Do Business Method Patents Hurt or Help?: A Financial Asset Management Industry Perspective[i]

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"The logic of words should yield to the logic of realities."

Justice Louis Brandeis
Supreme Court Justice, 1856-1941[3]

Abstract

The State Street Bank[4] *decision of 1998 affirmed U.S. business method patents. Along with the subsequent downpour of patent filings came a shower of commentary from the legal and business communities alike. The literature has generally been thoughtful and well-reasoned, or at least well-meaning. But as practitioners in the fields, we have found the commentary at times too focused on the trees of discord rather than the forest of potential. As we approach the decade anniversary, we take a closer and deeper look at the provocative subject– attempting to present a balanced view of the subject removed from the generically overbroad criticisms as well as the unbridled enthusiasms, supplemented by experience in the field.*

Overview

Economists have wrestled with whether patents spark business innovation, whether exclusive rights hurt or benefit businesses in general, and whether the current legal system is capable of issuing valuable, enforceable patents without too great a burden on companies. As a number of objections have been vocal, proponents and advocates who place much value behind their own patent portfolios have remained silent, lest they be subjected to highbrow disparagement because of their obvious conflicts of interest. Many of the critics, however, also have conflicts of interest—often unstated.

In our view, much commentary has been shielded from the light of the realities of the present intellectual property system. Legal scholars have not contributed significantly to business' concerns that the costs imposed by such patents may hurt well established organizations without fostering the innovation they profess to propound. Little analogy has been drawn between financial asset management industry business method patents ("BMPs") and the rich history of intellectual property jurisprudence, which has expanded to include innovations in all endeavors, including BMPs' predecessor software patents. Little has been articulated on the *why* it is valuable for business, though much has been written on the *what* it means to business, as counsel have carefully deciphered every word laid down by judges, and anticipated how the wisdoms of these Oracles at Delphi benefit their clients.

In the decade since *State Street Bank*, neither the fears of the harshest critics nor the hopes of the greatest advocates have come true. The problems cited against BMPs are generally systemic to the entire patent system, not individual to *State Street Bank* and its progeny. Too few business professionals were immersed in the patent system long enough to have a feel for its strengths and an understanding of its inherent shortcomings. And the rush to judgment by numerous commentators facilitated neither empathy nor understanding of the dynamics at issue. Consequently, when the financial asset management industry business community giant awakened in 1999, each issued patent, each lawsuit and each judicial act in the field were put under an electron microscope. Unlike other fields, however, with business methods the financial stakes were often large, the innovations often appeared more obvious than in the pure scientific and engineering technologies, regardless of their inherent value.

In response, patent administrative agency systems, legislators and courts have increased scrutiny, reduced allowance rates, and whittled away the scope of protection, often down to the very bone. Perhaps the broad brush has tipped the balance, as it has simultaneously reduced opportunities for abusers while in turn reducing legitimate rights of innovators. While critics may view the recent changes as a safeguard to unnecessary legal action, innovators may view them as reducing the incentive to explore new ideas, more easily expropriated without recompense.

The financial asset management industry BMP proponent's side of the story should not be excluded from the equation. First, patents and their underlying social values are founded on constitutional principles. The realms of patentable protection rightly reside in

all avenues of innovation, espoused by Congress as "anything under the sun that is made by man,"[5] not as so many items in a buffet chosen based on one's economic appetite. Lasting, valuable laws are not subject to loopholes and manipulation by moneyed interests and clever counsel, but rather internally consistent and founded on Jeffersonian principles. In fact, business methods have been around since the first Patent Statute of the 1790s, and evolved from machine implementation to their modern software format.

Secondly, BMPs do not reside in a vacuum from the intellectual property of other fields, but rather offer advantages and corresponding disadvantages, like any other class of patents. While certainly not perfect or even close, they provide a valuable device to protect early pioneers, particularly those without benefit of early capital. Well established, objective criteria for protection have been universally reflected in the majority of patent systems.

Where competition is keen and entry level capital requirements are high, patents are a key defensive component to block and defend against quick copy and entry by firms possessing superior market positioning, capital, and brand recognition. Further, the ability to protect innovation sparks entry level investment funding where it would not otherwise flow, fostering and expanding the rates of innovation. For example, Edison's first economically successful invention was to an improved stock ticker (for which he received several patents), which helped him get funding for his first laboratory and factory.[6] The use of patents to secure capital investment has been well known in the technology arts for decades.[7] No rational pharmaceutical manufacturers would invest hundreds of millions in research, development and governmental approvals were it legally permissible to copy innovation in generics without being offered limited monopoly.

Despite objections that the patent world belongs to technology, walking among researchers and scientists as opposed to financiers and business owners, in truth it has always been of, for and by the business—a fact better understood by the entrepreneurs seeking seed funding to create their Cisco than the engineers tasked to "design around" existing patents of competitors. The same very real and real-world concerns are expressed to patent prosecutors, licensing counsel and litigators daily by their financial service innovator clients, just as frequently as Goliath clients with competitive market share seek counsel to reduce their potential infringement liabilities and patent transaction costs.

As in other endeavors, BMPs were never, in fact, intended to be the exclusive end-all solution to innovators, but rather one of an arsenal of tools to protect pioneers of bona fide innovation. Many firms value superior rates and service, lead time and secrecy, not to mention market capability and branding, at least as highly as patents to secure innovation and retain market share. Yet, patent protection is sufficiently crucial to the latter bundle that few investors would consider funding high technology or biotechnology companies without it. Business innovators are increasingly required to secure patents, or have a very good reason for not having them, such as adequate lead time, ability to keep innovations or client data confidential, or substantial road blocks to patenting business

methods in their respective markets.

In this article, we trace the history of patents from their early days through the modern era, and review financial services industry BMPs in relation to technological advances, size and scope of the relevant issues, and the impact on the financial industry.

Early History of Method Patents

The first patent laws date back at least to the Venetian Statute of 1474, and scholars contend perhaps as far back as the ancient Greeks (Ryna 1998, pp. 21-25). The first recorded patent was granted to Italian Renaissance architect Filippo Brunelleschi in 1421 for a method of transporting goods down the river Arno in Florence.[8] Over three centuries later in the United States, a Constitution awarded the early Congress the power "to promote the Progress of Science and useful Arts"[9] by granting for limited time exclusive rights to inventors. The first patent laws were enacted by Congress on April 5, 1790 and signed into law on April 10 by President George Washington.

Despite a common misconception that BMPs did not exist until the 1990s[10] they in fact date back to the 1790s. The U.S. Patent Office granted 41 such patents in its first 50 years, including its first two, "Detecting Counterfeit Notes," granted to Jacob Perkins in March, 1799, and "A Mode of Preventing Counterfeiting" in April, 1815 (USPTO 1999) to John Kneas. The earliest stock printing communications systems arrived with Edward Calahan's stock telegraph printing instrument[11] in 1867, 2 years before Edison's universal stock ticker. Business functions were implemented on data processing systems since at least the 1870s. The earliest systems were operated by mechanical registering devices (USPTO 1999).[12] Herman Hollerith invented the first electromechanical data processing systems, and in January 1889, was granted three patents on automating and tabulating statistical information for businesses. The watershed invention signaled the birth of business data processing and secured the future of his company Tabulating Machine Company,[13] renamed International Business Machines by Thomas J. Watson, Sr. in 1924.

So was born the world of business data processing. In the progression of business processors, the electromechanical switches of Hollerith tabulators were replaced by individual transistors in the late 1940s,[14] by the first integrated circuit in the 1950s, [15] by the small and medium scale integrated circuits of the 1950s and 1960s, and by the large scale and very large scale integrated circuits of the 1970s and 1980s (Reid 2001). Each technological advance was documented and secured by patent protection.

The Software Dilemma

Modern financial industry BMPs are thought to be a subset or extention of computer programs. Computer programming languages—a.k.a., software, the mathematical algorithms and instructional codes for a computing device—had a chronological history parallel to the lineage of transistor technology, beginning with the machine language of Short Code in 1949,[16] to the scientific and business applications of FORTRAN[17] and

COBOL[18] of the late 1950s, Pascal[19] and BASIC[20] of the 1960's, C[21] and object oriented programming of the 1970s and 1980s, to the modern descendants (Randell and Buxton 1969). And the computer software advances continue, with applications functioning at every conceivable level and platform, from wireless personal digital assistants to nanostructures (Verner and Graham 1988; Chorafas 1986).

Unlike transistor technology, software found itself orphaned from protection as it did not fit neatly into the paradigm of patents. Understanding the reason requires a brief discussion of founding principles of patent law in the United States, which have been echoed in one form or another in all modern patent systems.

From its inception, the patent system was devised to protect the useful arts, not the algorithms and instructions underlying utility separate from such utility itself. Under §101 of the Patent Statute,[22] only inventions involving "process, machine, manufacture, or composition of matter" are patentable.[23] Laws of nature, physical phenomena and abstract ideas were not, and presently are not patentable.[24] It's been argued that man's creations are not to be equated with God's, as the latter are much more valuable, too valuable to receive exclusive rights.[25] In the case of abstract ideas, the patent system's *quid pro quo*, namely openly disclosing one's ideas for a limited monopoly, weighs too heavily in favor of the inventor versus society.

This left two problems. First, Congress had clearly mandated as patentable "anything under the sun,"[26] hardly squaring with the §101 exclusion.

