

STATE STREET BANK & TRUST CO. V. SIGNATURE FINANCIAL GROUP, INC.

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I. INTRODUCTION

During my second year of law school I invented a new method for skipping classes. I am currently considering patenting my new invention, and here is the first claim:

1. A data processing system for selecting classes to be skipped while engaged in a full-time legal educational program, comprising:

(a) computer processor means for processing data;

(b) first means for inputting:

(i) a student's class schedule and statistical data collected from previous students regarding the utility of attending particular classes;

(ii) data estimating the usefulness of relevant commercial outlines; and

(iii) desired holidays; and

(c) second means for processing data to determine a hierarchical list of times of days, days and whole school weeks which can be skipped by a student with minimal adverse educational impact.

In light of *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*¹, which liberalized patentability of methods for doing business, my invention might actually be patentable. Indeed, the United States Patent and Trademark Office ("PTO") recently has been issuing an unprecedented number of business-related patents, covering a surprisingly wide range of areas of innovation. While the nature of the inventions disclosed in some of these patents might appear to transcend the conventional understanding of patentability, many of these patents are likely to be upheld in light of *State Street* if challenged in court. This sudden liberalization of business-related inventions, however, has also created a controversy.

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1. 149 F.3d 1368, 47 U.S.P.Q.2d (BNA) 1596 (Fed. Cir. 1998), *cert. denied*, 119 S. Ct. 851 (1999).

Normative questions related to the desirability and impact of the *State Street* decision are already being raised, and the dispute is likely to intensify in the future.

State Street also relaxed the standards of patentability for inventions comprised of mathematical algorithms. While refining the process of patentability analysis, the court in *State Street* requested that the already disfavored *Freeman-Walter-Abele* test for patentability of mathematical inventions be fully abandoned. It is not clear, however, that the court has provided a satisfactory replacement for the *Freeman-Walter-Abele* test.

In addition to providing an overview of the *State Street* decisions, this paper discusses the analysis of the Federal Circuit and attempts to assess the impact of the *State Street* ruling upon the field of patent law.

II. BACKGROUND

A. Discussion of the Patent

Signature's patent ("the '056 patent")² discloses a data processing system which implements an investment structure for efficient administration of large-scale portfolios of mutual funds. Signature's system performs a set of elaborate calculations required to maintain a complex investment portfolio. Signature's system initializes itself daily by determining and allocating the assets of the portfolio's individual funds based on the most recent records. Signature's system then determines the percentage share that each fund constitutes in the portfolio, while accounting for dynamic changes in the value of individual investment securities and in the asset value of each fund. Signature's data processing system continuously monitors and records relevant data pertaining to individual investment funds to facilitate annual accounting and tax assessment.

The '056 patent contains an independent claim and five dependent claims. All claims are drafted in means-plus-function language,³ as per-

2. U.S. Patent No. 5,193,056, issued Mar. 9, 1993.

3. Section 112 ¶6 permits claims to be expressed as means for performing functions, and does not require a recital of specific structures or acts employed in actually performing such functions. Instead, section 112 specifies that the claims must be construed to cover the structures and acts described in the patent's technical specification. See 35 U.S.C. § 112 ¶6 (1994). Means-plus-function claims usually enable the patentability of devices even when inventions consist exclusively of processes. While means-plus-function claims constitute powerful tools for the protection of innovation, the doctrine of equivalents only confers such claims a limited reach beyond the actual invention disclosed in the patent application.

mitted by section 112, paragraph 6.⁴ Signature's claims disclose an apparatus (i.e., device or machine) by reference to devices described in the patent's technical specification. The '056 claims also mention a number of hardware components, including a computer system, computer memory and computer peripherals.

B. The District Court Decision

1. Facts

State Street Bank initially engaged in negotiations with Signature for licensing of the invention disclosed in the '056 patent.⁵ When negotiations broke down, State Street brought an action seeking a declaratory judgment that the '056 patent was invalid under 35 U.S.C. § 101 because it claimed an unpatentable mathematical algorithm.⁶

2. Court's analysis

The district court described the central issue in the case to be whether computer software that performed mathematical and accounting functions running on a computer was patentable subject matter under 35 U.S.C. § 101.⁷ In holding that the '056 patent was invalid, the court concluded that Signature's invention was both a method of doing business and a mathematical algorithm, both of which the court regarded as unpatentable.⁸

a) Unpatentable Mathematical Algorithm

In the first part of the opinion, the court concluded that the '056 patent constituted an unpatentable mathematical algorithm and declared the patent invalid. In this process, the court relied on the *Freeman-Walter-Abele* test ("*Freeman test*"),⁹ which provides that patentability of an invention

4. "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." 35 U.S.C. § 112 ¶6 (1994).

5. See *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 927 F. Supp. 502, 506, 38 U.S.P.Q.2d (BNA) 1530, 1534 (D. Mass. 1996).

6. See *id.* at 504, 38 U.S.P.Q.2d at 1532. State Street Bank also accused Signature of inequitable conduct and patent misuse. See *id.* Signature countersued, accusing State Street Bank of engaging in unfair and deceptive trade practices by filing suit, and also sought a declaratory judgment that State Street Bank had agreed to license the '056 patent. See *id.* at 504, 38 U.S.P.Q.2d at 1532.

