disclosed within the four corners of a single piece of prior art, the nonobviousness requirement allows the limitations of a claimed invention to be scattered throughout more than one prior art reference, where it would be obvious for one of ordinary skill in the art to assemble those elements in the form of the claimed invention. \textit{See} CHISUM, \textit{supra} note 31, at 530. Thus, the inventor is deemed to have knowledge of all prior art in his field of endeavor, and knowledge of arts outside his endeavor that are reasonably pertinent to the inventor’s particular problem. \textit{Id}.

\textsuperscript{210}Amazon.com, 73 F. Supp.2d at 1233. \textit{See} 35 U.S.C. §§102-03 (1994). \textit{Supra} note 36 and accompanying text. To constitute anticipation, all elements of a patent must be contained within the four corners of a single piece of prior art, and the reference must enable a person having ordinary skill in the art to produce the claimed invention. \textit{See} CHISUM, \textit{supra} note 31, at 431.

\textsuperscript{211}Amazon.com, 73 F. Supp.2d at 1233. Within the category of systems for ordering tangible items online, Barnesandnoble cited a Web Basket system, the Netscape merchant system described in the defendant’s “Creating a Virtual Store” reference, and the “Oliver’s Market” web pages. \textit{Id}. Under the category of electronic document delivery system prior art, Barnesandnoble cited a CompuServe financial information service, and U.S. Patent No.
tionally, Barnesandnoble also argued that that the "Express Lane" feature did not infringe any of the '411 patent's claims, the '411 patent was unenforceable, Amazon suffered no irreparable harm resulting from Barnesandnoble's use of the "Express Lane" method, and issuance of a preliminary injunction against Barnesandnoble would be contrary to public interest.

The court found key differences between the claims of the '411 patent and the prior art including, Web Basket, Netscape Instant Buy option, Oliver's Market web pages, the '780 patent, and the CompuServe trend service. Thus, the court concluded the following: (1) that none of the prior art references anticipated the '411 patent; and (2) there was insufficient evidence to conclude that one skilled in the art of e-commerce would combine the prior art references cited to make the '411 invention. The court further supported its finding of nonobviousness by noting that secondary

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5,708,780, entitled “Internet server access control and monitoring systems.” Id. For a full discussion of the context of each of the prior art references cited by Barnesandnoble, see Amazon.com, 73 F. Supp.2d at 1233-36.

212. Id. at 1231.
213. Id. at 1232.

214. Id. at 1235. For example, with respect to the Web Basket prior art, the court found that each claim of the '411 patent required performance of a single action to order an item. Id. at 1239. However, the Web basket ordering process required that the user perform at least 5 steps to order an item(s). Id. Also, claims 1-5 and 11-26 require that the items be ordered without using a shopping cart, whereas with the Web Basket, all items must be ordered using a shopping cart. Id.

215. Id. at 1240. Because Barnesandnoble's expert could admittedly not explain how the Netscape feature worked, the court found that the prior art reference did not teach the invention to one having ordinary skill in the art, which is required of an anticipatory reference. Id. Additionally, like the Web basket reference, the Netscape reference failed to include a single-action ordering component and was not independent from a shopping cart model. Id.

216. Id. at 1240. Oliver's market failed to claim both a single-step process and a checkout method independent from a shopping cart. Id.

217. Amazon.com, 73 F. Supp.2d at 1240. Although the '780 patent describes a method of accessing web pages, the access controlling system described by the '780 patent is not an ordering system. Id. Because the '780 patented invention simply delivers requested web pages and later bills the user for the web pages ordered, it does not constitute an order request and delivery system, but rather functions more like an ordinary web browser. Id.

218. Id. at 1241. The CompuServe system (used in delivering stock charts) does not identify an item that a consumer could order using a single function, and therefore does not anticipate claims 1-5 and 11-26. Id. Additionally, because '411 claims 6-10 require a performance of only a single action as well as a shopping cart component, CompuServe's lack of a shopping cart component results in non-anticipatory prior art. Id.

219. See supra notes 214-218 and accompanying text.

220. Amazon.com, 73 F. Supp.2d at 1235. The court found especially persuasive the testimony of defendant's witness Dr. John Lockwood, creator of the Web Basket prior art reference. Id. Dr. Lockwood testified that, although a single-action ordering method would have been easy to implement, it never occurred to him to modify his Web Basket program to include such a feature. Id. The court also gave weight to secondary considerations such as commercial success.
considerations, such as "one-click" purchasing, were major innovations in online shopping. The "one-click" method fulfilled the long-felt need for solving the problem of abandoned shopping carts, and neither party's experts, despite their knowledge of prior art, had ever conceived of such a system. In response to Barnesandnoble's claim that the "Express Lane" feature did not infringe any of the '411 patent claims, the court held that the strong similarities between Amazon and Barnesandnoble's business systems resulted in infringement. In dispute was the construction of the terms "shopping cart model," "fulfillment," "single action," and "single action ordering component," used in the '411 patent claims. Reading the claims in light of the '411 patent's specification, the court construed all disputed claims in favor of Amazon, holding that many of the defendant's proposed interpretations would result in exclusion of the preferred embodiment, or in internal inconsistencies within the '411 patent itself.

The Washington Federal District Court decided that Amazon would most likely suffer irreparable harm due to Barnesandnoble's infringement. Since easy to use and learn websites are more likely to be consumer-friendly, Amazon's "one-click" system has significant com-

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221. Id. at 1241-42.
222. Id. at 1237.
223. Id. at 1243. The court found Barnesandnoble's definition of "shopping cart" to be too broad, including almost any method of an online purchase, and contrary to both the '411 patent specification and the preferred embodiment. Id. The court instead elected Amazon's construction of shopping cart model ("a method for on-line ordering in which the user selects and accumulates items to be purchased while browsing a merchant's site and then must proceed to one or more checkout or confirmation steps in order to complete the purchase"). Id. at 1244.
224. Id. at 1244. The debate centered on whether "fulfill" referred to computer or physical processes. Id. Although the specification did not provide an explicit definition, both the claims and the specification referred only to computer processes. Id. Additionally, defendant's expert testified that "fulfillment application" was a term used in the industry to refer to software applications, not physical processes. Id. Thus, the fulfillment component of the server system does not include physical steps involved in handling or packaging actual orders. Id.
225. Id. The parties were in dispute over the definition of "single action" and when a "single action" occurred (at what point in the order, or which mouse clicks constituted a "single action"). Id. Again, although "single action" was not specifically defined in the patent specification, the court found that looking at the claims and the specification as a whole, the term "single action" referred to one action (clicking the mouse once) that a purchaser took to buy his or her items once he or she reached the screen that displays the items requested, and was prompted to perform one-click to purchase those items. Id.
226. Amazon.com, 783 F. Supp.2d at 1243.
227. Id. at 1245 (holding that Barnesandnoble.com had infringed claims 1, 2, 3, 5, 11, 12, 14, 15, 16, 17, 21, 22, 23, and 24 of the '411 patent).
228. Id. at 1238.
mmercial value. Further, the court found that Amazon would suffer greater harm if Barnesandnoble were allowed to continue operating the “Express Lane” system during the 1999 holiday season. Thus, the court found that defendant’s continued use of the “Express Lane” method would likely result in plaintiff’s loss of market share and customers to Barnesandnoble, thereby causing irreparable harm.

Overall, the court found that Amazon demonstrated the following: (1) a reasonable likelihood of success on the merits of the case at trial; (2) that it would suffer irreparable harm unless a preliminary injunction was granted; (3) a balance of hardships favoring the plaintiff; and (4) a preliminary injunction was not contrary to any public interest. In support of Amazon and its vested rights in the patented “one-click” technology, the U.S. District Court for the Western District of Washington granted plaintiff’s request for a preliminary injunction against Barnesandnoble. The court noted that Barnesandnoble could continue to offer the “Express Lane” feature if it was modified to require more than a single action to confirm orders. Barnesandnoble subsequently made arrangements to change its ordering system to a two click method, whereby the consumer first clicks a button next to the name of the book they have ordered, followed by a second click to choose from a number of options, such as shipping and address choices. Barnesandnoble appealed the preliminary injunction ruling, and fully expects to succeed on the merits of the case at trial.