Second, technology had evolved away from the patent system. Machines with working parts had always comfortably fit within §101 as patentable subject matter. In the realm of earlier business methods, i.e., non-software based business methods, mechanical, electromechanical, and later transistor technology were sufficiently tied to utility through the actions performed by the machines that patentability had not been an issue. However, technology advanced so that software, namely pure instructions to generate a solution, or machine "thought", could now be separated from the "action" of the computing platform. Thus it was the computing platform that came to provide utility. Microprocessors employing transistor technology would calculate and store data, and peripheral devices would receive inputs, perform outputs, and take on other required functions.

The patent system was left with a significant dilemma: Why should instructions be any less patentable as (i) software functioning on a microprocessor platform than as (ii) hardwired data etched on transistors of an outdated hardware machine? The dilemma begged for consistency.

The Courts answered. While mathematical algorithms or abstractions by themselves may not be patented, they may if applied to physical elements or process steps,[27] such as a real-world utility or significant activity following the number crunching.[28] In 1981, the landmark Supreme Court case of *Diamond v. Diehr*[29] established that the physical transformation of a simple task of opening and closing an oven door to vulcanize rubber, following the calculation of a solution (where the actual innovation resided) was

sufficiently significant "post solution activity" to deem the subject matter patentable.[30]

Thus, when instructions and utility are combined together in a patentable invention, as when software runs on a computing platform, current U.S. law permits patent protection. But what of pure software, without the impetus of the processor?

It bears mentioning that while business and the technology supporting it are generally prospective in nature, advancing to capture new ideas and new markets, law is generally retrospective, designed to fit current legal issues into preexisting, pre-established statutes and judicial case law. In the 1992 case of *Arrhythmia Research Technology v. Corazonix Corp.*[31], a transformation of data, analyzing electrocardiograph signals to determine heart attack risk was deemed patentable. In the 1995 case *In re Beauregard,* the Federal Circuit deemed patent claims covering pure software – when stored on a computer-readable storage device, such as a floppy disk or compact disk – patentable as an article of manufacture. [32] The Court of Appeals for the Federal Circuit (CAFC) is the penultimate patent authority, whose power is second only to the Supreme Court itself. Thus the patent high Court placed the new paradigm of software into an existing category having its own historically patentable jurisprudence.

Parallel conclusions have been reached in other patent systems despite their own early intentions to prohibit algorithms. For example, Articles 52(2)(c) and 52(3) of the European Patent Convention exclude from patentability "schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers . . . as such." The same has been reflected by national laws, such as the French Law L 611010 that similarly prohibits patent protection of software (Liotard 2006, p.10; Wagner 2004).

However, the Board of Appeal of the European Patent Office (EPO) has narrowed the statutory meaning to reflect that while computer programs by themselves may not be patented, they may if combined with a technical effect. In practice, patentability is more or less assumed if the invention as a whole refers to more than merely the mathematical method, mental act or business method. Likewise, France granted a patent on a computer program in 1981[33] (Mann 2005, p. 961).

Modern Business Methods Arise from Financial Services

The separation of computer instructions from the underlying functionality of microprocessing systems had spawned another orphan: *business methods* (Fisher 2001; U.S. Patent and Trademark Office 1999). The software versus microprocessor (a.k.a. hardware) separation represented the first time that innovations in business processing could be produced entirely devoid of the underlying utility required by §101, namely functional processors and accompanying transistor circuitry. Thus innovations in the underlying business methods could be stored on software, isolated from the technology and accompanying innovations to facilitate the methods. Business methods, at least as used in the modern context, are perhaps the Siamese twin of software, as their reasons for existence and very fate are inextricably bound together.

The financial services industry found itself in the middle of the controversy. On March 9, 1993, Signature Financial Group, Inc. was issued a patent[34] entitled "Data Processing System for Hub and Spoke Financial Services Configuration." The technology could not be easily dismissed as simply a computer implementation of a well known process. The patent provides a data processing system for monitoring and recording information flow and data, and making calculations necessary for maintaining a partnership portfolio and partner fund in a "hub and spoke" configuration.[35]

When licensing negotiations broke down, State Street Bank initiated a declaratory judgment action to invalidate the patent.[36] In the resulting Federal Circuit appeal, the *State Street Bank*[37] decision settled the question of whether modern business methods are patentable in the affirmative. Judge Giles Rich, longtime advocate of inventor's rights and himself an author of the *1952 Patent Act*,[38] answered that business methods, even in their modern software format, had never been proscribed, and had remained viable forms of protection, at least since the *Act*. So long as the results are "useful, concrete and tangible," the process is considered patentable. The decision was a reaffirmation of existing patent law, not an overthrow of bedrock intellectual property principles.

As with software patents, the dilemma over patentability had been focused on form over substance. What critics of business methods often miss is that it would have been logically inconsistent to forbid patenting a business method, allowable since 1799, merely because it was implemented on software running on a computing platform instead of solely on a machine. Aside from bearing internal ambiguities and inconsistencies, similarly to software patents, such formal distinctions could be overcome by skilled patent practitioners. Thus, they are particularly vulnerable to appellate level challenges through the legal system as well.

The *State Street Bank* decision itself provides as solid an explanation as any for rendering modern business methods patentable, if for no other reason than to assuage the fears of the business community. For one, simply because they are implemented by a computer, inventions directed to such subject matter as bookkeeping operations and accounting principles would not likely pass muster, because they lack novelty [39] and non-obviousness[40] in view of hundreds of years of business operations.

Before and after *State Street Bank*, all inventions, not merely business methods, were and are required to be novel over known systems, as well as not obvious variations of them. References that bear on patentability, termed "prior art," are used by patent examiners to prevent applications with overly broad claim scope from issuing as patents, and by accused infringers to invalidate patents already issued.

Simply using a computer to perform a known function is not considered patentable unless the legal fiction called the "person having ordinary skill in the art," ("PHOSITA") would have considered it novel and non-obvious. Financial services, like most fields, had obtained enough technical sophistication that simply adding a computer to a known technique should not deem it patentable in the eyes of the PHOSITA. Similar conclusions

have been reached in other sophisticated patent systems, including in Europe and Japan.

Quality and Structural Issues

The financial services industry has questioned patent quality and its ramifications since *State Street Bank*. Some of the challenges have merit in that the quality of patents issued over the past decade is questionable. But the quality and related structural issues related to certain patents do not invalidate the basis for BMPs in the industry.

Despite the fact that patentable inventions must pass muster under novelty and non-obviousness to the PHOSITA, which was true before and after *State Street Bank*, a number of alarmingly simplistic inventions were issued and subsequently litigated (Sullivan, 2007; Parker 2003, p. 307).

For example, Amazon.com's "one-click" patent, issued in 1999,[41] was the subject of litigation with Barnes and Noble. Amazon obtained a preliminary injunction against Barnes and Noble, which added an extra click to its ordering system, and had the injunction revoked.[42] The Federal Circuit found there were substantial questions regarding the validity of the patent, given the prior art references available at the time of the invention. Alarmingly, the Court also held there would be a substantial likelihood of infringement.

In 1998, Walker Digital obtained a reverse auction patent,[43] enabling computer implemented reverse auctions over a communications network. This was the infamous "name your own price" reverse auction of Priceline.com for selling airline tickets, hotel rooms and the like. Shortly after the patent was issued, Walker Digital sued Microsoft for its Expedia travel service, with the parties reaching a settlement and license agreement in 2001.

Additional contentious patents[44] have included Trading Technologies' futures trading software patents,[45] Merrill Lynch's computer system for financial transactions for investor cash management accounts,[46] New Jersey College Savings Bank's certificate of deposit that pays returns tied to increases in college tuition[47] and Lincoln National Risk Management's system for underwriting life insurance.[48]

Because patent examiners have backgrounds in the technologies and the sciences, there has been well founded criticism that they lack the business sophistication for examination of BMPs, and also perhaps lack the required tools, namely the business databases, to conduct effective examination. Combined with the government's limited financial resources for salaries and teaching resources, quality was an initial issue. The USPTO responded quite effectively, however, by hiring examiners with significant industry experience,[49] adding a sizeable searching business database, and providing an extensive training program (USPTO 1999).

Some issues, however, are so inherent to the structure of the patent system itself that they may never be resolved. For example, even an examiner skilled in financial services must

make a judgment call regarding who is the PHOSITA. With new technologies like the Internet, there may be very few references available, and the examiner may be stuck between the proverbial rock and a hard place given heightened public scrutiny.

Further, patent claims, which delimit the scope of protection and determine what products infringe the patent, are written in the English language instead of precise mathematical formulas. In fact, the patent procurement process, termed "patent prosecution," involves a series of negotiations between the examiner and the patent attorney, where the examiner uses references to force the attorney to narrow the claim language, and the attorney attempts to minimize the narrowing limitations in the timely interests of the client.

Consequently, what constitutes allowable patent subject matter, and what products infringe issued patents, are open to dramatically differing interpretations by examiners, judges and juries , none of whom typically qualifies as a PHOSITA. In fact, the rate of reversals by the Federal Circuit of lower district court patent cases is quite high, at 30 percent to 35 percent (Coyle 2006). Absent sweeping, possibly hurtful legislation to override the case law, the matter is immutable regardless of the talent of patent examiners and the quality of their examination.[50]

Network Effect on Financial Services Innovations

Financial services are significantly impacted by the network effect—that is, the vastly greater connectedness associated with local intranets and the World Wide Web over individual local machines. Across the gamut, from investment management, insurance and financial services to real estate, all avenues of the industry are increasingly interconnected with clients, consumers, financial exchanges, as well as with one another and other industries.