7. See *id.* at 506, 38 U.S.P.Q.2d at 1534.

8. See *id.* at 516, 38 U.S.P.Q.2d at 1542.

9. The *Freeman-Walter-Abele* test for patentability under 35 U.S.C. § 101 was developed by federal courts in the course of three related decisions. See *In re Freeman*,

encompassing a mathematical algorithm depends on whether the algorithm is applied to or limited by physical elements or process steps.¹⁰ The court embraced the *Freeman* test by stating that the test was “the best guidepost for determining the patentability of computer software.”¹¹

The district court next distinguished the invention in the '056 patent from prior mathematical inventions rendered statutory by the Federal Circuit.¹² The court eventually concluded that the invention disclosed in the '056 patent did not involve the transformation or conversion of subject matter representative of physical activity and that a change of one set of numbers into another was insufficient to warrant patent protection.¹³ Consequently, the court held that the '056 patent was invalid because it disclosed nothing more than a non-patentable mathematical algorithm.¹⁴

b) Unpatentable business method

The district court next considered whether the '056 patent fell within the scope of “the long established principle that “business ‘plans’ and ‘systems’ are not patentable,”¹⁵ and concluded that the '056 patent qualified as an unpatentable business method. To support this conclusion, the

573 F.2d 1237, 197 U.S.P.Q. (BNA) 464 (C.C.P.A. 1978); *In re* Walter, 618 F.2d 758, 205 U.S.P.Q. (BNA) 397 (C.C.P.A. 1980); *In re* Abele, 684 F.2d 902, 214 U.S.P.Q. 682 (BNA) (C.C.P.A. 1982).

10. *State Street*, 927 F. Supp. at 510, 38 U.S.P.Q.2d at 1537.

11. *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 927 F. Supp. 502, 511, 38 U.S.P.Q.2d (BNA) 1530, 1538 (D. Mass. 1996).

12. *See id.* at 514, 38 U.S.P.Q.2d at 1540-41. (discussing patents upheld in *In re* Alappat, 33 F.3d 1526, 31 U.S.P.Q.2d (BNA) 1545 (Fed. Cir. 1994) (en banc) (computer data converted to be displayed on a monitor), *Arrhythmia Research Technology Inc. v. Corazonix Corp.*, 958 F.2d 1053, 22 U.S.P.Q.2d (BNA) 1033 (Fed. Cir. 1992) (digital data processed to analyze electrocardiograph signals), and *In re* Taner, 681 F.2d 787, 214 U.S.P.Q. (BNA) 678 (C.C.P.A. 1982) (computer-implemented method of seismic exploration)).

13. *See id.* at 515, 38 U.S.P.Q.2d at 1541-42.

14. *See id.* at 515, 38 U.S.P.Q.2d at 1542.

15. *Id.* (quoting DONALD S. CHISUM, PATENTS: A TREATISE ON THE LAW OF PATENTABILITY, VALIDITY AND INFRINGEMENT § 1.03[5] (1990) (stating that business methods are not patentable even though they may not be dependent upon the aesthetic, emotional, or judgmental reactions of a human). *See also* ERNEST BAINBRIDGE LIPSCOMB III, WALKER ON PATENTS § 2:17 (3d ed. 1984) (“[A] ‘system’ or method of transacting business is not an ‘art,’ [i.e., process] nor does it come within any other designation of patentable subject matter apart from the physical means of conducting the system.”); PETER D. RONSENBERG, PATENT LAW FUNDAMENTALS § 6.02[3] (2d ed. 1995) (“Whereas an apparatus or system capable of performing a business function may comprise patentable subject matter, the law remains that a method of doing business whether or not generated by an apparatus or system does not constitute patentable subject matter.”).

court reviewed a number of cases which, as the court stated, “while not holding explicitly on [grounds of a business method exception], recognize the validity of that rule.”¹⁶ The court, however, summarily dismissed in a “*but see*” reference both a previous court decision which had upheld a patent remarkably similar to the ’056 patent and a solid dissenting opinion which had called for the elimination of the business method exception.¹⁷

The court finally ruled that the ’056 patent was invalid since the invention disclosed therein was an abstract idea which was both a nonpatentable mathematical algorithm and a nonpatentable method of doing business.¹⁸ The court also dismissed Signature’s two counterclaims.¹⁹ Signature subsequently appealed.

C. The Federal Circuit Decision

1. *The ’056 patent discloses a machine*

The Federal Circuit commenced its analysis by considering the district court’s classification of the ’056 patent claims as process claims, despite their means-plus-function structure. The court noted that machine claims comprising means clauses may only be reasonably viewed as process claims if no supporting structure exists in the technical disclosure.²⁰ The court concluded that the technical description of the ’056 patent fully supported the conclusion that the patent claims and their equivalents described a machine.²¹

The court, however, specified that patentability of an invention did not depend on the invention’s classification as a process or a machine. Instead, patentability depended on whether the invention fell “within one of the

16. *State Street*, 927 F. Supp. at 515, 38 U.S.P.Q.2d at 1542.

17. *See State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 927 F. Supp. 502, 515-16, 38 U.S.P.Q.2d (BNA) 1530, 1542 (D. Mass. 1996) (discussing *Paine, Webber, Jackson & Curtis, Inc. v. Merrill Lynch, Pierce, Fenner & Smith, Inc.*, 564 F. Supp. 1358, 218 U.S.P.Q. (BNA) 212 (D. Del. 1983) (holding patentable a computerized system for combining packages of popular financial services) and *In re Schrader*, 22 F.3d 290, 297, 30 U.S.P.Q.2d (BNA) 1455, 1462 (Fed. Cir. 1994) (Newman, J., dissenting) (urging that the method of doing business exception be eliminated as error prone, redundant and obsolete)).

18. *See id.* at 516, 38 U.S.P.Q.2d at 1542.

19. *See id.* at 517, 38 U.S.P.Q.2d at 1543.

20. *See State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368, 1371, 47 U.S.P.Q.2d (BNA) 1596, 1599 (Fed. Cir. 1998) (quoting *In re Alappat*, 33 F.3d 1526, 1540-41, 31 U.S.P.Q.2d (BNA) 1545, 1555 (Fed. Cir. 1994) (en banc)), *cert. denied*, 119 S. Ct. 851 (1999).