Similarly, Priceline.com (Priceline), a pioneer in e-commerce business method patenting, filed a complaint against Expedia.com (Expedia) for infringement of its “reverse auction” system of sales, United States Patent No. 5,794,207 (‘207 patent) entitled, “Method and Apparatus for a Cryptographically Assisted Commercial Network System Designed to Facilitate Buyer-Driven Conditional Purchase Of-

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229. Id. at 1237-38.
230. Id. at 1238. During the 1998 holiday season, Amazon added over one million new customer accounts, a 20 percent increase during the last six weeks of the year. Id. Further, analysts predicted that internet purchases would increase two to three times that of last season. Id.
231. Id. at 1238-39.
232. Amazon.com, 783 F. Supp.2d at 1232.
233. Id. at 1249.
234. Id.
235. See supra note 205 and accompanying text.
236. Id. According to a Barnesandnoble representative, the online bookseller “do[es] not intend to sit back and allow Amazon to stake a claim upon any technology that is widely used.” See Louise Kehoe, Further Legal Challenges Likely Over the Online Equivalent to the Express Lane at a Supermarket, FIN. TIMES (LONDON), Dec. 3, 1999, World News: The Americas, at 10 (available 1999 WL 21149357).
fers." Priceline filed suit in Connecticut District Court, alleging that Expedia’s “Hotel Price Matcher” system not only infringed Priceline’s ‘207 patent, but also violated the State of Connecticut’s Unfair Trade Practices Act. Priceline requested that the court uphold the validity of its patent, block Expedia from violating the patent via an injunction, and award Priceline unspecified damages. Expedia responded to the suit by filing a motion to dismiss the suit challenging the validity of the patent based on inventorship, and questioning whether Priceline, or its vice-chairman, Jay Walker, in fact owns the patent at issue.


Overall, analysts agree that resolution of these lawsuits will ultimately determine the future validity of e-commerce patentability. However, in the wake of the Washington Federal District Court’s pre-

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(a) No person shall engage in unfair methods of competition and unfair or deceptive acts or practices in the conduct of any trade or commerce. (b) It is the intent of the legislature that in construing subsection (a) of this section, the commissioner and the courts of this state shall be guided by interpretations given by the Federal Trade Commission and the federal courts to Section 5 (a) (1) of the Federal Trade Commission Act (15 U.S.C. §45 (a) (1)), as from time to time amended.

CONN. GEN. STAT. §42-110(b) (1999).

239. See Expedia Seeks to Dismiss Suit, supra note 238.

240. Id. Determining who invented the subject matter in question affects who has the right to enforce the patent in question. See CHISUM, supra note 31, at 504. Contesting the inventorship designation of a patent serves as a defense in an infringement suit, and is based on 35 U.S.C. §256, which states:

Whenever through error a person is named in an issued patent as the inventor, or through error an inventor is not named in an issued patent and such error arose without any deceptive intention on his part, the Commissioner may, on application of all the parties and assignees, with proof of the facts and such other requirements as may be imposed, issue a certificate correcting such error. The error of omitting inventors or naming persons who are not inventors shall not invalidate the patent in which such error occurred if it can be corrected as provided in this section. The court before which such matter is called in question may order correction of the patent on notice and hearing of all parties concerned and the Commissioner shall issue a certificate accordingly.

liminary injunction decision against Barnesandnoble, it appears that neither the Priceline nor the Amazon patent will be invalidated under the weakened mathematical algorithm exception. Rather than invalidating the patents alleging a lack of statutory subject matter, the defendants are raising arguments based on obviousness, anticipation, and inequitable conduct. Utilizing traditional defenses, however, may also prove difficult due to the lack of prior art in the e-commerce field. Since a general defense of invalidity, based on broad exceptions for e-commerce business methods is not available, litigants must concentrate their efforts on invalidating the patent and narrowing the scope of the claims through the use of what little prior art exists, and available file wrapper estoppel.

**B. European Patent Office/German Patent Office Mathematical Algorithm and Business Method Patentability Policies**

The European Patent Office (EPO) represents a system of unified patent laws and practice, encompassing a number of member nations. Established during the European Patent Convention (EPC)
on October 5, 1973, the EPO functions as a multi-national patent authority. The EPO allows inventors to file a single patent application in either English, German, or French, and designates the EPO member states where the inventor wants to receive patent protection from. Thus, once the EPO grants the patent, the member states are legally responsible for affording the invention the same protection as a national patent.

The basic rules governing general invention patentability are similar in the EPO and the USPTO. However, unlike the USPTO, the EPO expressly excludes computer software and programs from patent protection because of the lack of technical character. However, if the patentee combines the program with at least some program-controlled apparatus or process, so that the whole invention concerns a technical problem or achieves a technical result, it is patentable.

Currently, this requirement is not fulfilled by conventional uses of

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248. Id.
249. Id. EPO-granted patents have the same term of protection as a USPTO-granted patent: 20 years. Id.
250. As in the United States the EPO’s examination guidelines are not rules of law; however, they are normally followed by the EPO’s examining staff. Jan A. H. van Voorhuizen, The Patentability of Computer Programs and Computer-Related Inventions under the European Patent Convention, 5 IIC 627, 628 (1987). See also Guidelines for Examination in the EPO, Part C, Chapter IV-1 (1999). The guidelines state:

There are four basic requirements for patentability: (i) There must be an “invention”. (ii) The invention must be “susceptible of industrial application”. (iii) The invention must be “new”. (iv) The invention must involve an “inventive step...”. In addition to these four basic requirements, the examiner should be aware of the following two requirements that are implicitly contained in the Convention and the Regulations: (i) The invention must be such that it can be carried out by a person skilled in the art (after proper instruction by the application) ... (ii) The invention must be of “technical character” to the extent that it must relate to a technical field (Rule 27(1)(a)), must be concerned with a technical problem (Rule 27(1)(c)), and must have technical features in terms of which the matter for which protection is sought can be defined in the claim (Rule 29(1)) (see III, 2.1). The Convention does not require explicitly or implicitly that an invention to be patentable must entail some technical progress or even any useful effect. Nevertheless, advantageous effects, if any, with respect to the state of the art should be stated in the description (Rule 27(1)(c)), and any such effects are often important in determining “inventive step” (see IV, 9).

252. See Bauer, supra note 251, at 1. See also Guidelines for Examination in the EPO, Part C, Chapter IV-2 (1999) which states:
software in conventional computers. However, recent EPO case law demonstrates that the requirement may slowly be fulfilled by conventional uses, thereby following current U.S. practices. While both the EPO and the German Patent Office (GPO) have traditionally allowed only copyright protection for computer software, a directive of the Council of Ministers of the European Community provides that a new program is patentable if it has some individual characteristic beyond a mere routine development, based on prior art. However, according to Articles 52(2)(c) and 52(3) of the EPC, the patentability of business methods is explicitly prohibited. Thus, the EPO has yet

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.

Id. See Bauer, supra note 251, at 2.

253. Id. at 2 (computer programs are afforded copyright protection if they demonstrate a considerable amount of peculiarity). See also Stanislaw Soltysinski, Protection of Computer Programs: Comparative and International Aspects, 1 IIC 1, 14-15 (1990) (arguing that copyright should not be applied to software because software as such is a utilitarian work with technical qualities that lack the distinctive characteristics of copyrightable works); supra note 245, at 475 (citing German Inkasso-Programm case which held that copyright protection can be claimed for computer programs based on "obviously above-average creative achievement"). For a discussion of the protectability of computer programs under trademark law in EPO member countries, see supra note 245, at 481-82.

254. See Council of Ministers of the European Community, Directive No. 91/250 (May 14, 1991); Bauer, supra note 251, at 2; and the Japanese Patent Office's (JPO) "further technical effect" analysis, infra notes 304-310 and accompanying text.