Once the critical mass of subscriptions is achieved in the network, the value of goods and services obtained equals, then exceeds, the price paid. Thus additional subscribers will enlist due to a positive utility to price ratio. Growth continues across the network until points of congestion and eventual saturation are achieved, where the value again equals the price paid, and the network stops growing unless it is then expanded (Farrell and Klemperer 2006).

The network effect serves to amplify other factors inherent to BMPs in the financial services industries. First, unlike technical innovations that target specific problems, the processes may have wide scale application to a large pool of users. Thus there may be applicability of claims across numerous applications.

Second, because innovations in the finance industry are encapsulated in software and other high technology products, rather than in biotechnology products, financial industry BMPs resemble high technology patents in several ways. For one, the life cycles are short and evolution is rapid, as the industry quickly adopts faster, more efficient methods. For another, individual innovations are rather narrow, building upon one another. Where innovations are cumulative and sequential, as in the software and business method arts in

general, patent crowding occurs.

An example of network effect is exhibited by financial exchanges (Hunt 2007). The market liquidity is a major indicator of transaction cost in the purchase or sale of a security. A bid-ask spread exists between the price at which a purchase may be accomplished versus the price at which the sale of the same security may be accomplished. Liquidity increases and transactions costs decrease as the number of buyers and sellers on the exchange increases. The positive feedback attracts larger numbers of buyers and sellers to the exchange.

This network effect advantage barrier makes it extremely difficult for startup exchanges to compete with well established exchanges.[51] New innovators may not be able to compete with established exchanges until a critical mass is obtained. Consequently, innovations, no matter how valuable, may be easily replicated with no advantage to innovators, thus limiting the growth of industry innovation in general. Here, patent BMPs may provide an excellent remedy, namely additional security to startup innovators until critical mass is established.

On the other hand, it may be argued that the patent system's term of protection, namely 20 years from patent filing, is far longer than it would take to achieve critical mass, tipping the balance of justice toward innovators away from established exchanges.[52] At the root of the issue is the patent system itself (Marco 2003). As noted, U.S. patent law, like that of Europe and other systems, was able to resolve the dilemmas imposed by software and business method patents by incorporating both forms of protection into the existing, uniform body of intellectual property laws.

While it makes for sound, principled laws, less subject to manipulation, it also naturally imposes a one-size-fits-all approach. In the present case, as all patents are entitled to 20 years of protection minus a few years of application pendency. The term of BMPs may not be changed based on the economic considerations of financial exchanges, excepting unilateral legislative action. Applied across many patent families, across many fields of the financial services industry, relatively narrow innovations with short shelf lives may receive relatively sizeable protection (Maskus 2002).[53] However, a body of patent law unique to business methods would have problems of inconsistencies and *ad hoc* enforcement.

Due to many narrow, cumulative innovations, patent crowding may cause lowering of incentives to innovate, since greater license fees must be paid to earlier inventors, unlike in the non-cumulative arts such as biotechnology (Scotchmer 1996). Some sources have even alleged that in complex technologies, transaction costs may disparage inventions wholesale (Heller and Eisenberg 1998).

The argument has some merit. However, logic would dictate that such lowered innovating incentives would reduce patent filings until a natural equilibrium is established. To quote Yogi Bera, it is "like déjà vu all over again," as the patent thicket argument was raised for software patents by Lessig and others following the work of

Heller and Eisenberg (1998) as stifling to newcomers. Some of the data contradicts the prediction. For example, in 2002 R&D as a percentage of revenues was 14.5% for the software industry as contrasted to 6.7% for computer hardware and 7.4% for electrical/electronics, and 8.1% for telecommunications (Mann 2005; National Science Foundation 1997-2002). Furthermore, in the years following software patenting, rates of R&D as a percentage of revenues continued to lead most industries: 19.2 (1997), 19.8 (1998), 16.8 (1999), 20.5 (2000), 19.4 (2001) and 21.5 (2002). As BMP novelties are produced in software format, and as it is unlikely all innovation went toward technical innovations in a relatively low tech field, at least a sizeable portion of R&D of software developed for the multibillion dollar financial services industry went toward increased innovation. Yet the cautions of software patents are often redirected for BMPs (Lerner 2006; Jaffe and Lerner 2004).

Further, a number of measures would refute alleged declines in innovation. Studies on a countrywide basis have shown the number of organizations active in a technology may indicate ability and potential for innovation in an area of technology (Porter 1990; Rausch 2003). Innovation in groups called clusters may also be on par with higher rates of innovation, productivity growth, and formation of new business (Council on Competitiveness 2001). The United States had the most number of organizations filing patent applications in business methods since 1995. In fact, from 1997-1999, the United States had two to four times the number of patenting organizations as Japan. The number of citations to other patents is also considered indicative of technological significance, which the United States also led by 40% more than expected from the level of activity.

Experience with Financial Industry BMPs

BMPs in the financial services industry have been contentious. Lerner (2006) found the rate of litigation 27 times greater than that of patents as a whole. Combined with finding a higher rate of suits by smaller, patent holding types of entities, he concludes the issue is that patents of low quality, with no real innovations, are exacting sums from industry. For example, he compares business innovators,[54] patentees,[55] plaintiffs[56] and defendants,[57] to show the lack of correlation between the groups.

Lerner's analysis is reflective of a number of criticisms of BMPs in general. Such analyses and resulting conclusions may have a number of problems. First, the number of lawsuits is no indicator of the revenues achieved from such lawsuits, or even of royalties customarily paid in an industry. It may result from the fact that the financial industry is relatively new to business methods and established royalties have not been set in place as in other industries, or that the industry has not had sufficient opportunity or motivation to deal with the issues. In addition, at least one study compiling suits filed across industries found fewer suits in business services and software than a number of other industries (Bessen and Meurer 2005).[58]

Based on such analyses and anecdotal evidence of patent holding companies, pejoratively referred to as "patent trolls," the industry lobbied for reform in 2007. (Lerer 2007). Headed by the Financial Services Roundtable, and aided by the American Bankers

Association, the Securities Industry and Financial Markets Association, some $20 million was spent on lobbying. John Squires, Goldman, Sachs' chief intellectual property counsel, has testified before the Senate Judiciary Committee on behalf of these associations.[59]

Despite concerns over such litigiousness, our empirical and anecdotal evidence shows that market forces and business interests will likely exert enough influence on the players that surprisingly uniform cross-licensing royalties are the likely end result.

The overwhelming majority of patents are held by the major industry players. Even if a relatively large proportion of these patents are of marginal quality, which is rarely the case, the "force" of patent families leads to significant offensive and defensive positioning—ultimately finding a reasonable middle ground.[60] For example, offensive use of patents against other major players may adversely impact or offend larger downstream customers, which in turn exerts sufficient business pressure on the patent-owning firm to act moderately. No customer enjoys hearing that one of its suppliers is facing litigation (and possibly higher transaction costs) from one of its other suppliers. Major customers are not shy about bringing significant pressure to bear, particularly if the "issue" could result in adverse downstream consequences. The bulk of valuable industry patents are thus cross-licensed to create interdependency relationships since business pressures outweigh potential profits from patent litigation.

The major players also find it difficult to enforce patents against relatively minor market participants, which typically possess their own patents albeit in much smaller numbers. The reason here is that the relatively fewer patents held by a minor player may impact a much larger market share, so that the minor player's BB gun may resemble a machine gun to the major player. Assuming equivalent contributions to innovation in proportion to their respective size, uniform patent quality and rational decision-making by management, major and minor players may find themselves at a Mexican standoff. These conditions are perhaps only rarely true, however, a likely reason smaller firms are more likely to be plaintiffs or defendants in patent suits (Bessen and Meurer 2005).

As a result, competitive companies with significant market share and real clients generally favor mutually beneficial cross-licensing schemes as opposed to contention. They also favor protection of innovation for at least defensive purposes. Despite the lack of litigation, itself a costly proposition in this arena, tremendous profits have been earned from licensing revenues.

Unfortunately, public data on the extent of licensing in the financial services industry is relatively non-existent, given its propensity for confidentiality and its recent awareness of patenting. Using the software industry as an analogy, analysts had initially expressed concern that network effects and narrow, cumulative innovations would yield patent thickets. But, despite grave concerns that software patents would ruin the industry, real players with unquestionable innovations have profited extensively from patents. For example, IBM is widely known to license its enormous portfolio for over a billion royalty dollars per year.

It is not to say that patent holding companies are not a problem, in all industries and not just for financial services. Patents are fully alienable economic rights, not tied to an inventor, assignee or area of business. A company accused of patent infringement cannot use its own core patents to defend or retaliate against a company with no customers.

The issue is not exclusive to holding companies, however. Businesses with real market share may, and do, use the concept to seek royalties outside their core areas. For example, a technology company with no market in financial services may, if it desires, purchase financial services BMPs, and seek royalties from the major financial services players; again, the would-be infringer lacks patents they could use for defense, cross-license or retaliation. The clever accused infringer would likely seek to acquire its own patents impacting the accuser, or use one of the other defense outlined below.