21. *See id.*

four enumerated categories of patentable subject matter [in 35 U.S.C. § 101], 'machine' and 'process' being such categories."²²

2. *Statutory interpretation of 35 U.S.C. § 101*

The court next turned to the statutory language of section 101.²³ The court engaged in extensive statutory analysis in an apparent attempt to assess the statutory basis for the two "judicially-created exceptions to statutory subject matter" that the district court relied on in its decision, namely the "mathematical algorithm" exception and the "business method" exception.²⁴ The court noted that the "plain and unambiguous meaning of [section] 101 is that any invention falling within one of the four²⁵ stated categories of statutory subject matter may be patented...."²⁶ The court then stated that, "The repetitive use of expansive term 'any' in [section] 101 shows Congress' intent not to place any restrictions on the subject matter ... beyond those specifically recited in [section] 101."²⁷ The court further noted that the Supreme Court had previously decided that "Congress intended [section] 101 to extend to 'anything under the sun that is made by man.'"²⁸ The court finally concluded that "it is improper to read limitations into [section] 101 ... where ... Congress clearly did not intend such limitations."²⁹

3. *The '056 patent is not subject to the mathematical algorithm exception*

- a) The mathematical algorithm produces a "concrete, useful and tangible result"

After the Federal Circuit alluded that it disapproved of the limitations that the district court had imposed upon section 101, the court turned to

22. *Id.* at 1372, 47 U.S.P.Q.2d at 1600.

23. "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title." 35 U.S.C. § 101 (1994).

24. *State Street*, 149 F.3d at 1372-73, 47 U.S.P.Q.2d at 1600.

25. The four categories of patentable subject matter permitted by section 101 are processes, machines, manufactures and compositions of matter. *See* 35 U.S.C. § 101 (1994).

26. *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368, 1372, 47 U.S.P.Q.2d (BNA) 1596, 1600 (Fed. Cir. 1998), *cert. denied*, 119 S. Ct. 851 (1999).

27. *Id.* at 1373, 47 U.S.P.Q.2d at 1600.

28. *Id.* (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980)).

29. *Id.* (citing *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980)).

the first of these limitations, the mathematical algorithm exception. The court noted that the Supreme Court had ruled that mathematical algorithms are not patentable subject matter to the extent that they are just abstract ideas.³⁰ The court further noted that in order for a mathematical algorithm to be patentable, the algorithm must be reduced to a practical application, such that it generates a “useful, concrete and tangible result.”³¹ The usefulness of results, which is also an essential requirement of section 101, played a central role in the remaining part of the court’s analysis.

The court then reviewed a number of its prior decisions centered around the usefulness of results of mathematical algorithms. In *In re Alappat*,³² the court had held that data transformed by a machine through a series of mathematical calculations to produce a smooth waveform display on a rasterizer monitor constituted a practical application of an abstract idea because it produced “a useful, concrete and tangible result.” The court also mentioned its decision in *Arrhythmia Research Technology Inc. v. Corazonix Corp.*,³³ where it had held that the transformation of electrocardiograph signals from a patient’s heartbeat by a machine through a series of mathematical calculations constituted a practical application of an abstract idea, because it corresponded to “a useful, concrete or tangible result”—the condition of the patient’s heart.

Following the structure of its decisions in *Alappat* and *Arrhythmia*, the court ruled that in the present case,

[T]he transformation of data, representing discrete dollar amounts by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces ‘a useful, concrete and tangible result’—a final share price ... relied upon by regulatory authorities and in subsequent trades.³⁴

30. See *id.* (quoting *Diamond v. Diehr*, 450 U.S. 175 (1981)).

31. *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368, 1373, 47 U.S.P.Q.2d (BNA) 1596, 1600-01 (quoting *In re Alappat*, 33 F.3d 1526, 1544, 31 U.S.P.Q.2d (BNA) 1545, 1557 (Fed. Cir. 1994) (en banc)), *cert. denied*, 119 S. Ct. 851 (1999).

32. 33 F. 3d 1526, 31 U.S.P.Q.2d 1545 (Fed. Cir. 1994).

33. 958 F.2d 1053, 22 U.S.P.Q.2d at 1033 (Fed. Cir. 1992).

34. *State Street*, 149 F.3d at 1373, 47 U.S.P.Q.2d at 1601.

4. *Application of the Freeman-Walter-Abele test by the District Court was inappropriate*

Once the court indicated that it was going to uphold the validity of the '056 patent against the mathematical algorithm challenge, the court took the opportunity to discredit the *Freeman* test.³⁵ The court engaged in a comprehensive historical review of the development and evolution of the *Freeman* test. The court recalled that the *Freeman* test was developed by the Court of Customs and Patent Appeals in the aftermath of *Gottschalk v. Benson*³⁶ and *Parker v. Flook*,³⁷ and subsequently adopted by the Federal Circuit to identify unpatentable mathematical algorithms.³⁸ Noting a number of inconsistent applications of the *Freeman* test by different courts,³⁹ the Federal Circuit stated that after *Diamond v. Diehr*⁴⁰ and *Diamond v. Chakrabarty*,⁴¹ the test "has little, if any, applicability to determining the presence of statutory subject matter."⁴²

Noting that application of the *Freeman* test only enables identification of mathematical algorithms, the court reiterated the importance of the test of usefulness of results. Specifically, the court stated that "the mere fact that a claimed invention involves [an algorithm], in and of itself, would not render it nonstatutory subject matter unless, of course, its operation does not produce a 'useful, concrete and tangible result.'"⁴³

The court next attempted to provide guidelines for claim construction and interpretation. The court initially advised that "the question of whether a claim encompasses statutory subject matter should not focus on which of the four categories of subject matter a claim is directed to...."⁴⁴ The court, however, also stated that "the subject matter *must* fall into at least one

35. See *supra* note 9.

36. 409 U.S. 63 (1972).