255. See Article 52(2)(c), 52(3), EPC, Convention on the Grant of European Patents (European Patent Convention) October 5, 1973. The text of 52(2) entitled "Patentable Inventions," states:

(1) European patents shall be granted for any inventions which are susceptible of industrial application, which are new and which involve an inventive step. (2) The following in particular shall not be regarded as inventions within the meaning of paragraph 1: (a) discoveries, scientific theories and mathematical methods; (b) aesthetic creations; (c) schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers; (d) presentations of information. (3) The provisions of paragraph 2 shall exclude patentability of the subject-matter or activities referred to in that provision only to the extent to which a European patent application or European patent relates to such subject-matter or activities as such. (4) Methods for treatment of the human or animal body by surgery or therapy and diagnostic methods practised [sic] on the human or animal body shall not be regarded as inventions which are susceptible of industrial application within the meaning of paragraph 1. This provision shall not apply to products, in particular substances or compositions, for use in any of these methods.
to abandon the business method exception to patentable subject matter.  

Through the expansion of software patentability, the EPO has invariably expanded the possibilities for business method patentability. According to C-IV 1 and 2 of the Guidelines for Examination in the EPO (Guidelines), computer programs claimed individually or as a record on a carrier are not patentable. However, if the subject matter claimed makes a technical contribution to the known art, patentability can not be denied solely based on the fact that the invention involves a computer program or its implementation. The Guidelines provide examples of statutory subject matter, such as program-controlled machines and manufacturing systems, and program-controlled internal workings of a known computer. Thus, as long as a

European Patent Convention, Article 52 (1973). The text of EPC Article 52(3) entitled "Exceptions to patentability," states:

European patents shall not be granted in respect of: (a) inventions the publication or exploitation of which would be contrary to "ordre [sic] public" or morality, provided that the exploitation shall not be deemed to be so contrary merely because it is prohibited by law or regulation in some or all of the Contracting States; (b) plant or animal varieties or essentially biological processes for the production of plants or animals; this provision does not apply to microbiological processes or the products thereof.

EPC, Article 52(3) (1973).

257. See Guidelines for Examination in the EPO, Part C, Chapter IV (1999). Chapter IV-3 states:

[a] scheme for learning a language, a method of solving cross-word puzzles, a game (as an abstract entity defined by its rules) or a scheme for organising [sic] a commercial operation would not be patentable. However, novel apparatus for playing a game or carrying out a scheme might be patentable.

Id.

258. See Guidelines for Examination in the EPO, Part C, Chapter IV-2 (1999), which states:

[i]f a computer program is claimed in the form of a physical record, e.g. on a conventional tape or disc, the contribution to the art is still no more than a computer program. In these instances the claim relates to excluded subject-matter as such and is therefore not allowable. If, on the other hand, a computer program in combination with a computer causes the computer to operate in a different way from a technical point of view, the combination might be patentable.

Id.

259. Id.

260. Id. Specifically, the text states:

[programmed controlled-machines and programmed-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. As an example consider the case of a known data-processing system with a small fast working memory and a larger but slower further memory. Suppose that the two memories are organised under program control, in such a way that a process which needs more address space than the capacity of the fast working memory can be executed at substantially the same speed as if the process data were loaded entirely in that fast memory. The effect of the program in virtually ex-
technical contribution exists, the invention is patentable.\textsuperscript{261}

While the EPC explicitly bans the patentability of business methods, EPO case law demonstrates that business method inventions utilizing software are patentable if they make a technical contribution. In EPO case number T 0769/92, the Board of Appeals upheld a patent for a general purpose management system based on reasoning similar to the United States Federal Circuit's \textit{State Street II} decision. The EPO board of appeals reached such a holding despite EPC Article 52(2) and (3).\textsuperscript{262} In T 0769/92, the inventor claimed a computer system used for financial and inventory management, as well as a method for operating the system.\textsuperscript{263} Thus, data could be inputted using a sin-

\textsuperscript{261} Id.  The Board of Appeals of the European Patent Office has upheld a number of computer-related patents based on the existence of novel technical contributions. See EPO case number N DEO4/93 (Feb. 1992) (holding that entire subject matter, both technical and non-technical features, must be examined in determining existence of an inventive step); EPO case number T 0115/85 (Sept. 1988) (holding that even if the basic idea of an invention resides in a computer program, claims that solve technical problems are not precluded by EPC Articles 52(2) and (3)); EPO case number T 0769/92 (May 1994) (holding that patentability is not precluded for inventions containing patentable technical elements and solutions merely because additional features such as those relating to business methods are also claimed); EPO case number T 0038/86 (Feb. 1989) (holding that because EPC 52(3) precludes patentability only for patent applications related to EPC 52(2) non-patentable subject matter, the EPC intended for inventions containing subject matter that is considered patentable in light of EPC 52(2) to be patentable). \textit{But see} EPO case number T 0603/89 (Jul. 1990) (holding that if subject matter consists of a mix of technical and non-technical elements, the subject matter as a whole is excluded under EPC Article 52(2) and 52(3) if the combination does not use technical means to solve a technical problem); EPO case number 1.1 T 115/85 (Sept. 1988) (holding that merely setting out the sequence of steps necessary to perform the solution using conventional computer hardware does not imply any technical considerations, and therefore does not lend technical character to the activity or the claimed subject matter as a whole).

\textsuperscript{262} See Board of Appeals of the European Patent Office case number T 0769/92 (May 1994). \textit{See also} Pierre Lancon, \textit{The Case Law of the EPO Boards of Appeal 1994 to 1996—A Summary}, 6 IIC 889, 896 (1997). Lancon gives the following description of the invention:
[a] computer system for plural types of independent management including at least financial and inventory management and a method for operating said system. Data for the various types of management which could be performed independently from each other with this system could by inputted using a single "transfer slip," in the form of an image displayed on the screen of the display unit of the computer system, for example.

\textit{Id.} at 896.

\textsuperscript{263} See Board of Appeals of the European Patent Office case number T 0769/92, (May 1994).

The patent's independent claim specifically states:
A computer system for plural types of independent management including at least financial and inventory management comprising of a display unit (4), an input unit (3), a memory unit (2), an output unit (4, 5) and a digital processing unit . . . .

\textit{Id.} at 2. The patent's method claim specifically states:
A method for operating a general-purpose computer management system and including a display unit (4), an input unit (3), a memory unit (2), an output unit (4, 5) and a
得意‘transfer slip,’ via an image displayed on the computer’s display unit. Under EPC Article 52, both financial and inventory management systems are classified as methods of doing business, and are therefore unpatentable. However, the EPO accepted the patent at issue, finding that the particular kinds of management functions mentioned in the invention were not decisive, they were of different “specific” types that would be performed independently of each other. Additionally, because implementation of the processing unit used to perform the business functions required technical considerations, the EPO Appeals Board held that “an invention comprising functional features implemented by software (computer programs) [was] not excluded from patentability” under EPC Article 52(2)(c) and (3) if technical considerations existed. More importantly, however, the EPO Appeals Board held that an invention could not constitute non-patentable subject matter merely because it contained an element considered a method for doing business. If an invention contains a mix of features, some which are excludable under EPC Article 52(2) and (3), and some which are not excludable, the invention may be patentable. Thus, because technical considerations lend technical character

processing unit (1), for plural types of independent management including at least financial and inventory management . . . .

Id. at 3.

264. See id. The inventor specifically claims:

[said digital processing unit (1) comprises: first processing means for causing said display unit (4) to display said transfer slip for automatically displaying data entered through said input unit (3) and storing said data in accordance with said transfer slip into said journalized daybook file in the memory unit (2), second processing means for automatically updating data corresponding to each item code in said item master file and data corresponding to each commodity code in said commodity master file with use of data entered through said input unit (3), third processing means for transferring data necessary for financial management processing stored in said journalized daybook file to said journalized daybook accumulation file to store therein and for relating data stored in said journalized daybook accumulation file with item codes in said item master file, fourth processing means for transferring data necessary for inventory management processing stored in said journalized daybook file to said inventory file to store therein and for relating data stored in said inventory file with commodity codes in said commodity master file, and fifth processing means for reading, in response to an output command entered through said input unit (3), data necessary for a specific type of management from at least one of said journalized daybook file, item master file, commodity master file, journalized daybook accumulation file and inventory file to output them through said output unit (4, 5) in accordance with a predetermined format for said specific type of management.