The financial services firm threatened with litigation is not left without options. In fact, there are a large number of such defenses available, which may be used in any type of combination:

- *Business Level Remedies*. Customers often provide significant leverage against competitors alleging patent infringement.

- *Contractual Remedies*. As patent litigations have increased, customers have increasingly requested indemnification from patent infringement damages from their suppliers. The Uniform Commercial Code and equivalent international codes respecting sales of goods may provide default protection under a theory of an implied warranty.

- *Licensing Discussions*. The accused infringer may engage in licensing discussions toward a workable solution. The licensing strategy may include open discussions of tactical positions, applying positions of non-infringement and invalidity, as well as potential damages, toward entering a licensing agreement.

- *Declaratory Judgment*. The accused infringer may seek a declaratory judgment that it does not infringe. Many parties favor declaratory judgments because they permit the accused infringer to pick the forum, i.e., the trial court.

- *Patent Retaliation*. Parties approached by direct competitors may use their own core patents defensively, either threatening to retaliate at the discussions level, or filing separate actions. Patents not core to the defendant's industry may also be acquired through third party agents.

- *Patent Pools*. Often significant players across the industry form patent pools which may provide umbrella protection. Members are often provided affordable or free cross-licenses to essential patents.

- *Non-infringement*. In licensing discussions or during litigation itself, a defendants' strongest arguments are typically that its products do not infringe the

plaintiff's patents. Every word of the claim language must be met by the product to establish direct infringement. Given that claims are viewed in light of the specification and prosecution history according to relevant case law, an infringement finding may be avoided by careful analysis and presentation of evidence.

- *Invalidity*. Prior art that may potentially invalidate the references may provide a valuable tool in the defendant's arsenal, as well as during licensing discussions.[61]

- *Reexamination*. In *Ex parte reexamination*, a party may anonymously present prior art to the USPTO and request that the patent in question be reexamined for validity. If sued, the defendant may file a motion for stay of proceedings to halt the litigation pending the outcome of the reexamination, which may itself take months or years. *Inter partes* reexamination is also available, where the party requesting reexamination is an active party to the proceedings.

As the system is inherently inexact, a balance of the equities is always present.[62] If patenting is too easy and lax, more inventions qualify for protection and reduce the risk for imitation, but competition of technologies increases the royalty and litigation costs to industry. If too strict, fewer inventions qualify for protection, decreasing the risk to competitors, but fewer dollars will flow to innovation and new discoveries (Hunt 2001, p. 11).

The Scale of Financial Services BMPs

The USPTO created the modern business processing class 705[64] in 1997 from the business and cost/price sections of the computer classes 395 and 364. As shown in Figure 1, there has been a slow, steady increase in BMP issues from 1987 until a jump in the 1997-1999 period, attributable to growth in the Internet and the *State Street Bank* decision. Despite the controversy that BMPs were rising out of control in the 1999-2002 period, where most critical articles were published, BMP issues showed relatively little growth until 2005 and 2006, where issues doubled to just over 2000.

One reason is the backlog of patents, termed "pendency period," resulting from many more patent filings than issues, which the USPTO has recently attempted to alleviate as public pressure has dampened.[65]

Another reason was change in case law. Prior to 2005, patent examiners rejected BMP applications that did not require use of a computer or other electronic means. Therefore, any claimed process carried out without a computer was not deemed patentable, as it was not tied to a known science or technology. In 2005, the USPTO Board of Patent Appeals and Interferences rejected this technological arts rejection as inconsistent with existing case law.[66] Thus, practically, BMP applications may no longer be rejected because they recite method claims without requiring computer implementation.[67] However, the USPTO has continued to argue for the technological requirement, and has more recently found the Federal Circuit receptive. In *In Re Comiskey*,[68] the court explicitly held that

purely mental business methods are unpatentable. The Federal Circuit at the time of this writing has granted *sua sponte*, en banc rehearing in the *In Re Bilski* case, potentially revisiting the State Street decision as it applies to methods not involving a machine.[69]

In fact, the allowance rate on business method applications at mid-year 2007 was 20%, less than half the rate of the 2001 45% high water mark, but almost double the 2004-2005 11% low water mark. During the low allowance rate years, the USPTO had implemented a second-eye policy for issuances. In other words, a supervisory patent examiner (SPE) in a different technology area (termed "art unit") than that of the original examiner would have to sign off before a patent could be granted; the policy led to excessive second-guessing of the examiners' authority, leading to often lengthy prosecutions, some in excess of 5 years,[70] well over the average of approximately 3 years for the patent office as a whole.[71] Quality was also arguably improved.[72]

A review of prolific patenting entities is instructive. Issued patents for the top 10 entities decreased from 284 to 159 between the 1977-89 and the 1990-94 periods, and increased to 351 in the 1995-99 period, hardly exponential in nature. The figures are shown in Table 2.

The areas of innovation and market expansion made a difference. Before 1990, the bulk of the patents were in cash register and computer postage metering systems, which by 1994 moved to financial transaction systems. By 1999, with the propagation of the Internet, most patents were issued in electronic shopping, with financial transaction systems as a secondary category.[73]

Since BMPs are subclasses of electrical systems, which are in turn subclasses of all utility patents, the relative proportion of the categories is illustrative of their effects. (i) From Figure 2, the total number of utility patent applications filed in 1999 to 2006 grew from 270,187 to 425,967, while issued patents grew at a much slower rate of 153,485 to 173,771 (USPTO Data B). (ii) From Figure 3, in the same period, issued patents in all electrical classes rose from 51,400 to 83,995 (USPTO Data B; USPTO Data C; USPTO Data D). (iii) From the same figure, the number of issued BMPs are diminutive, with the mean teetering at less than 1,000 in recent years.

As Figure 4 illustrates, the total number of business method applications filed in Class 705 for this period grew from 3,023 to 10,015, while issued patents grew from 493 to 1,191, small numbers in view of the aforementioned total utility and electrical class filings (USPTO Data D)[74].

Class 705 is but one of 94 classes in electrical systems, which at the time of contention in 1998-99 represented merely 1% of total patent filings. In fact, of the 57,000 applications filed in communications and information technologies for 1999, less than 5%[75] were filed in Class 705.

The data shows that of the 53,548 originally filed applications during the 1999-2006 period, only 4,933 or 9% have been issued, generating a backlog of 48,615 or 91% of

BMP filings. In addition, the USPTO has also stated that the majority of innovations are in the enabling engineering versus in the business innovations (USPTO, p.9).

Re-filings due to rejections must also be taken into account. Of the 10,015 filings, approximately 25% were continuations, or re-filing of the applications initially rejected by the USPTO. Whether there was any real growth may be disputed, though difficult to tell from the raw data, since preceding creation of Class 705 in 1997, business methods were simply classified in other areas.[76]

With respect to patent litigation of BMPs, most studies have used the rates of litigation per patent or viewed aggregate rates, which do not necessarily reflect the cost of litigation imposed on the parties or the impact left by the suits. Bessen and Meurer (2005) performed an analysis of litigation across industry groups. The recent analysis differed from others in that the firm was taken as the unit of analysis. As shown in Figure 5, their study shows suits defended and filed were significantly less for business services/software than for other industries, with the rate of filings and defense on equal par.[77]

Financial services undeniably receives its shares of innovations. As Figure 6 shows, real estate, insurance and finance R&D expenditures in the United States peaked at about $4 billion in 2000, with a downward trend in years 2001-03, followed by an upward trend in 2004-05. The trending roughly parallels BMP filings. But the correlation may or may not be causal for a number of reasons, one being that business method innovations are often categorized in other areas, such as software, computer and electronic products, and computer system design and related services. It is worth mentioning that R&D spending in these other categories, like the patent filings, is significantly greater than in real estate, insurance and finance (National Science Foundation 1997-2002).

The data shows that the financial asset management industry has been a leader in exploiting information technology to manage and invest capital. In this arena, numerous patents have been granted to highly cited and cross-referenced innovators relating to asset management, asset creation, financial index construction and weighting, customer service delivery, money management, asset allocation methodologies, portfolio selection, and the like. Table 1 lists a number of influential patents granted since 1987.[78] Examples include Atkins patents for investing equity from real estate, Champion's financial asset management system, Barr's work with predictive neural networks, Fernholz's dynamic re-weighting of capitalization based index by a constant function, Sharpe's financial advisory system, Michaud's optimization of portfolios by resampled efficient frontiers, Karp's tax-efficient investment using long and short positions, Gastineau's system for calculating intraday net asset value for actively traded ETFs, Arnott's virtual mutual fund, and Chen and Milevsky's optimal asset allocation in retirement using annuities. The financial asset management industry has clearly evolved from historical use of trade secrets to patents as a default choice to protect financial industry innovations.

It has been argued the American financial services sector is reaching the end of the beginning in its adoption of BMPs (Hunt 2007, p. 1). That may be true, but certain

pockets of the financial services industry have been more aggressive in obtaining patent protection than others. The pace of competition in the credit card and banking industries has led such companies to develop patent portfolios (Scott and Schreiner 2007). Credit card, banking and investment institutions have actively sought patent protections, as provided below.