37. 437 U.S. 584 (1978).

38. See *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368, 1374, 47 U.S.P.Q.2d (BNA) 1596, 1601 (Fed. Cir. 1998), *cert. denied*, 119 S. Ct. 851 (1999).

39. See *id.* at 1374 n.5, 47 U.S.P.Q.2d at 1601 n.5 (discussing *In re Abele*, 684 F.2d 902, 214 U.S.P.Q. (BNA) 682 (C.C.P.A. 1982), *In re Taner*, 681 F.2d 787, 214 U.S.P.Q. (BNA) 678 (C.C.P.A. 1982) and *In re Meyer*, 688 F.2d 789, 215 U.S.P.Q. (BNA) 193 (C.C.P.A. 1982)).

40. 450 U.S. 175 (1981).

41. 447 U.S. 303 (1980).

42. See *State Street*, 149 F.3d at 1374, 47 U.S.P.Q.2d at 1601.

43. *Id.* at 1374, 47 U.S.P.Q.2d at 1602 (quoting *In re Alappat*, 33 F.3d 1526, 1544, 31 U.S.P.Q.2d (BNA) 1545, 1557 (Fed. Cir. 1994) (en banc)). See *In re Iwanashi*, 888 F.2d 1370, 1374, 12 U.S.P.Q.2d 1908, 1911 (Fed. Cir. 1989).

44. *State Street*, 149 F.3d at 1375, 47 U.S.P.Q.2d at 1602.

category of statutory subject matter.”⁴⁵ The court then noted that the ’056 patent claims recited a machine, which “for purposes of [the court’s] analysis” was sufficient to qualify the patent as statutory subject matter.⁴⁶

The court then advised that inquiries into patentability of inventions should concentrate on “the essential characteristics of the subject matter, in particular, its practical utility.”⁴⁷ The court recalled that the invention disclosed in the ’056 patent “admittedly [produced] a ‘useful, concrete, and tangible result.’”⁴⁸ The court finally concluded that utility of results rendered the ’056 patent valid, “even if the useful result [was] expressed in numbers, such as price, profit, percentage, cost, or loss.”⁴⁹

5. *The court overruled the business method exception*

The Federal Circuit turned next to the judicially-created business method exception to subject matter. The court stated in decisive terms that “[the court took] this opportunity to lay this ill-conceived exception to rest.”⁵⁰ The Federal Circuit justified its disfavor of the business method exception by noting that the doctrine had “merely represented the application of some general, but no longer applicable legal principle ... which was eliminated by [35 U.S.C.] § 103.”⁵¹

The court recalled Judge Newmann’s dissenting opinion in *In re Schrader* which had described the business method exception as “an unwarranted encumbrance to the definition of statutory subject matter in section 101, that [should have been] discarded as error-prone, redundant, and obsolete.”⁵² A retrospective analysis of the opinion reveals that the Court of Appeals closely followed Judge Newman’s recommendations by eliminating the business method exception and requiring instead strict adherence to the relevant statutory provisions.⁵³

45. *Id.* at 1375 n.9, 47 U.S.P.Q.2d at 1602 n.9 (emphasis added).

46. *Id.* at 1375, 47 U.S.P.Q.2d at 1602.

47. *Id.*

48. *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368, 1375, 47 U.S.P.Q.2d (BNA) 1596, 1602 (Fed. Cir. 1998), *cert. denied*, 119 S. Ct. 851 (1999).

49. *See id.* at 1375, 47 U.S.P.Q.2d at 1602.

50. *Id.*

51. *Id.* Section 103 further specifies conditions for patentability, including the requirement that inventions must exhibit non-obviousness to be patentable. *See* 35 U.S.C. § 103 (1994).

52. *Id.* at 1375 n.10, 47 U.S.P.Q.2d at 1603 n.10 (quoting *In re Schrader*, 22 F.3d 290, 298, 30 U.S.P.Q.2d (BNA) 1455, 1462 (Fed. Cir. 1994) (Newman, J., dissenting)).

53. While calling for the elimination of the business method exception, Judge Newman had noted, “Patentability does not turn on whether the claimed method does ‘business’ ..., but on whether the method ... meets the requirements of patentability as set

The court noted that the business method exception had never constituted a determinative ground for rejection of patentability by the Federal Circuit.⁵⁴ Instead, cases had generally been decided on different grounds.⁵⁵ The court stated that, "Even the case frequently cited as establishing the business method exception ... did not rely on the exception to strike the patent."⁵⁶

The court rejected State Street Bank's argument that the business method exception had been conclusively acknowledged in *In re Maucorps*⁵⁷ and *In re Meyer*⁵⁸ by stating that the two cases were actually decided based on an antiquated analysis under the mathematical algorithm exception.⁵⁹ The court further noted that the *Maucorps* and *Meyer* decisions had relied on the *Freeman* test, a test which the court had essentially demolished in the first part of the *State Street* decision.

The court appeared to acknowledge that the business method exception had been judicially established in *In re Patton*,⁶⁰ where the Court of Customs and Patent Appeals had decided that a business method was not patentable subject matter when separated from the means for implementing the method. The court, however, rejected this precedent by stating that

forth in sections 102, 103, and 112 of the Patent Act." *In re Schrader*, 22 F.3d at 298, 30 U.S.P.Q.2d at 1462.

54. *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368, 1375, 47 U.S.P.Q.2d (BNA) 1596, 1603 (Fed. Cir. 1998) (quoting Rinaldo Del Gallo, III, *Are "Methods of Doing Business" finally out of Business as a Statutory Rejection?*, 38 IDEA 403, 435 (1998)).