Id. at 2.

265. Id. at 5.

266. Id.

267. Id. at 1.

268. Id.

269. See Board of Appeals of the European Patent Office case number T 0769/92, (May 1994).
to otherwise business method centered inventions, a patentable technical problem results from the patent's implicit technical features.\textsuperscript{270} While not explicitly overruling EPC Articles 52(2) and (3), the EPO is certainly diminishing the effect of its business method exception by allowing the technical features of an invention to overshadow any business method aspects.\textsuperscript{271} Today, the USPTO focuses on the use of algorithms in software-related inventions, and whether they produce a new and useful, concrete, or tangible result.\textsuperscript{272} Similarly, the EPO appears to be disregarding the business method character of an invention if it contains a technical problem to be solved by technical features implicit to the invention.\textsuperscript{273}

Thus, under European patent law practice, software-related inventions are patentable if they claim technical subject matter, and the subject matter as a whole makes a technical contribution to the prior art.\textsuperscript{274} As a result, there is ample room for obtaining patent protection for software-based inventions in Europe.\textsuperscript{275} Therefore, it appears that the EPO, and countries harmonized with the EPC, will patent inventions used for business method purposes as long as the subject matter, when taken as a whole, possesses a technical character.\textsuperscript{276}

\section*{C. Japanese Patent Office Mathematical Algorithm and Business Method Patentability Policies}

Unlike European countries, Japan has not fully harmonized with the EPC.\textsuperscript{277} Thus, the Japanese Patent Office (JPO) qualifies a statutory invention whether under separate standards, as “a creation of

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{270} \textit{Id.}
\item \textsuperscript{271} See EPO Decision, case number T 0769/92 (May 31, 1994).
\item \textsuperscript{272} \textit{State Street}, 149 F.3d at 1374.
\item \textsuperscript{273} Lancon, supra note 262, at 896.
\item \textsuperscript{275} \textit{Id.}
\item \textsuperscript{276} \textit{Id.} at 661. While it may seem that almost anything can be patented as long as it contains a technical element, the EPC still requires that the claimed subject matter as a whole actually makes a contribution to the prior art. \textit{Id.} If the claimed subject matter contributes to the prior art, differing from it with respect to defined features, then it must be determined whether that contribution is of a technical nature. \textit{Id.} Therefore, an “intrinsically unpatentable” invention does not become patentable merely by being associated with a known manufactured article. \textit{Id.} Furthermore, program and data processing systems must be examined as an integrated whole. Wilfried Anders, \textit{Patentability of Programs for Data Processing Systems in Germany: Is the Case Law Undergoing a Change?}, 4 IIC 475, 489 (1991). Thus, “[a] technical result may be caused solely by the contents of the program since a general-purpose computer is always able to produce technical and non-technical results.” \textit{Id.}
\item \textsuperscript{277} See supra note 246 (listing the current and prospective members of the EPO). Japan is not a member of the EPO; therefore, applying for a Japanese patent requires a filing separate from either the single EPO filing or a USPTO filing. \textit{Id.}
\end{itemize}
\end{footnotesize}
technical ideas utilizes natural laws,” based on the stated claim.278 Example solutions “utiliz[ing] natural laws” are implicit in controls for hardware resources, information processed based on the physical or technical properties of an object, and information processed where hardware resources are used.279 However, the JPO specifically excludes solutions classified as mathematical algorithms, natural laws, natural phenomena, mathematical expressions of natural laws or natural phenomena, and solutions related solely to cultural sciences.280 Furthermore, the JPO refuses to patent solutions which, while utilizing natural laws, result in the mere processing of information by a computer, or that merely record a program on a storage medium.281 Programming language, or a programming listing, does not constitute statutory inventions under the JPO Implementing Guidelines.282 However, if a claimed invention processes information using a computer, the claim must indicate, either directly or indirectly, how the computer’s hardware resources are utilized in the processing.283 If the claim fails to make such an indication, it is categorized as a

278. See Implementing Guidelines for Inventions in Specific Fields, Chapter 1, Computer Software Related Inventions, Implementing Guidelines for 1994-Revised Patent Law (May 1995), 6 [hereinafter “Implementing Guidelines”]. Similar to the USPTO guidelines, the JPO requires the claimed invention to be enabling “for a person having ordinary skill in the art to understand the technical significance of the invention.” Id. at 7; see also notes 46, 169-170 and accompanying text. Additionally, the JPO also requires the application to clearly disclose the invention’s embodiment, much like the best mode disclosure requirement under U.S. law. Id. at 7; see also 35 U.S.C. §112 (1994) (outlining requirement for disclosing inventor’s best mode in specification).

279. Id. Additionally, when the structure of recorded data identifies how the computer processes the data, the processing utilizes natural laws. Id. at 9.

280. Id. at 7.

281. Id. at 7. The text of the JPO guidelines specifically state:

Even if the solution is such as utilize natural laws, when it is no more than the ‘mere processing of information by using a computer,’ ‘mere recording of a program or data on a storage medium,’ or ‘mere processing of information by using a computer and mere recording of a program or data on a storage medium,’ the claimed invention is deemed non-statutory.

Id.

282. Id. at 8-9. For example, an application claiming a computer program listing for natural number multiplication, where the following formula is involved does not constitute statutory subject matter because it merely claims a mathematical algorithm:

var x, y, z, u: integer;
begin z: =0; u: =0
repeat
z: = z + y; u: = u-1
until u = 0
end.

Id.

283. Id.
mere processing of information using a computer and thus not patentable.\textsuperscript{284}

However, an invention claiming a storage medium with a recorded program or a storage medium having recorded structured data may constitute statutory subject matter.\textsuperscript{285} The JPO Implementing Guidelines illustrate its computer-related guidelines by applying them to sample prospective inventions.\textsuperscript{286} Such an invention's patentability is predicated on the following conditions: (1) the claimed invention does not correspond to any of the categories of non-statutory subject matter outlined in the Implementing Guidelines for Industrial Applicable Inventions;\textsuperscript{287} (2) the solution to the problem is claimed in a manner enabling a person having ordinary skill in the art to understand the technical significance of the invention;\textsuperscript{288} and (3) any solution utilizing natural laws neither merely processes information using a computer, nor merely records a program or data on a storage medium.\textsuperscript{289} Similar to the U.S., the JPO requires that the prospective invention be nonobvious in light of existing prior art as of the filing date.\textsuperscript{290}

The JPO applies its guidelines for computer-related invention patentability by citing examples\textsuperscript{291} similar in content to the inventions