Credit Card Companies	Number of Patents	Number of Patent Publications
American Express	146	340
Capital One	37	80
First Data	465	200
MasterCard	42	14
Visa	92	14

Banking Institutions	Number of Patents	Number of Patent Publications
Bank of America	50	29
Citibank	109	2
JP Morgan / Chase	15	16
Wachovia	7	8
Wells Fargo	18	3
Bank of New York	0	6

Selected Investment Services Institutions	Number of Patents	Number of Patent Publications
Cantor Fitzgerald	8	4
Charles Schwab	17	1
eSpeed Inc. (Cantor Fitzgerald electronic bond trading unit)	10	7
Genworth Financial	11	2
Merrill Lynch	39	8
Trading Technologies International	11	50
Vanguard Group	10	7

Selected Insurance Companies	Number of Patents	Number of Patent Publications
AIG	5	11
Metlife	17	0
Prudential	8	2

Policy Issues

As the overwhelming majority of countries have established patent systems, there is universal recognition that a system is needed to support and foster innovations in industry. When innovations are quickly emulated, the incentives for R&D are substantially diminished. Particularly benefited by patents are industries where large capital is required, such as the biotechnology and complex information technologies (Hall 2003). However, also benefited are fields where innovations are easy to reverse engineer or replicate, and trade secret protection is difficult. Consequently, BMPs and software industries have real need of such protection.

Despite a number of criticisms directed at BMPs, the recognition of the importance and adoption of patent protection in the financial services industry has grown in recent years. The proliferation of BMP applications speaks volumes of their importance, if not for offensive use, at least for defensive purposes. So does market reaction. In the period following *State Street Bank*, the granting of a BMP has been shown to evoke a positive average stock price reaction (Boscaljon, Filbeck and Smamby 2006). As examples, the financial services sector and asset management industries in particular have produced an enormous amount of innovation, particularly as information technology and computers have played an ever increasing role in these endeavors.

Traditionally many financial and asset management innovations were maintained in confidence using trade secret protection as competitive barriers to entry. Trade secret law has drawbacks, however, as secret innovations must be maintained in confidence. There is also risk of loss due to independent invention and reverse engineering, both permissible under existing laws. The new world, however, shares information at the speed of the Internet. Once an idea or even customer data supporting the idea, are taken to a market, maintaining the confidentiality of the idea may be nearly impossible. Lost ideas may be costless to imitate and have surprisingly low marginal costs (Sullivan, 2007).

Furthermore, today's dynamic workforce has also replaced a once immobile one, so that insulation of firm information is no longer a viable option. In fact, a number of studies directed to establish that BMPs are not necessary for profits and innovation implicitly assume secrecy of innovations and customer information (Schroth and Herrera 2003).

To borrow patent law's own phraseology, criticism here is not novel or unobvious, as legal and economics scholars alike have questioned the basis for the system since its inception. The very concept of offering individuals a limited monopoly over their ideas was troubling even to the patent system's early advocate and first commissioner Thomas Jefferson, who characterized the limited monopoly as a necessary embarrassment for society rather than a natural right (Jefferson 1813).[79]

The financial value of patents has also been drawn into question since well before the Internet as well. Graham and Dodd deemed valuation of patents too complicated for meaningful analysis, as their value cannot be calculated as against other assets, and as the effect of their expiration on business cannot be predicted (Graham and Dodd, pp. 422-23).

Economists and business professionals have questioned BMPs as a viable source of protection, but perhaps too much has been made of patent trolls and a flood of critical articles, and not enough regarding underlying policy and a need for a uniformly principled set of laws. Wholesale exclusion of business methods would be difficult, if not impossible. This is true not only because of the historical jurisprudence, but also for the practical realities. Practitioners may simply draft to emphasize the technology and deemphasize the underlying business method. As testament, few practitioners winced at the *State Street Bank* decision, since they had been drafting business method patents for years to overcome mathematical algorithm issues. Practitioners were effectively hiding the business innovations behind computers, circuitry, and the types of subject matter the patent system finds comfortable and the public-at-large finds palatable.

The legal history lacks any examples of where laws applied *ad hoc*, or *sui generis* forms of protection proved effective. Internally inconsistent laws are slave to easy manipulation by lawyers, the judicial system and affluent parties;[80] such laws also yield indeterminable results. They would be a greater bane to business owners and economists, who place value on economic predictability.

Like the U.S., other nations have struggled with patentability of BMPs in treaties and international laws, and like the U.S., faced with the impracticability of distinguishing BMPs from other forms of protection and the potential downfall of innovations, protection has generally been afforded, whether in words or in actions.[81]

Finally, but importantly, a number of recent cases and proposed legislation have significantly impacted BMP patentees. These measures are sweeping reforms that may take the wind out of the sails of BMPs for years to come.

- *Rendering patentee's claims obvious made easier*: *KSR International v. Teleflex*[82] makes it much easier to reject or invalidate patent applications or patents on obviousness grounds, an effect particularly pronounced for BMPs where novelty bearing sources are difficult to find, and where the technology at play is not of high sophistication.

- *Invalidating a patent license made easier*: In *MedImmune v. Genentech*,[83] on constitutional grounds the Supreme Court made it possible for a licensed party paying royalties on a patent to sue for declaratory judgment to invalidate the same patent.

- *Injunctions against patent infringers made more difficult*: In *eBay v. MercExchange*,[84] the Supreme Court rejected the customary granting of an injunction following a finding of patent infringement, instead requiring application of a four-prong balancing of equities test.[85] Also, in a concurrence, four justices linked a public interest portion of the test to concerns about the validity of business method patents.

- *Willfulness made difficult to prove*: If infringement is willful, the infringer is required to pay threefold damages. In *In re Seagate Technology*[86], the affirmative duty of care was raised to objective recklessness, lessening the burden on infringers and making it much more difficult for the patentee to prove infringement was willful.

- *Is State Street Bank even good law, or law for how long*?: In *Lab Corp. v. Metabolite*,[87] the Supreme Court denied appeal, but Justice Breyer dissented on the decision, joined by Stevens and Souter. In the dissent, Breyer notes that the Supreme Court had never accepted the "useful, concrete and tangible result" test set forth by the Federal Circuit in *State Street Bank*. If new appointments were to alter the make-up of the high court, there is the real possibility that *State Street Bank* could be overturned.

- *Purely mental business methods are not patentable*: In *In Re Comiskey,*[88] the Federal Circuit explicitly held that purely mental business methods are unpatentable.[89] Mental processes, standing alone without practical application via computers and the like, were deemed non-patentable.[90]

- *Reform Legislation*: Reform legislation[91] passed by the House of Representatives awaits Senate approval. Proposed provisions may provide further limits on damages, by requiring the trial court to determine the patent's specific contribution over the prior art, and expanding defenses of prior use, though willful damages may be increased.

Conclusion

We have sought to separate the facts from the myths in the contentious area of intellectual property law seeking to protect financial asset management related innovations. Our journey included viewing the historical jurisprudence, the association with software patents, the criticisms respecting quality and capability, the uniqueness of the financial asset management industry and the quantitative data available. We concluded with balancing the policy implications with well intentioned if not convincing advocacy.

In a world devoid of dishonest practices, perhaps patent and trademark law would be largely unnecessary. But in the one in which we live, there are two principle ways to protect and grow new ideas and spur innovation. One is to keep a closely-guarded secret – the formula for Coca-Cola – while the other is to broadcast your secret to the world, openly sharing all its secrets, in a patent application. Each has its advantages, though in the information age trade secrets are going the way of the vacuum tube and buggy whips.

Winston Churchill described democracy as "the worst form of government except all the others that have been tried." The oft quoted saying is perhaps apropos of the patent

system as a whole, not just its progeny the modern BMP. To the surprise of early critics, the legal system has shown much elasticity and resilience in responding to criticism, in recent years even swinging the pendulum too far in the direction away from patentees.

As a society, we have moved largely from moral norms to legal norms, no different for business and particularly financial services industry related intellectual property than business as a whole (Arnott, 2004). The contention is the basis for the current controversy regarding business methods. But we should not always intermingle the abused system with its abusers. The basic ethical tenets that underlie good business practice should be equally applied by companies procuring, licensing and enforcing their business methods intellectual property.