55. *See id.* at 1375-76, 47 U.S.P.Q.2d at 1603. The court reviewed a number of decisions consistent with the conclusion that patentability had generally been decided without relying on the business method exception. *See In re Howard*, 394 F.2d 869, 157 U.S.P.Q. (BNA) 615 (C.C.P.A. 1968) (decided on grounds of novelty). *See also* *Dann v. Johnston*, 425 U.S. 219 (1976) (holding patent invalid under 35 U.S.C. § 103); *In re Schrader*, 22 F.3d 290, 30 U.S.P.Q.2d (BNA) 1455 (Fed. Cir. 1994) (decided on the mathematical algorithm exception); *In re Chatfield*, 545 F.2d 152, 191 U.S.P.Q. (BNA) 730 (C.C.P.A. 1976); *Loew's Drive-In Theatres v. Park-In Theatres*, 174 F.2d 547 (1st Cir. 1949) (decided on grounds of novelty); *In re Patton*, 127 F.2d 324 (C.C.P.A. 1942) (decided on grounds of novelty); *In re Wait*, 73 F.2d 982 (C.C.P.A. 1934) (decided on grounds of novelty); *Berardini v. Tocci*, 190 F. 329 (C.C.S.D.N.Y. 1911); *Ex parte Murray*, 9 U.S.P.Q.2d 1819 (BNA) (B.P.A.I. 1988) (decided on grounds of obviousness and novelty).

56. *State Street*, 149 F.3d at 1376, 47 U.S.P.Q.2d at 1603 (quoting *Hotel Security Checking Co. v. Lorraine Co.*, 160 F. 467 (2d Cir. 1908)).

57. 609 F.2d 481, 203 U.S.P.Q. (BNA) 812 (C.C.P.A. 1982).

58. 688 F.2d 789, 215 U.S.P.Q. (BNA) 193 (C.C.P.A. 1982).

59. *See State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368, 1376, 47 U.S.P.Q.2d (BNA) 1596, 1603 (Fed. Cir. 1998).

60. 127 F.2d 324 (C.C.P.A. 1942).

“the jurisprudence does not require the creation of a distinct business class of unpatentable subject matter.”⁶¹

The Federal Circuit next addressed the lower court’s concern that the ’056 patent was so broad that it “foreclose[d] virtually any computer-implemented accounting method necessary to manage [similar] type[s] of financial structure[s].”⁶² The court pointed out that the scope of a patent’s claims must be evaluated under sections 102, 103 and 112, and not under section 101, as the district court had done.⁶³

The Federal Circuit also discussed a relevant change in the newest edition of the PTO’s *Manual of Patent Examining Procedures* (“MPEP”), which now states: “Claims should not be categorized as methods of doing business. Instead such claims should be treated like any other process claims.”⁶⁴ The court expressed its accord with this modification of the MPEP, and seemed to derive confidence from it. The court’s endorsement of this new provision in the MPEP was consistent with the court’s favorable review of the decision in *Paine, Webber, Jackson & Curtiss v. Merrill Lynch*,⁶⁵ where the *Paine* court had upheld a patent for a computerized system of cash management which exhibited many characteristics of a business method.⁶⁶

The Federal Circuit concluded its analysis by stating, “Whether the claims are directed to subject matter within [section] 101 should not turn on whether the claimed subject matter does ‘business’ instead of something else.”⁶⁷ While abolishing the business method exception and refining the judicial standards for patentability of mathematical inventions, the Federal Circuit reversed the district court’s decision by upholding the validity of the ’056 patent, and remanded the case back to the district court.⁶⁸

61. *State Street*, 149 F.3d at 1376 n.15, 47 U.S.P.Q.2d at 1604 n.15.

62. *Id.* at 1376-77, 47 U.S.P.Q.2d at 1604 (quoting *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 927 F. Supp. 502, 516, 38 U.S.P.Q.2d (BNA) 1530, 1542 (D. Mass. 1996)).

63. *See id.* at 1377, 47 U.S.P.Q.2d at 1604.

64. Examination Guidelines, 61 Fed. Reg. 7478, 7479 (1996).

65. 564 F. Supp. 1358 (D. Del. 1983).

66. *See State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368, 1376 n.13, 47 U.S.P.Q.2d (BNA) 1596, 1603 n.13 (Fed. Cir. 1998), *cert. denied*, 119 S. Ct. 851 (1999).

67. *Id.* at 1377, 47 U.S.P.Q.2d at 1604.

68. *See id.*

III. DISCUSSION

A. Mathematical Algorithms: The Demise of the Freeman-Walter-Abele Test

The Federal Circuit demolished the *Freeman* test by stating that the test had “little, if any, applicability to determining the presence of statutory subject matter.”⁶⁹ The court advised that the analysis of patentability should not center on identification of a specific category of subject matter (i.e., process, machine, manufacture, or composition of matter). Instead, the court suggested that analysis of patentability should be concerned with “the essential characteristics of the subject matter, in particular, its practical utility.”⁷⁰ The court, however, also stated that “the subject matter *must* fall into at least one category of statutory subject matter.”⁷¹

Consequently, in order to perform an analysis of utility of result, as the Federal Circuit required, a court must initially ensure that the invention falls “into at least one category of statutory subject matter.” The court in *State Street* further advised that after identification of a process or machine, an analysis of patentability should focus on the characteristics of the subject matter, e.g., utility. This implies that when inventions involve mathematical algorithms, courts must initially identify the presence of the mathematical algorithms, which are processes, and then ensure that they achieve some useful result.