\begin{itemize}
  \item \textsuperscript{284} See Implementing Guidelines, \textit{supra} note 279, at 8.
  \item \textsuperscript{285} \textit{Id.} at 9.
  \item \textsuperscript{286} \textit{Id.} at 8.
  \item \textsuperscript{287} \textit{Id.} at 9. \textit{See JPO Implementing Guidelines for Industrial Applicable Inventions, 1.1(4)-(6).}
  \item \textsuperscript{288} \textit{Id.} The JPO’s enabling requirement parallels that of the USPTO, where the invention and the method for using it must be explained in “such full, clear, concise and exact terms as to enable any person skilled in the art to which it pertains … to make and use the same.” 35 U.S.C. §112 (1994).
  \item \textsuperscript{289} \textit{Id.} \textit{See Implementing Guidelines, \textit{supra} note 279, at 9. For example, an application claiming “a computer-readable storage medium having a program recorded thereon” is considered a statutory invention if the solution to the problem (processing information) is accomplished by utilizing natural laws that are identified by the recorded program. \textit{Id.}
  \item \textsuperscript{290} \textit{Id.} at 10. \textit{See also supra} note 38 and accompanying text.
  \item \textsuperscript{291} The JPO’s Implementing Guidelines enumerate a total of eight examples:
    \begin{itemize}
    \item Example 1. An apparatus, a method, and a storage medium containing a computer program recorded thereon for controlling rate of fuel injection for an automobile engine
    \item Example 2. An image processing method by computer and a computer-readable storage medium containing a computer program for image processing recorded thereon
    \item Example 3. An apparatus for calculating the sum of natural numbers from ‘n’ to ‘n+k’ by using a computer
    \item Example 4. A process for calculating the sum of natural numbers from ‘n’ to ‘n+k’ by using a computer
    \item Example 5. An apparatus for predicting daily sales of commodities
    \item Example 6. Computer-readable storage medium containing student performance management data
    \item Example 7. Game machine
    \item Example 8. Invoice approval system
  \end{itemize}
\end{itemize}
litigated in *Diehr* and *Alappat*. Analogous to *Diehr* and *Alappat*, the JPO found similar inventions patentable under its statutory subject matter analysis. In other cases, where the invention seeking protection was purely based on a mathematical algorithm, the JPO found the inventions unpatentable because they involved the mere processing of information by a computer. However, if the solution results in information processing where hardware resources are used, and the claim directly states how the hardware resources of the computer will be utilized, the solution is more than mere processing of information using a computer, rather the solution utilizes a natural law.

Although the requirements for statutory subject matter differ on their face between the U.S. and Japan, the results are similar. The USPTO requires a two-tiered approach. First, the Office must decide whether the invention recites statutory subject matter, and second, the invention must also generate a “useful, concrete and tangible result.” The JPO guidelines state that although pure mathematical algorithms are not patentable, if a claimed invention processes information using a computer, it may be patentable if it indicates how the hardware resources of the computer are utilized in the processing. In both countries, inventions are not precluded from patentability simply because they contain a mathematical algorithm or formula. While the second step of the U.S. analysis requires an algorithm to produce a concrete, tangible result, in order for the invention utilizing the algorithm to be patentable, the JPO requires inventors to show that the computer’s hardware resources are utilized in processing the solution. If an invention fails to do so, it is considered to merely process information using a computer. The U.S. requires a connection between the mathematical algorithm and the result obtained, particularly a useful, tangible result. In Japan, however, the required

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293. 33 F.3d 1526 (Fed. Cir. 1994). See *supra* notes 90-96 and accompanying text. The invention in *Alappat* corresponds in content to that in Example 2. See *supra* note 291.

294. See *supra* notes 278-284 and accompanying text.


297. See *supra* notes 199-201 and accompanying text.

298. See *supra* note 284 and accompanying text.

299. See *supra* notes 170-171 and accompanying text.

300. *Id*.

301. See *supra* notes 329-385.

302. See *supra* notes 199-201 and accompanying text.
connection is between the algorithm used, and how the hardware resources are utilized to achieve the calculation or process.\textsuperscript{303} Thus, while the tests used by the two countries may result in the same conclusion for a given invention, the USPTO focuses on useful post-solution activity, while the JPO focuses on how the hardware component is used to achieve the process or calculation in question.

However, the JPO has updated its current law on algorithm patentability, and has currently begun to consider the patentability of business methods that utilize mathematical algorithms.\textsuperscript{304} In \textit{In re Karmarkar}, the claims recited a computer programming method according to a novel mathematical algorithm, which would ultimately be used to solve business problems.\textsuperscript{305} The Japanese trial court upheld the patent because it claimed a computer program having an improved technical effect. The program resulted in high speed processing, and not merely a mathematical idea.\textsuperscript{306} Thus, the JPO has seemingly switched its focus from the law of nature utilized by the solution, to whether or not the invention has an improved technical idea over prior art.\textsuperscript{307} The opinion referred to the recently decided IBM cases by the EPO, where the court referred to further technical effects in upholding the patents at issue.\textsuperscript{308}

Through the addition of the "further technical effect" requirement, the JPO and EPO have come closer to reconciling their patent laws regarding mathematical algorithms with those of the USPTO. One could argue that "further technical effect" should be viewed simply as a variation of the USPTO requirement for a "useful, concrete and tangible result."\textsuperscript{309} However, the standards differ in that "further technical effect" more closely parallels the U.S. statutory requirement for novelty found in 35 U.S.C. \$102.\textsuperscript{310} Thus, it appears that the new JPO/EPO requirement for a further technical effect may be no more than a need to show that the invention has superseded prior art in technical advancement.

\begin{footnotes}
\footnotetext[303]{See supra notes 278-284 and accompanying text.}
\footnotetext[304]{See Nobuaki Kato, Japanese Report to Copyright Committee at APAA 43rd Council Meeting in Kyongju, Korea (Oct. 1999) (transcript on file with author).}
\footnotetext[305]{\textit{In re} Karmarkar, invalidation trial 09-2452, JP Patent No. 2033073.}
\footnotetext[306]{Id.}
\footnotetext[307]{Id.}
\footnotetext[308]{Id. Among the solutions considered "further technical effect[s]" were faster execution, better resolution of image processing, higher data transfer rates, increased filtering effectiveness, improved screen interface, easier image manipulation of computer graphics, and more effective data compression algorithm. \textit{Id.}}
\footnotetext[309]{State Street, 149 F.3d at 1374.}
\footnotetext[310]{35 U.S.C. \$102 (1994); supra note 36.}
\end{footnotes}
Although the invention in *Karmarkar* is used in solving business problems, the JPO refused to evaluate the patent based on business method patentability theories because the "further technical effect" concept is a significant step for software patentability. The concept in no way acts as a criterion for business method patents, which are currently not allowed by the JPO or the EPO. Thus, the JPO has yet to accept pure business methods as patentable subject matter. In light of the *Karmarkar* decision, if a patentee successfully disguises his or her business method as strictly a technical invention, the inventor most likely will be granted a patent by the JPO.

Despite the JPO's continual allegiance toward a business method exception, reformation of the Japanese patent system seems likely due to *State Street* and the growing number of Internet patents being filed in the United States as well as internationally. In light of Japan's recent economic and bureaucratic difficulties, JPO Commissioner Takeshi Isayama views the country's intellectual property as a means for strengthening its national economy, and a leveraging tool in the global marketplace. To promote Japan's intellectual property holdings, Commissioner Isayama proposed stronger and broader rights, thereby creating criteria for judging technical innovations, as well as creating a market for the trading of patents, and harmonizing the tri-lateral patent offices (USPTO, EPO, and JPO) under international patent standards. Thus, Japan's eagerness to revitalize its economy and unify international patent standards may lead to the JPO's abandonment of the business method exception to patentability. While the

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311. *In re Karmarkar*, invalidation trial 09-2452, JP Patent No. 2033073. The court in *Karmarkar* notes that just because a calculator can be used for business calculations, this does not indicate that the calculator patent is a business method patent.

312. See supra note 304.

313. *Id.* The JPO's Implementing Guidelines, while judging computer-related inventions in light of pre-*Karmarkar* law, cites examples which appear to be more business-method related than simply technical inventions. See Implementing Guidelines, supra note 279, at 15. In particular, the Implementing Guideline's Example 5 is an application for an apparatus used to predict daily sales commodities. *Id.* As in the application for the "Hub and Spoke" configuration covered in *State Street*, the JPO Example 5 patent also uses means plus function language, resulting in claiming the invention more as a machine than as a process. See supra notes 144-145 and accompanying text. While the type of statutory subject matter upon which an application is based is no longer an issue the U.S. (i.e. business method v. machine, manufacture or process), the JPO has not yet abandoned the business method exception to statutory subject matter. Thus, the use of means plus function claims to accentuate the technical nature of an invention may be useful in getting business method patents accepted by the JPO and the EPO.


316. *Id.*
JPO is currently circumventing the exception via examination of the technical character of an invention, pressure to compete in the Internet's global marketplace may provide the push to conform with the USPTO's statutory subject matter standard.