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Listing of Figures

Fig. 1: Issued US Business Method Patents

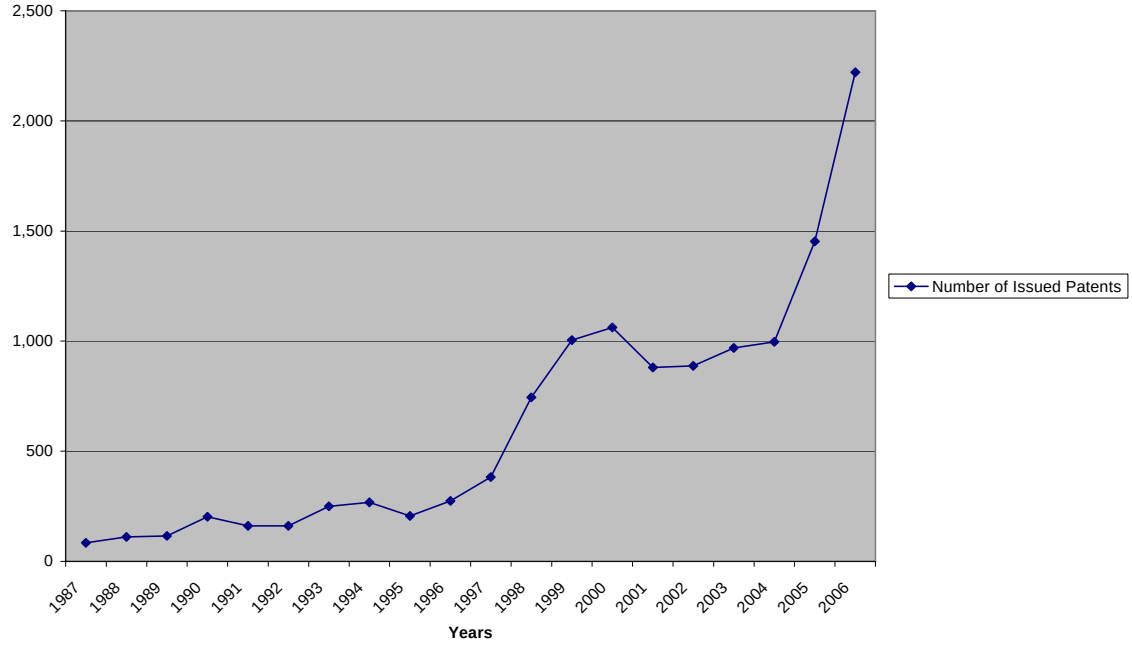


Fig. 2: US Utility Patents

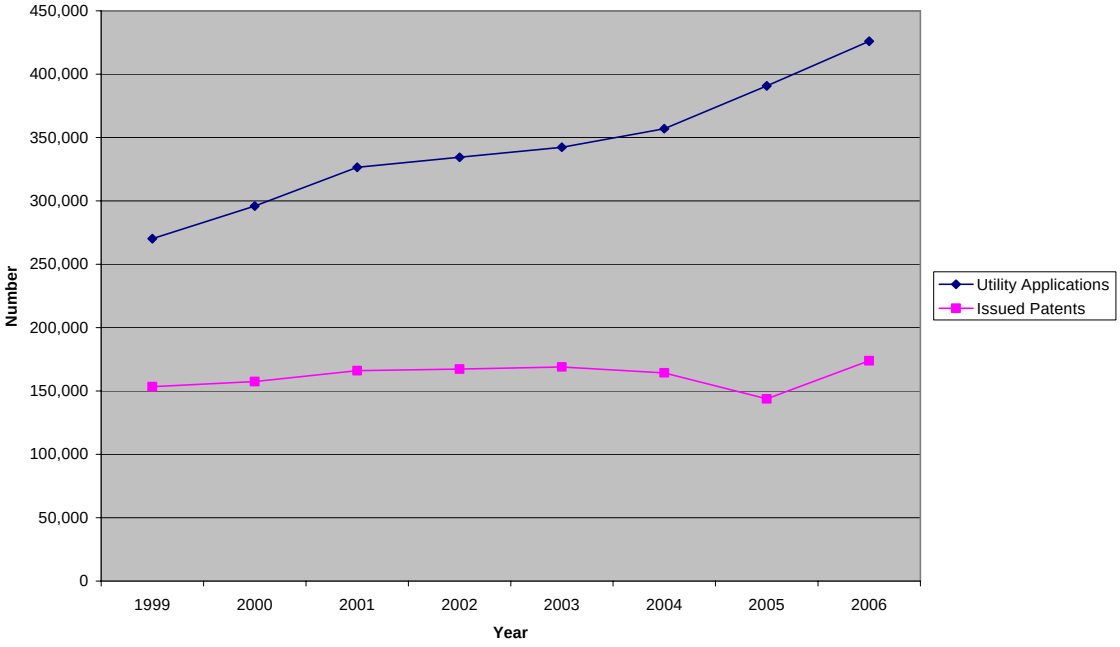


Fig. 3: US Issued Patents

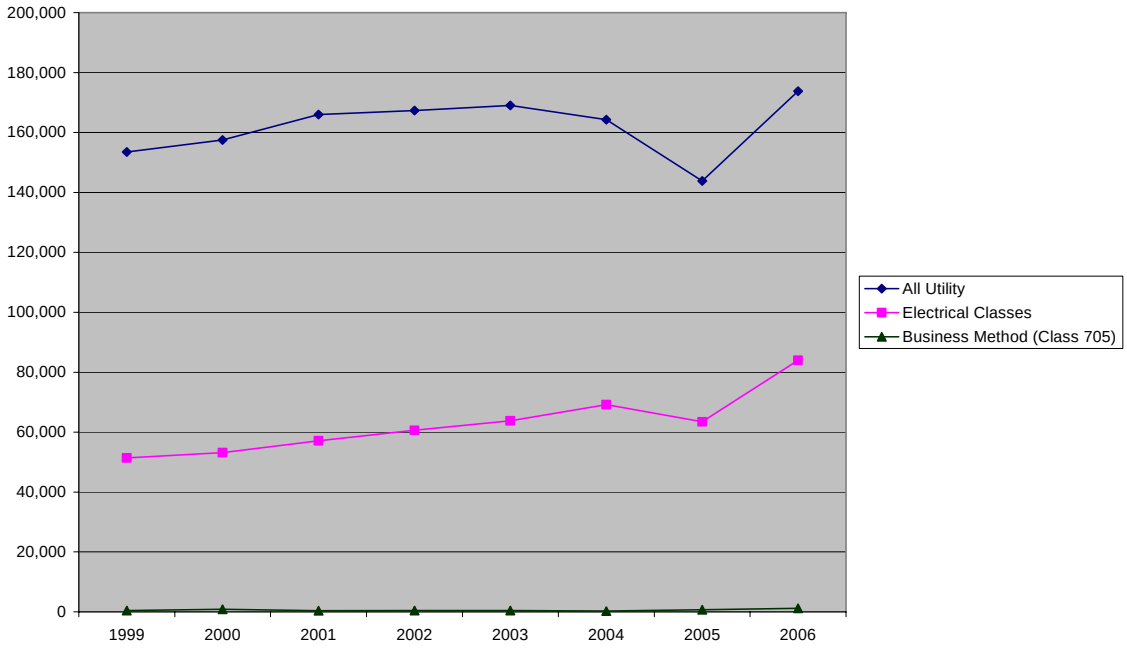


Fig. 4: US Business Method Patents

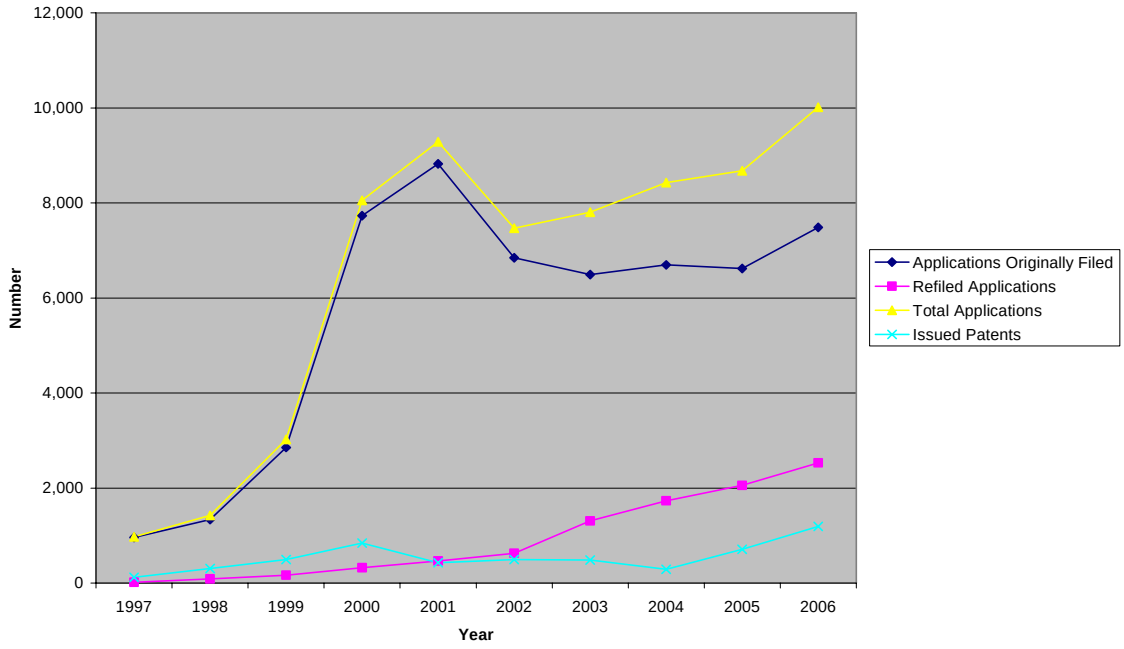


Fig. 5: Expected Patent Suits Per Year

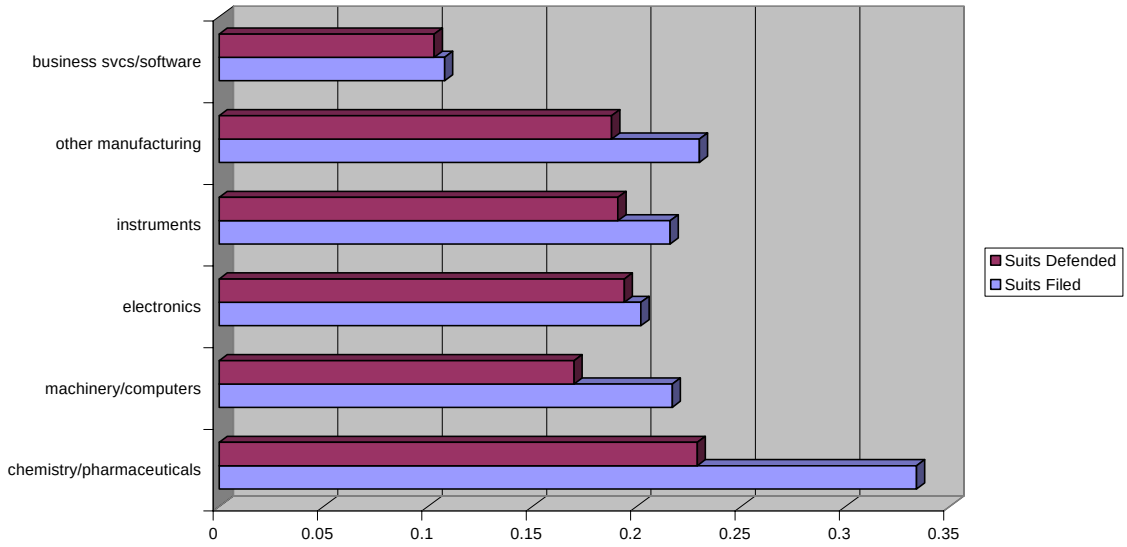
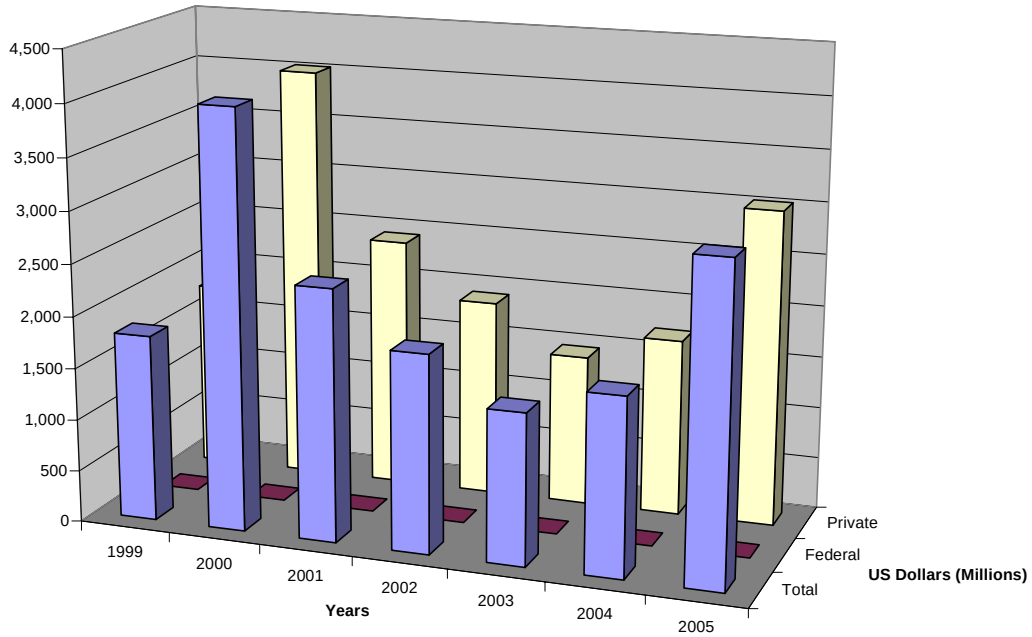


Fig. 6: R&D for Real Estate, Insurance and Finance



Listing of Tables

Table 1. – Exemplary Financial Asset Management Patents

Inventor(s)	***Title***	***Filing Date***	***Patent No.***	***Grant Date***
Atkins, Charles A.	System for the Operation of a Financial Account	April 15, 1987 December 6, 1994 August 27, 1991 April 15, 1997 January 16, 1992 April 16, 1991 March 26, 1997	4,953,085 5,644,727 5,864,828 5,875,437 5,884,285 5,911,135 5,911,136	August 28, 1990 July 1, 1997 January 26, 1999 February 23, 1999 March 16, 1999 June 8, 1999 June 8, 1999
Champion, Robert R. and Twist Jr., Basil R.	Goal-Directed Financial Asset Management System	September 1, 1989	5,126,936	June 30, 1992
Barr, Dean S. and Mani, Ganesh	Predictive Neural Network Means and Method for Selecting a Portfolio of Securities wherein each network has been trained using data relating to a corresponding security	August 31, 1994	5,761,442	June 2, 1998
Fernholz, Erhard R.	Apparatus and Accompanying Methods for Automatically Modifying a Financial Portfolio Through Dynamic Re-weighting based on a Non-constant Function of Current Capitalization Weights	December 13, 1996	5,819,238	October 6, 1998
Maggioncalda, Jeff N., Sharpe, William F., Jones, Christopher L., Fine, Ken, Tauber, Ellen, Scott, Jason, Grenadier, Steven R., Park, Ronald T.	Financial Advisory System	December 10, 1997 May 25, 1999 December 2, 1997 February 1, 2000 July 12, 2001	5,918,217 6,012,044 6,021,397 7,016,870 7,062,458	June 29, 1999 January 4, 2000 February 1, 2000 March 21, 2006 June 13, 2006
Michaud, Richard O. and Michaud, Robert	Portfolio Optimization by Means of Resampled Efficient Frontiers	September 9, 1998 October 25, 2002	6,003,018 6,928,418	December 14, 1999 August 9, 2005
Giansante, Joseph E.	Investment Portfolio Selection System and Method* **Expired for failure to pay maintenance fee.*	November 27, 1996	6,275,814	August 14, 2001
Baker, Nardin L.	Rapid Method of Analysis for Correlation of Asset Return to Future Financial Liabilities	August 2, 1989	6,336,103	January 1, 2002
Karp, Ronald A. and Karp, Jeffrey M.	Method and Apparatus for Tax-Efficient Investment Using both Long and Short Positions	October 6, 1999	6,832,209	December 14, 2004
Lear, James A.	Investment Portfolio Selection	January 27, 2000	6,912,509	June 28, 2005
Gastineau, Gary L. and Weber, Clifford, et al.	Determining Intra-Day Net Asset Value of an Actively Managed Exchange Traded Fund	March 27, 2000 March 27, 2000 April 16, 2002	6,941,280 7,099,838 7,305,362	September 6, 2005 August 29, 2006 December 4, 2007
Green, Paul T.	Financial Instrument Filtering System and Method Therefor	September 3, 1999	7,013,291	March 14, 2006
Kihn, John	Momentum Investment System, Process and Product	August 26, 2000	7,020,629	March 28, 2006