The process for determining the presence of mathematical algorithms in claims cannot be formalized. In a widely-read concurring opinion in *Arrhythmia Research Technology v. Corazonix Corp.*, Judge Rader criticized the *Freeman* test as depending upon the definition of an “algorithm,” because the definition of mathematical algorithms was vague and without a “statutory anchor” in the categories defined in section 101.⁷²

While Judge Rader’s criticism of the *Freeman* test was justified, the same statements also expose the inadequacy of searching for mathematical algorithms within inventions in general. When a court is unable to define what the court is looking for, how can the court find it? Because the court in *State Street* actually required identification of processes and not necessarily of algorithms, courts might attempt to circumvent the search for mathematical algorithms completely. If a court were to focus directly on

69. *Id.* at 1374, 47 U.S.P.Q.2d at 1601.

70. *Id.* at 1375, 47 U.S.P.Q.2d at 1602.

71. *Id.* at 1375 n.9, 47 U.S.P.Q.2d at 1602 n.9 (emphasis added).

72. *See Arrhythmia Research Technology v. Corazonix Corp.*, 958 F.2d 1053, 1063, 22 U.S.P.Q.2d (BNA) 1033, 1041 (Fed. Cir. 1992).

identifying processes within an invention reciting mathematical algorithms, however, such an analysis would again consist of heuristic and arbitrary inquiries. No formal approach to the identification of processes exists, either. Consequently, the first step in the analysis suggested by the *State Street* must contend with ambiguity and uncertainty, at least on a conceptual level.

State Street's suggestion that patentability analysis should commence with the identification of processes within mathematical inventions raises further concerns. Most inventions center around processes, so a simple inquiry into the existence of processes would fail to serve as a discriminating tool and would not perform any practical function. Consequently, a search for processes within inventions could become a mere formality in the context of patent law. Emphasizing form over substance undermines the fundamental legal quest for truth grounded in substantive reality. Additionally, Copyright law already provides adequate protection for form and expression, so patent law should not duplicate this protection even at a conceptual level.

B. The Business Method Exception: 110 Years of Unjustified Confusion

New discoveries, even when revolutionary, are sometimes old. China, for example, long ago discovered furnaces for making steel, gunpowder and the cannon. More than eight centuries later, when these inventions were rediscovered in Europe, they sparked the industrial revolution. Similarly, the Federal Circuit rediscovered in the *State Street* decision guidelines provided by the Supreme Court 110 years earlier. In an era of increased economic globalization, when computerized financial transactions involve staggering amounts, the *State Street* court's discovery could also spark a technological revolution which might one day be known as the "computerized business revolution."

The business method exception was a judicially-created doctrine which should have never existed. In the first case involving issues regarding the patentability of business-related subject matter to reach the Supreme Court, *Munson v. City of New York*,⁷³ the Court suggested the correct approach to determine patent validity. In *Munson*, the Court considered the validity of a patent for a method for filing coupons by pasting the coupons in serial order on consecutively numbered pages of blank books.⁷⁴

73. 124 U.S. 601 (1888).

74. *See id.* at 604.

The Court declared the patent invalid, concluding that the invention lacked the requisite novelty in light of filing methods in existence at that time.⁷⁵

While the *Munson* Court expressly declined to rule on whether the method for filing coupons actually qualified as patentable subject matter, the Court alluded that the correct approach to this determination involved direct analysis of the statute.⁷⁶ Without acknowledging the decision in *Munson*, the Federal Circuit indicated unambiguously in *State Street* that patentability should indeed be assessed by closely observing the relevant statutes. Specifically, the court in *State Street* liberally qualified the '056 patent claims as machine claims by strictly applying 35 U.S.C. § 112, ¶6,⁷⁷ and then read section 101 literally to permit patentability of a machine.

The fact that the court in *State Street* ignored *Munson* is surprising in light of the fact that federal courts have acknowledged *Munson* in the past. In *Cincinnati Traction Co. v. Pope*,⁷⁸ a federal court rendered valid a patent for a railway transfer ticket by ruling that a specific item used in a "method of doing business" was a "manufacture," which was deemed to be a patentable process.⁷⁹ While this ruling appears confusing, it probably indicates that the court in *Cincinnati* deemed the invention patentable and searched for a plausible reason to so hold.

A significant aspect of the *Cincinnati* decision is that the court followed the process outlined by the Supreme Court in *Munson*, and assessed patentability based on direct application of the relevant statute. It is also noteworthy that *Cincinnati* was the first case involving a business method to be decided in the aftermath of *Hotel Security Checking Co. v. Lorraine Co.*,⁸⁰ which is widely acknowledged to have originated the business method exception doctrine in dicta. Therefore, courts did not immediately deviate from the correct line of patentability analysis after the business method exception originated.

Twenty one years after *Cincinnati*, in *In re Wait*,⁸¹ a federal court again outlined the correct procedure for determining the patentability of inventions comprising business methods. *Wait* involved a method for sale of commodities by coordinating the offer and acceptance at a central loca-

75. *See id.* at 604-05.

76. *See id.*

77. *See supra* note 3.

78. 210 F. 443 (6th Cir. 1913).

79. *See id.* at 446.

80. 160 F. 467 (2d Cir. 1908).

81. 73 F.2d 982 (C.C.P.A. 1934).

tion. The *Wait* court found no novelty in the invention and invalidated the patent.⁸²

While the court in *State Street* court acknowledged the *Wait* decision,⁸³ it failed to point out that the court in *Wait* had unequivocally acknowledged that the business method exception had been an innocuous artifact of dicta: "However inviting [the concept of a business method exception] may be, the court does not deem it proper to deviate from its usual practice of determining only the relevant questions presented by the application actually before it, avoiding dicta in so far as possible."⁸⁴ The court in *Wait* actually had gone one step further and had specified that business methods "might present patentable novelty"⁸⁵ It is remarkable that the Federal Circuit in *State Street* neglected to point out such strong support in prior case law for its position, especially since the court insisted that the business method exception had been nothing more than dicta.