IV. IMPACT

A. Patent Economics and Monopoly Economics

Economic impact may also play an important role in determining how e-commerce patent suits will be decided in the U.S., as well as how foreign countries will react to the surge of Internet patents. The theory that patents create a "legal monopoly" on the patented goods or services in question has been challenged by many economists as a misconception. While patents possess some key features of monopolies, they do not necessarily create monopolies.317 Rather, the patent right confers upon a patentee the ability to exclude others from the manufacture, sale, or use of his or her invention.318 Further, in most cases, the limits imposed on a patentee by the patent term, as well as the state of the evolving art, may create a temporary monopoly. However, if the market creates a demand for the invention, the monopoly owned by a patentee is supposed to be countered by the incentives to invent,319 disclose,320 commercialize321 and design around322 a pat-

317. According to Kenneth W. Dam, it became conventional to say that a patent is a monopoly. Nonetheless, it is readily apparent that the right to exclude another from "manufacture, use, and sale" may give no significant market power, even when the patent covers a product that is sold in the market. Indeed, without the benefit of empirical research, it is entirely plausible to conclude that in the great bulk of instances no significant market power is granted. We must bear in mind that leading companies may obtain 1,000 or more patents in a single year, and yet many such firms are unlikely ever to obtain even a single monopoly in any market.


319. The incentive to invent theory relies on the premise that patents are issued to encourage invention. Roberto Mazzoleni & Richard R. Nelson, Economic Theories about the Benefits and Costs of Patents, 32 J. ECON. ISSUES 1031, 1034-38 (1998). In order to recover costs for inventing, the patentee is granted an exclusive right to his or her inventive efforts. However, the incentive to invent theory may also lead to an unusually high rate of inventive activity. In such an event, the cost of inventing may increase despite the slightly earlier time of discovery. See CHISUM, supra note 31, at 62. At the same time, duplicate efforts could also lead to novel inventions, distinct from the inventor's original objective. Id. at 63.

320. The incentive to disclose theory suggests that patents are granted to encourage the dissemination of information to the public, for the greater good of society. See Mazzoleni, supra note 319, at 1038-40. Based on the enabling disclosure requirement of 35 U.S.C. §112, this theory is based on the premise that nondisclosure works against the basic principles of science, which encourage the free dissemination of information. See CHISUM, supra note 31, at 64. How-
mented product. In light of the broadened scope of statutory subject matter since the *State Street* decision, these incentives are ineffective against threats of lawsuits and excessive licensing fees imposed by those who have patents on key ways of doing business on the Internet.  

The economic impact of e-commerce patentability may be better understood after examining the factors which contribute to development of either a competitive or a monopolistic economy. Primarily, in a competitive market, the price of goods is inversely proportional to demand quantity. As the price of goods decreases, the quantity in demand increases. A basic premise of the competitive model is that a firm selling goods, where the increased demand is represented by a line with a negative slope on a graph plotting increasing price versus increasing quantity, can maximize profit if its marginal revenue equals its marginal cost. Where marginal revenue exceeds marginal cost, it is to the firm’s advantage to produce more goods, thereby capturing the additional profit between the marginal revenue and margi-

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321. According to the incentive to commercialize theory, obtaining a patent grant allows the patentee to give notice to all prospective licensee parties. See Mazzoleni, *supra* note 319, at 1040-2. This theory is based on the assumption that parties will fairly bargain for the patented product with the patentee firm—an end that is achieved by awarding the patentee the exclusive right to exclude others for a limited term. See *Chisum*, *supra* note 31, at 65. Because other alternatives to the patentee’s invention may exist, the monopolistic nature of the patent is curbed because in order to remain marketable, the patentee’s product must remain at a cost at or below that of a competitor. Further, the incentive to commercialize theory allows patentees to direct the market around their products via licensing while discouraging others from investing in inventions too similar to the patented product. *Id.* at 66.

322. The incentive to design around theory presents the patent as non-duplicative, encouraging others to design around the patented invention in order to avoid infringement. See Mazzoleni, *supra* note 319, at 1042-44. As the market for a product becomes tighter, there exists a greater incentive to design around a monopolizing invention. Such secondary inventive activity results in better, cheaper and more effective alternatives to the patented product. See *Chisum*, *supra* note 31, at 67.


324. The term “goods” is based on the idea that the more money consumers have, the more products they will buy. *Id.* at 53-54.

325. Marginal revenue is “the additional amount a firm earns from the sale of an additional unit of output.” *Id.* at 54.

326. Marginal cost is “the additional cost incurred by a firm to produce an additional unit of output.” *Id.* at 54-55.
nal cost. However, if marginal cost exceeds marginal revenue, selling a greater number of goods incurs a loss because the firm is earning less for the additional products than it costs to make them.\textsuperscript{327} Thus, optimal conditions exist when the firm’s marginal revenue equals its marginal cost.

Marginal revenue is set at the good’s competitive market price. Thus, marginal revenue always equals the competitive market price. Where the competitive market price equals the marginal revenue, the competitive firm produces a corresponding competitive quantity. Consumer surplus develops when consumers are willing to pay an amount greater than the competitive price for the quantity of goods. A producer surplus measures the difference between the market price and the marginal cost, representing the additional amount above marginal cost actually received by the producer.\textsuperscript{328} Thus, the consumer surplus plus the producer surplus equals the amount that society as a whole benefits from the marketplace exchange.\textsuperscript{329}

Conversely, in a monopoly system, price and output are not fixed.\textsuperscript{330} While a monopoly firm will also maximize its profits when marginal cost equals marginal revenue, the marginal revenue curve in a monopoly economic model is sloping downward, whereas in the competitive model, the marginal revenue equaled the competitive price which was constant (zero slope).\textsuperscript{331} Thus, as prices increase, a monopoly firm produces a decreasing quantity of goods. The decreased quantity produced and the increased price charged results in a decrease in net surplus (producer plus consumer surplus).\textsuperscript{332} Since the monopoly price is greater than the competitive price, the amount of consumer surplus decreases. Furthermore, because the monopoly quantity is less than the competitive quantity, the producer surplus also decreases. The net decrease results in dead weight loss, representing a decrease in societal wealth due to lower quantities produced.

\textsuperscript{327} Id. at 55.
\textsuperscript{328} Id. at 56.
\textsuperscript{329} The above competitive analysis is further illustrated by the following diagram. See CHISUM, supra note 31, at 54.
\[\begin{align*}
P_c &= \text{Competitive Pricing} \\
Q_c &= \text{Competitive Quantity} \\
D_c &= \text{Competitive Demand} \\
MR_c &= \text{Competitive Marginal Revenue} \\
A+B+C &= \text{Consumer Surplus in Competitive Market} \\
D+E &= \text{Producer Surplus in Competitive Market}
\end{align*}\]
\textsuperscript{330} See CHISUM, supra note 31, at 56.
\textsuperscript{331} See CHISUM, supra note 31, at 56.
\textsuperscript{332} See CHISUM, supra note 31, at 57.
at increased prices.\textsuperscript{333} If a substitute exists for the monopolized good, the demand curve will become more horizontal, resulting in less dead weight loss.\textsuperscript{334} Therefore, as the number of substitutes for a given product increase, the dead weight loss decreases.