Usui, Masaaki	Method and System for Unified Management of Plurality of Assets Using Computer Networks	October 6, 2000 based on May 24, 2000 (JP)	7,069,241	June 27, 2006
Arnott, Robert D.	Method and apparatus for Managing a Virtual Mutual Fund	September 23, 2002	7,117,175	October 3, 2006
Chen, Peng and Milevsky, Moshe A.	Optimal Asset Allocation During Retirement in the Presence of Fixed and Variable Immediate Life Annuities	June 18, 2002	7,120,601	October 10, 2006
Philip, Karun and Maini, Harpal	Segregation and Management of Financial Assets by Rules	October 20, 2000	7,181,422	February 20, 2007

Table 2: Leading Patentees					
Leading Patentees 1977-1989		Leading Patentees 1990-1994		Leading Patentees 1995-1999	
Company	*Issues*	*Company*	*Issues*	*Company*	*Issues*
Pitney-Bowes	134	**Pitney-Bowes**	47	**Pitney-Bowes**	77
Sharp Corporation	39	**IBM**	32	**Sharp Corporation**	64
Omron Technologies	31	**Hitachi**	23	**Omron Electronics**	58
IBM	26	**Sharp**	11	**IBM**	30
Casio	21	**Omron Electronics**	9	**Casio**	27
Tokyo Electric	21	**Alcatel Business System**	9	**Tokyo Electric**	22
Hitachi	10	**NCR**	6	**Hitachi**	21
NCR	7	**AT&T**	6	**NCR**	20
Toshiba	6	**Unisys**	6	**Toshiba**	16
Merrill Lynch	5	**Casio**	5	**Merrill Lynch**	16

Notes

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[3] *Di Santo v. Pennsylvania*, 273 U.S. 34, 43 (1927).
[4] *State Street Bank & Trust Company v. Signature Financial Group, Inc.*, 149 F.3d 1368 (Fed. Cir. 1998).
[5] *Diamond v. Chakrabarty*, 450 U.S. 303, 309 (1981), this Supreme Court case dealt with the patentability of genetically modified microorganisms.
[6] Edison's improved stock ticker in 1869 was entitled "Universal Stock Printer." The successful sales of the Universal ticker in the 1870s, partnering with Wall Street funded Edison's first research thinktank laboratory and manufacturing facility in Newark, NJ, five years before his move to the storied Menlo Park location. Edison's relationships forged in the financial community helped investment in his later many storied innovations. Edward Calahan is the original inventor of the stock ticker, he patented in 1867 the first stock telegraph printing instrument. Edison began as a telegrapher. His first patent was on a voting telegraphy machine, but it was a commercial failure.
[7] Startup software companies have complained a mere whisper by a large software company that it would enter into their market space was enough to shut down their fledgling operations, even if the Goliath had created little more than mere "vaporware." So patents can provide an equalizing force for obtaining investment for companies such as Stac Electronics. See *Stac Electronics v. Microsoft Corp.*, 38 F.3d 1222 (CD Cal. 1994).
[8] Brunelleschi (1377-1446) refused to share his idea until granted exclusive rights to the idea for 3 years. His idea involved a paddle-wheeled boat. He obtained the right to burn any infringing ship for 3 years. Apparently he was only able to exploit the idea in 1428 (well after expiration of his patent), when the ship dubbed Il Badalone "The Monster" was launched with 50 tons of Marble from Pisa. It sunk 25 miles later. Brunelleschi never recovered financially. See Frank D. Prager, "Brunelleschi's Patent," Journal of the Patent Office Society, XXVIII, 1946, pp. 109-135.
[9] *United States Constitution*, Article 1, Section 8, Clause 8.