C. Patentability of Business Methods: A Normative Analysis

The Federal Circuit's decision that business methods are patentable has settled a judicial dilemma, but has only defined the framework for the normative analysis and criticism that are sure to follow. The practical consequences of the fact that business methods are now patentable cannot be fully ascertained yet. A number of general observations, however, can still be made regarding the social, economic and legal contexts in which the *State Street* decision fits.

One of the fundamental purposes of intellectual property law is to preserve inventors' incentives to innovate. Supporters of the *State Street* decision are likely to argue that the ability to protect business methods will probably encourage further innovation in the context of competitive business practices. Specifically, if companies in a specific field realize that a competitor has developed a better business model, but that model is protected from duplication, the companies are likely to strive to develop new approaches to commercial enterprise in order to remain competitive. This process would likely increase efficiency across the whole economic spectrum.

The conceptual difficulty associated with this argument is that the incentive to innovate in a functional business context is inherently embed-

82. *See id.* at 983.

83. *See State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368, 1376 n.15, 47 U.S.P.Q.2d (BNA) 1596, 1604 n.15 (Fed. Cir. 1998), *cert. denied*, 119 S. Ct. 851 (1999).

84. *In re Wait*, 73 F.2d at 982.

85. *Id.* at 983.

ded in the nature of the economic system: commercial entities which succeed in developing more efficient business models prosper at the expense of their competitors. This survival-of-the-fittest economic model permeates all aspects of business operations, and is reflected in the ubiquitous approach to increasing productivity that corporate America has developed. Once investments in new technology cease to provide further improvements in productivity, and when stock prices or earnings stagnate, companies announce layoffs and restructure their operations. The purpose is usually to streamline some section of the business operations, e.g., reducing managerial costs. Consequently, companies are likely to develop new business methods whether or not these methods can be patented. Indeed, companies have been refining their business practices since long before the *State Street* decision.

The type of business methods that are likely to benefit from the *State Street* decision, however, are probably more material than just general functional operating schemes. The court in *State Street* repeatedly reiterated the utility of the invention disclosed in Signature's patent, while concurrently emphasizing the concreteness and materiality of the result that the invention achieved.⁸⁶ The *State Street* decision seems to indicate that to be patentable, business methods must achieve concrete and material results in addition to being useful. If this interpretation is correct, it would probably be difficult for a company to prove that a general operating business plan developed by that company deserves patent protection. To satisfy the requirements of concreteness and materiality, such a company would probably have to provide conclusive evidence that the new business method decreases operating costs, increases productivity, or achieves some other tangible economic benefit. Such an analysis would probably involve complex forecasting techniques and rely on economic assumptions and projections. The speculative nature of such endeavors probably reduces the likelihood that companies will attempt to patent general business operating methods. Instead, the business methods that will continue to be patented will probably involve computer software, and will also qualify as machines through proper use of means-plus-function claims.

Another objection directed to the patentability of business methods notes that patentability of methods of doing business amounts to a protection of the fundamental tools for economic competition and progress. Specifically, preventing use of basic commercial mechanisms erodes the concept of a free market economy, which constitutes the essence of American

86. See, e.g., *State Street*, 149 F.3d at 1375, 47 U.S.P.Q.2d at 1602. (“[Signature's invention] admittedly produces a “useful, concrete, and tangible result.”)

society. This concern is valid and justified. Protection of business methods, however, is conceptually similar to protection of technological innovation, which is broadly permitted under patent law. While general business methods are essential for the economic existence of commercial entities, technology and innovation are quintessential to human progress and survival. Since inventors of new technology have an undisputed right to limited protection of their ideas, it is difficult to argue that inventors of new business methods should be denied similar rights simply because such methods serve a fundamental commercial role. Because patentability of technological innovations is subject to certain restrictions, protection of business methods should also be appropriately limited, but should not be unilaterally denied.

The Federal Circuit concluded, ‘Whether the claims are directed to subject matter within [section] 101 should not turn on whether the claimed subject matter does ‘business’ instead of something else.’⁸⁷ Indeed, nothing in the patent statutes suggests that business methods should be given any special treatment. A retroactive review of the court’s approach to statutory analysis in *State Street* reveals that the court’s ruling that business methods are just ordinary methods for purposes of patentability should not have been surprising.

In concluding that section 101 should be broadly construed,⁸⁸ the Federal Circuit seemed to conduct its analysis in a framework generally consistent with new textualism.⁸⁹ The court initially concentrated on the statutory language, specifically on the “plain and unambiguous meaning of [section] 101....”⁹⁰ The court then employed grammar canons of statutory construction and concluded that, “The repetitive use of expansive term ‘any’ in [section] 101 shows Congress’ intent not to place any restrictions on the subject matter ... beyond those specifically recited in [section] 101.”⁹¹ The court then adopted an intentionalist⁹² tool for statutory analysis, and considered the legislative intent behind section 101.⁹³

87. *Id.* at 1377, 47 U.S.P.Q.2d at 1604.

88. *See id.* at 1372-73, 47 U.S.P.Q.2d at 1600.

89. New textualism is a theory of statutory interpretation which emerged in the 1980s. New textualism seeks to interpret statutory language according to its plain meaning, as construed in the context of the whole statute. *See* WILLIAM N. ESKRIDGE, JR. & PHILIP P. FRICKEY, *CASES AND MATERIALS ON LEGISLATION, STATUTES AND THE CREATION OF PUBLIC POLICY* 586-87 (1995). The Supreme Court has adopted new textualism to a significant extent, but not completely. *See id.* at 634-35.

90. *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368, 1372, 47 U.S.P.Q.2d (BNA) 1596, 1600 (Fed. Cir. 1998), *cert. denied*, 119 S. Ct. 851 (1999).

91. *Id.* at 1373, 47 U.S.P.Q.2d at 1600.