\textbf{B. Contributing Factors to Growing Global and Local Monopoly Economic Environment}

Generally, a patent does not grant its owner a monopoly for all forms of the invention.\textsuperscript{335} Most patents stimulate free market competition, allowing consumers to find alternative means for the patented article, thereby diminishing the patentee's ability to gain pricing power over the invention's market.\textsuperscript{336} However, the proliferation of e-commerce patents is resulting in a monopoly of key components needed to do business on the Internet, thereby providing "market power" to those who own patents.\textsuperscript{337} Critics of the USPTO's recent grant of business method Internet patents has led to a belief that such patents defeat the incentive to disclose one's invention, ultimately resulting in a shift from a competitive economy to a monopoly market.\textsuperscript{338} Since the rights to key e-commerce business components lie in the hands of those who quickly file and obtain patents, patentees are able to manipulate factors like service price and production, thus, cre-

\begin{itemize}
    \item \textsuperscript{333} The above monopoly analysis is further illustrated by the following diagram. \textit{Id.} at 57.
    \begin{align*}
        P_c &= \text{Competitive Pricing} \\
        Q_{c} &= \text{Competitive Quantity} \\
        D_{c} &= \text{Competitive Demand} \\
        M_{Rc} &= \text{Competitive Marginal Revenue} \\
        P_{m} &= \text{Monopoly Price} \\
        Q_{m} &= \text{Monopoly Quantity} \\
        A+B+C &= \text{Consumer Surplus in Competitive Market} \\
        D+E &= \text{Producer Surplus in Competitive Market} \\
        B+C &= \text{Lost Consumer Surplus Because of Monopoly} \\
        B &= \text{Consumer Surplus recovered as producer surplus} \\
        E &= \text{Lost Producer Surplus} \\
        C+E &= \text{Dead Weight Loss}
    \end{align*}
    \textsuperscript{334} See \textit{Chisum, supra} note 31, at 57.
    \textsuperscript{336} \textit{Id.} at 511-12. Rose demonstrates the free market theory using General Electric as an example. \textit{Id.} at 512. If GE were to patent a more energy efficient AC motor, consumers could either choose to pay a premium for the more efficient motor, or remain with an older or less efficient design. \textit{Id.}
    \textsuperscript{337} See U.S. Department of Justice Antitrust Guidelines for the Licensing and Acquisition of Intellectual Property <http://www.antitrust.org/law/US/intellect.html#begin> (last modified Aug. 8, 1994). Market power is defined as "the ability profitably to maintain prices above, or output below, competitive levels for a significant period of time." \textit{Id.} at 2.2.
    \textsuperscript{338} See \textit{Rivette \& Kline, supra} note 314, at 13; see Hansell, \textit{supra} note 16.
\end{itemize}
ating dead weight loss.\textsuperscript{339} However, substitutes for the patented processes and methods are less likely to counterbalance the dead weight in light of the proliferation of "trash" patent grants by the USPTO.\textsuperscript{340} A lack of uniformity among the trilateral patent offices\textsuperscript{341} increases the licensing of key Internet components,\textsuperscript{342} and therefore increases infringement litigation.\textsuperscript{343} Unless the scope of acceptable statutory subject matter is narrowed, the monopolistic effects of e-commerce patentability will continue to be felt.

1. \textit{Proliferation of "Trash" Patents}

Opponents of e-commerce patentability believe that patent rights should not be granted for simplistic and obvious technology that lacks the requisite novelty. Specifically, those disfavoring business method patents believe that e-commerce patents merely apply long-standing business techniques to the Internet.\textsuperscript{344} These "trash patents"\textsuperscript{345} result from granting patents for broad concepts rather than specific technologies.\textsuperscript{346} The proliferation of e-commerce patents has been fueled mainly by the lack of prior art in the software field.\textsuperscript{347} Unlike other fields of invention which have well-documented prior art literature, the history of the prior art for software is seldom documented.\textsuperscript{348} Instead, most of the art in the software industry is in the minds of programmers, not in academic journals where it would be easily accessible to patent examiners.\textsuperscript{349} Additionally, software designers contend that since the USPTO lacks the resources or manpower to allow computer software experts to review e-commerce patent applications, "trash patents" are granted, leaving the ultimate question of validity for the judiciary to decide.\textsuperscript{350} Although the USPTO maintains

\begin{quote}
\textsuperscript{339} See supra note 333 and accompanying text.
\textsuperscript{340} See infra notes 345-351 and accompanying text.
\textsuperscript{342} See infra notes 356-358 and accompanying text.
\textsuperscript{343} See infra notes 359-361 and accompanying text.
\textsuperscript{344} See Hansell, supra note 16.
\textsuperscript{345} See Rivette \& Kline, supra note 314, at 13.
\textsuperscript{346} See Hansell, supra note 16.
\textsuperscript{347} Lames Gleick, \textit{Patently Absurd}, N.Y. TIMES, Mar. 12, 2000, at §6, at 44.
\textsuperscript{348} Id. PTO examiners have the burden of proving that an application is obvious in light of actual references in the published literature, not what logically would seem obvious to the examiner himself. \textit{Id.} See Waldmeir \& Kehoe, supra note 16.
\textsuperscript{349} Id.
\textsuperscript{350} See Alternatives to Amazon.com <http://www.noamazon.com/faq.html> (visited Feb. 3, 2000). \textit{See also} supra note 347 (stating that 80 percent of software patents issued by the USPTO cite no computer literature); Black, supra note 16 (commenting that most examiners are given only two hours to search for relevant prior art with inadequate resources).
\end{quote}
that its examiners are qualified, and its increased staff size has aided in
competent review of e-commerce patents, critics contend that State
Street's broad holding, and the USPTO's lax implementation of that
holding has resulted in the proliferation of "trash patents." 351

2. Lack of Uniformity Among International Patent Offices

A lack of uniformity among the trilateral patent offices also contrib-
utes to the conversion from a competitive economy to a monopoly
economy. Non-uniformity in the standards employed to grant e-com-
merce business method patents will likely result in inequalities in bar-
gaining power among parties when trying to negotiate patent
infringement suit settlements or licensing agreements. Patents are
often viewed as valuable assets when attempting to attract financial
backing for a new Internet corporation, or bargaining leverage in li-
censing negotiations. 352 If U.S. business method patents are ulti-
mately upheld in court, EPO member countries, as well as Japan, may
exert pressure on their respective patent offices to lift restrictions on
business method patents. If such restrictions are lifted, U.S. patentees
may be able to claim priority dates on their earlier filed U.S. applica-
tions, resulting in a monopoly on such patents in both the U.S. and
abroad; or race to file patents with the EPO and JPO in order to gain
rights in EPO member countries and Japan. 353 U.S. patentees may be
currently attempting to file their U.S. granted business method pat-
ents with the EPO and JPO based on earlier U.S. filing dates. 354
However, since the EPO requires that a technical contribution exists,
while the JPO requires a further technical effect, U.S. patentees must
overcome stricter standards in order to obtain foreign patents. 355

351. See Black, supra note 16. The USPTO has increased the number of examiners reviewing
e-commerce patents to 645, compared to 400 examiners in 1991. Id.
352. Id. See also J. Bruce Harrold, Building Smarter, Faster Organizations in Blueprint
to the Digital Economy: Creating Wealth in the Era of E-Business 64 (Don Tapscott
et al. eds., 1998) (advising management teams to create intellectual inventories in order to pro-
mote productivity gleaned from intellectual property assets).
353. The Paris Convention requires that a patent filed in any member country can obtain that
priority date in another member country as long as it is filed within one year of the original
filing. See Chisum, supra note 31, at 469. Thus, if the EPO and JPO do decide to allow business
method patentability, U.S. patentees will be barred from claiming a priority filing date unless
less that one year has passed. Additionally, both the EPO and JPO decide priority on a first to
file basis, unlike the U.S. which employs a first to invent system. Id. at 485. Therefore, if the
EPO and JPO do decide to broaden patentability of e-commerce business methods, there will be
a rush on both offices from their respective countries as well as the U.S. to file business method
patents. Id.
354. See supra note 353.
355. See supra notes 246-316 and accompanying text.
3. Licensing of Key Internet Components and the Threat of Litigation

Regardless of future EPO and JPO business method patentability, if U.S. business method patents are upheld, U.S. patentees will have a monopolistic advantage over competitors, not only for attracting investment capital, but also in licensing negotiations for key Internet components. In the past eight years, patent license revenues have increased 700 percent, jumping from $15 billion in 1990, to over $100 billion in 1998. As a result of licensing costs, Internet licensees will be forced to pass those costs onto their consumers. Additionally, payment of royalties to one or multiple inventors for key components necessary to do business on the Internet may force small, entrepreneurial e-commerce businesses off the Internet, leaving an elite few corporate sellers. Thus, if the number of competitors is low and consumer prices increase due to licensing royalties, a decrease in the net surplus will occur, resulting in dead weight loss, thereby decreasing combined societal wealth, and resulting in a monopoly market. A monopoly market may develop as a result of increased infringement litigation. In 1997, patent related lawsuits reached 2,100, whereas there were 1,500 such lawsuits in 1992. Similar to licensing, the threat of litigation also tends to have a chilling effect on Internet growth, especially on smaller Internet competitors who lack the resources to successfully defend themselves against infringement claims. Again, a decrease in competitors and competitor products, along with an increase in market value, will inevitably lead to dead weight loss, resulting in a monopoly economy.

C. Remedies

Many analysts believe that the patent system is in crisis due to the Federal Circuit’s overly broad ruling in State Street, stifling both competition and innovation. The most direct way to counter the mo-
nopolistic effects of e-commerce patents is to invalidate patents that do not possess the requisite novelty needed to warrant patent protection. While claiming the functional aspects of one's invention is the hallmark of a utility patent application, under 35 U.S.C. §102(a), patentable subject matter must be novel to obtain patent protection.\textsuperscript{363} The novelty requirement is based on anticipation, thus a patent fails to meet the requirement if a single piece of prior art contains all of the patent's essential elements.\textsuperscript{364} However, since there is little documented e-commerce, business method, or software prior art, demonstrating a lack of novelty becomes increasingly difficult.\textsuperscript{365} Lack of documented prior art also inhibits invalidating frivolous e-commerce patents based on obviousness grounds under 35 U.S.C. §103.\textsuperscript{366}

While examiners must base novelty or obviousness rejections on documented art, prior art cited needs only to be reasonably pertinent to the problem that the inventor is trying to solve.\textsuperscript{367} Prior art is reasonably pertinent "if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem."\textsuperscript{368} Even if the courts expanded the scope of permissible prior art, references relating to business methods (such as the use of virtual "shopping carts" and auctioning systems) may still be difficult to find. Nonetheless, expanding the scope of acceptable prior art beyond the immediate scope of software and Internet applications may counter the monopolistic effects of the current state of e-commerce patentability by adding to the resources available to invalidate frivolous e-commerce patents.\textsuperscript{369}
Another method to lessen the monopolistic effects of e-commerce patentability is placing would-be infringers on notice of pending patent applications which they may infringe once issued. In the past, the USPTO has not published patents until they were granted, thereby making a patent application "secret prior art" between its filing date and acceptance date. As a result, those who may have been infringing a pending patent were unaware that they were doing so because the patent had yet to be published.

In an attempt to curb the litigious nature of e-commerce patents, the United States legislature has amended 35 U.S.C. §122, providing for the publication of certain patents eighteen months after filing. Under the new amendment to 35 U.S.C. §122, all patent applications, with the exception of design patents, abandoned applications, provisional applications, secrecy applications, and applications which will not be filed in foreign countries, will be published eighteen months after the earliest date of filing, regardless of whether they have been granted. This provides would-be infringers with constructive notice.

prior art references dealt with hinges used on cabinets and washing machines which taught various methods of attaching a cover to a device so that it would swing radially. Id. at 1481. The court cited Heidelberger Druckmaschinen A.G. v. Hantscho Commercial Products, Inc., which held that:

[References that are not within the field of the inventor's endeavor may also be relied on in patentability determinations, and thus are described as "analogous art," when a person of ordinary skill would reasonably have consulted those references and applied their teachings in seeking a solution to the problem that the inventor was attempting to solve.

21 F.3d 1068, 1071 (Fed. Cir. 1994).

370. See 35 U.S.C. §122 (1999). Under 35 U.S.C. §122, "applications for patents shall be kept in confidence by the Patent and Trademark Office . . . ." Id. As a result, pending patent applications are not known or publicly accessible. And yet, they can serve as prior art as of their filing date under section 102(e), if the application eventually issues as a patent.


(1) In general: (A) Subject to paragraph (2), each application for a patent shall be published, in accordance with procedures determined by the Director, promptly after the expiration of a period of 18 months from the earliest filing date for which a benefit is sought under this title. At the request of the applicant, an application may be published earlier than the end of such 18-month period. (B) No information concerning published patent applications shall be made available to the public except as the Director determines. (C) Notwithstanding any other provision of law, a determination by the Director to release or not to release information concerning a published patent application shall be final and nonreviewable. (2) Exceptions: (A) An application shall not be published if that application is— (i) no longer pending; (ii) subject to a secrecy order under section 181 of this title; (iii) a provisional application filed under section 111(b) of this title; or (iv) an application for a design patent filed under chapter 16 of this title.

Id.

372. Id.
that they may be infringing on a potential patent as of its publication date, eighteen months after the patent's filing date, similar to the process in Europe and Japan. Additionally, would be infringers will continue to use particular business methods if they began use before the filing date of the published patent. Thus, the amendment to 35 U.S.C. §122 may prevent some of the chilling effects of litigation, and promote competition by increasing the number of competitors and decreasing dead weight.\footnote{373}

V. Conclusion

While not initially apparent, Darwin's "survival of the fittest" theory has social and economic applications beyond its traditional biological context.\footnote{374} In an environment under constant change, those doing business on the Internet are continuously forced to adapt to the current conditions or perish in the process. Presently, e-commerce business organizations are being bombarded by several life determining factors, including a broad interpretation of State Street,\footnote{375} inaccessibility to key features of e-commerce, varying patent standards among the trilateral patent offices, and a proliferation of licensing demands and infringement suits. Countervailing elements, such as increasing the number of patent examiners, placing would be infringers on notice of pending patents, and allowing companies to continue using business methods employed before a patent was filed, add to the "complex web of relations" existing on the Internet. However, these measures may still not be enough to neutralize overly-broad patents.

In light of criticism and backlash voiced in response to the current U.S. e-commerce patenting standards, those organizations "less fit" to survive in a fully patented Internet world may not be forced to try. Although the recent preliminary injunction ruling in the Amazon patent dispute exemplifies a liberal reading of the State Street II ruling, a final interpretation of the patent at issue will not occur until the case is appealed to the Federal Circuit, or ultimately to the Supreme Court of the United States. However, since it may be years before a final decision is rendered, the fate of smaller e-commerce organizations remains in the balance. Thus, smaller companies with fewer resources

\footnote{373. See supra note 329 and accompanying text. E-commerce monopolies and overly-broad patents may also be prevented by petitioning the legislature. See ROBERT E. LITAN & WILLIAM A. NISKANEN, supra note 13, 70-73 (1998) (discussing possible antitrust measures to prevent online monopolies).}

\footnote{374. See supra notes 1-11 and accompanying text.}

\footnote{375. State Street, 149 F.3d 1368.}
will either have to pay licenses on demand or refuse to pay and risk litigation.

Not only does the fate of e-business hang in the balance, but worldwide e-commerce organizations may be losing bargaining power and venture capital to their U.S. counterparts due to strict business method claim requirements in their countries. However, pressure to remain competitive and survive on the Internet may result in less stringent standards abroad. Adaptations abroad to the current state of e-commerce may also result from impetus to unify the trilateral patent offices, resulting in a single standard rather than varying confused standards.

Ultimately, however, the fate of e-commerce consumers and the resulting economic model must be considered. In patenting almost any e-commerce business method imaginable, the USPTO diminishes the free, open, and competitive nature of the Internet. Broad patents on key elements of Internet business reduce the number of e-commerce competitors, increase product prices due to licensing fees and costs of litigation, and limit the free market nature of the medium. Patent rights predicated on broad, overreaching claims also counter the incentives to create and disclose, upon which the patent system is predicated. Thus, it is probable that e-commerce business method patentees will eventually be limited in their claiming abilities in order to promote a competitive market. Until that time, however, it appears that the “fittest” are those who quickly acted to obtain patents, and are currently “surviving” at the expense of weaker organizations and the patent system itself.

Ann Marie Rizzo