Given the absence of references to business methods in section 101 and the court's textualist approach to statutory interpretation, the *State Street* decision was inevitable. Criticism addressed to the court in *State Street*, therefore, is probably unwarranted. If patentability of business methods is fundamentally undesirable in a social or economic context, the judicial branch might not be adequately equipped to remedy it. Congress, as the legislative body, is the appropriate forum where competing ideas and policies should be exposed and debated. For example, overprotection of intellectual property might actually impair economic growth,⁹⁴ so permitting patentability of business methods could negatively impact economic progress. Congress, however, is best qualified to consider and define the United States' national interests and to formulate appropriate legislation. Until then, *State Street* remains a lucid and solid decision.

D. *State Street's* Effect on the Patentability of Business and Mathematical Inventions

State Street appears to have relaxed the standard of patentability for inventions reciting business methods and mathematical algorithms. In light of *State Street*, courts must now undergo a two-step inquiry: 1) determine whether the invention recites statutory subject matter (e.g., process or machine); and 2) determine whether the invention generates "a useful, concrete and tangible result." The usefulness of results appears to be a low threshold for patentability, as illustrated by the court's conclusion that "the transformation of data, representing discrete dollar amounts ... into a final share price" is patentable.

A retrospective analysis of previous cases involving mathematical algorithms and business methods suggests that many of these cases would probably be decided differently today using the standard defined by *State Street*. For example, in *Parker v. Flook*, the Supreme Court considered a method claim for updating an alarm limit involved in a process for the catalytic conversion of hydrocarbons. The only novelty in the *Flook* patent consisted of a mathematical algorithm employed in the computation of the alarm limit. The Court denied the patent based on the now abandoned

92. Intentionalism is a theory of statutory interpretation which advocates interpretation of statutes in a manner consistent with the original intent of the drafters of the statute. See ESKRIDGE, *supra* note 84, at 514.

93. See *State Street*, 149 F.3d at 1376 n.13, 47 U.S.P.Q.2d at 1603 n.13 (discussing S. Rep. No. 82-1979 at 5 (1952) and H.R. Rep. No. 82-1923 at 6 (1952)).

94. See, e.g., ANNALIE SAXENIAN, REGIONAL ADVANTAGE, CULTURE AND COMPETITION IN SILICON VALLEY AND ROUTE 128 (1998) (arguing that the decreased regulation in California contributed to the superior economic success of Silicon Valley as compared to Route 128 in Massachusetts).

“point of novelty test,” which held that a mathematical algorithm “cannot support a patent unless some other inventive concept exists in the algorithm’s application.”⁹⁵

In light of *State Street*, the patent in *Flook* should have been upheld. The mathematical algorithm employed in the *Flook* invention enabled the accurate determination of abnormal conditions during a process of chemical conversion of hydrocarbons, which was definitely “a useful, concrete and tangible result.” If the prospect of qualifying a Supreme Court decision as wrong based on a ruling by the Federal Circuit appears unsettling, it might be useful to recall that *Flook* was decided 20 years before *State Street*, in an era when automation and modern technology were just emerging. Additionally, the *State Street* decision was authored by Judge Rich, the same person who had drafted the modern patent code in 1952.

State Street’s effects on patentability of new inventions cannot be fully assessed yet. It appears, however, that the PTO will be more lenient with inventions consisting exclusively of software. The standard for patentability of software under sections 102, 103 and 112 will probably remain high, however, and the technical disclosure should still be an essential component of properly drafted applications.

The standards pertaining to the patentability of inventions involving business methods have probably been significantly relaxed, too.⁹⁶ The PTO has recently granted an unprecedented number of business-related patents, covering a surprisingly broad inventive spectrum.⁹⁷ In light of

95. *Parker v. Flook*, 437 U.S. 584, 594 (1978). The point of novelty test essentially assumed that any mathematical algorithm was part of the prior art. *See id.*

96. A brief review of recent patents involving business methods illustrates the PTO’s increased leniency and the broad spectrum of patentable inventions. For example, the PTO recently allowed the patentability of a system for on-line, Internet commerce, where offers to buy can be instantly accepted by sellers. The selling merchants have instant access to buyers’ monetary accounts, and upon completion of the transaction can debit the selling price in real-time. *See* U.S. Patent No. 5,724,424, issued March 3, 1998. Another intriguing patent was recently issued for a system for buying and selling the attention of computer users in a computer network. Essentially, the invention manages a process through which computer users receive monetary compensation for viewing advertisements delivered to their computers in real-time. *See* U.S. Patent No. 5,794,210, issued August 11, 1998. It is noteworthy that both of these patents disclose “systems,” even though the inventions themselves constitute nothing more than methods. Much like the invention in the ’056 patent, these inventions were disguised as machines in order to circumvent the PTO’s pre-*State Street* reluctance to grant patents for mathematical algorithms.

97. The PTO’s official statistics show a dramatic increase in the number of business-related patents that have been issued recently. Following are statistics for the period between 1994-97: 1994—146; 1995—204; 1996—232; 1997—2150. *See* United States

State Street, it is unlikely that these patents will be challenged in court under section 101. However, if these patents are challenged, the patents may be upheld. Law firms specializing in intellectual property protection and patent licensing will probably experience an increase in the demand for their services.

IV. CONCLUSION

State Street continues a trend of judicial leniency towards patentability. The court in *State Street* rendered an incisive decision which both eliminated the judicial concept of a business method exception and demolished the traditional *Freeman-Walter-Abele* test for patentability of mathematical inventions. While the court's analysis was probably not perfect, the judicial basis and the validity of the final decision cannot be contested. The academic debate concerning the social, economic and legal implications of the *State Street* decision, which is certain to erupt, should probably not focus on the acts of the judicial branch. Instead, commentators concerned with the patentability of business methods should realize that Congress constitutes the appropriate forum where such policy issues should be considered.