[10] *See*, e.g., Hunt 2001, p. 6. ("Prior to 1980, most patent attorneys believed these exceptions precluded the possibility of patenting computer software or methods of doing business.")
[11] US Patent No. 87242, issued 1869. Calahan's stock ticker built on Samuel Morse's US Patent 1,647 (1840) to the first commercially successful telegraph and method of use. Morse himself built upon the work of Joseph Henry (1825) regarding communications using electromagnets(EM), and British inventor William Sturgeon of the EM. See Bellis, Mary, "History of the Stock Ticker," http://inventors.about.com/od/sstartinventions/a/stock_ticker.htm, accessed March 14, 2008.
[12] "The development of today's business data processing systems follows an unbroken evolutionary path back to simple manually operated mechanical registering devices that predate electrically controlled Hollerith type machines."
[13] The company was incorporated as "Computing Tabulating Recording Corporation" on June 16, 1911, and five years later, listed on the New York Stock Exchange.
[14] Transistors were invented in 1947 by William Shockley, John Bardeen and Walter Brattain at Bell Telephone Laboratories.
[15] Integrated circuits were invented in 1958-1959 by Jack Kilby of Texas Instruments and Robert Noyce of Fairchild Camera.
[16] Much of the earliest machine code arose from the work of John Von Newmann at the Institute of Advanced Study.
[17] The "FORmula TRANslating" language developed by IBM in 1957 for scientific applications.
[18] The "Common Business Oriented Language" was developed in 1959 by the Conference of Data Systems Languages (CODASYL), a joint effort by universities and the U.S. Dept. of Defense to improve business computing.
[19] Pascal was developed in 1968 by Niklaus Wirth as a teaching tool.
[20] BASIC was developed in 1964 by John Kemeny and Thomas Kurtz.
[21] C was developed in 1972 by Dennis Ritchie at Bell Labs.
[22] Title 35 of the United States Code.
[23] *See Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 483 (1974). ("[No] patent is available for a discovery, however useful, novel, and nonobvious, unless it falls within one of the express categories of patentable subject matter of 35 U.S.C. § 101."). In *In Re Nuitjen*, No. 06-1301 (Fed. Cir. 2006), the Federal Circuit declared a signal, by itself, as unpatentable subject matter. Upon review, the Supreme Court may specify the patentable bounds of § 101.
[24] *Diamond v. Diehr*, 450 U.S. 175, 185, 209 USPQ1, 7 (1981).
[25] The tremendous importance of abstract ideas is frequently misunderstood and misstated by practitioners who equate utility with value, espousing that abstractions are unimportant because they lack utility.
[26] *Diamond v. Chakrabarty*, 450 U.S. 303, 309 (1981), quoting S. Rep. No. 1979, 8 2d Cong., 2d Sess., 5 (1952); H.R. Rep. No. 1923, 82d Cong., 2d Sess., 6 (1952).
[27] *In re Abele*, 684 F.2d 902 (CCPA 1982).
[28] Examples include post-solution activity, field of use limitations, data-gathering steps, transformation of something physical and structural limitations in process claims.
[29] 450 U.S. 175 (1981).
[30] The decision was intellectually honest. After all, if a machine performing the vulcanizing function in a single unit were patentable, while another machine that separates the task into machine instructions and a post-solution activity were not, then the law would fail to be logically consistent.
[31] 958 F.2d 1053, 22 USPQ2d 1033 (Fed. Cir. 1992), confirming a transformation of data must occur, and processes entailing computer-performed calculations, described in mathematical symbols or words, do not themselves render a claim nonstatutory.
[32] *In re Beauregard*, 53 F.3d 1583 (Fed. Cir. 1995).
[33] *Schlumberger c INPI* (1981).
[34] U.S. Patent No. 5,193,056.
[35] The data processing system makes a daily allocation of assets of two or more funds ("spokes") invested in a portfolio ("hub"). The system would then calculate the percentage share that each fund has in the portfolio. Daily changes in the value of the portfolio's investment securities and in the amount of each fund's assets would also be taken into account. The system would calculate each fund's total investments based on the book capital account. The system tracks the relevant data as well.

[36] The declaratory judgment may be filed as a defense to infringement, to prove the USPTO erred in granting the patent.
[37] *State Street Bank & Trust Company v. Signature Financial Group, Inc*., 149 F.3d 1368 (Fed. Cir. 1998).
[38] Codified as Title 35 of the *Unites States Code*.
[39] 35 U.S.C. § 102.
[40] 35 U.S.C. § 103.
[41] U.S. Patent No. 5,960,411.
[42] *Amazon.com v. Barnesandnoble.com*, 239 F.3d 1343 (Fed. Cir. 2001).
[43] U.S. Patent No. 5,794,207.
[44] See Hunt 2001.
[45] U.S. Patent Nos. 6,766,304, and 6,772,132. See, e.g., *Trading Technologies Int'l, Inc. v. eSpeed Inc*., 04CV5312, (U.S. D.Ct. for NDst. of IL 2008).
[46] U.S. Patent No. 4,346,442.
[47] U.S. Patent No. 4,839,804.
[48] U.S. Patent No. 4,975,840.
[49] "Fourteen (14) patent examiners working in Class 705 have business industry work experience that pertains directly to the examination of patent applications in Class 705. Of these, ten have three or more years of work experience in various fields including Banking, Securities, Business Development, Marketing Analysis, Real Estate Analysis, Business Consulting, Management, Sales, Insurance, Business Information Systems, and Financial Analysis."
[50] As biotech patents are more mathematically precise in their claim language than high tech patents, they may provide fewer ambiguities.
[51] Examples include the Chicago Board of Trade and the Chicago Mercantile Exchange, neither of which faced serious competition in futures contracts and interest rates futures respectively from Eurex and Euronext.Liffe.
[52] As pendency of the application is about 3 years, the term of the issued patent is about 17 years.
[53] "This situation rewards a thin edge of creation with a thick wedge of protection."
[54] He concludes these are led by Merrill Lynch, Citigroup, American Express, Citicorp and McGraw-Hill.
[55] He concludes these are led by Hitachi, IBM, NCR, Citigroup and Fujitsu.
[56] He concludes these are led by Pangea Intellectual Properties, LLC, Divine Technology Ventures, Source, Inc., Meridian Enterprise Corp. and Travelers Express Co.
[57] He concludes these are led by American Express, Citigroup, Chicago Board of Trade, New York Mercantile Exchange and JP Morgan Chase.
[58] *See* Fig. 9, as described below.
[59] "An industry has developed in which firms use patents not as a basis for producing and selling goods but, instead, primarily for obtaining licensing fees." 547 U.S. ___, 126 S. Ct. 1837 (2006) (Kennedy, J., referencing FTC, To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy, ch. 3, pp. 38–39 (Oct. 2003).).
[60] To quote Joseph Stalin, "Quantity has a quality all its own."
[61] For example, eSpeed Inc.'s US Patent 6,560,580, issued 2003, for its electronic bond trading technology was held invalid by a federal court jury in DE.
[62] The balancing issue may be seen with a simple example in the non-high tech field of preserving. John Landis Mason invented a shouldered glass jar with a threaded edge and a metal lid that revolutionized home preserving (*The Old Foodie* 2006). Mason patented his Mason jar (U.S. Patent 22,186) but died a pauper. The patent expired before real commercial impact. Larger companies, with little to fear from a weak patent system driven primarily by access to capital, had little incentive to take an early license on the idea. In fact, the Ball Brothers, though not a licensee, had the audacity to manufacture millions of the jars into the 1920s, with the caption "Mason's Patent."

Today, Mason might well be able to benefit from the commercial uses of his idea. Perhaps he would have joint ventured with industry players against competitors, or begun a licensing and litigation program, possibly funded on a contingent fee basis. Industry players, fearing sizable damages or injunction, and living in a time where lawsuit forum shopping is less prevalent, may have taken licenses to make Mason quite wealthy. The licenses may have had limited effect on profits, or alternatively constituted a sizable tax and possibly hurt the industry. Perhaps the industry players would have refused a license after conferring with their own counsel, and the matter would have gone to litigation where the stakes were higher. Perhaps

Mason's success would have fostered notable innovations in the home preserving field and even expanded the market.

It is unlikely consumers would have paid more or less for Mason jars depending on whether Mason made a profit. But, if the transactions costs were distributed throughout the entire industry, and the bulk of products were effected, perhaps consumers would have paid more. Added innovation bolstered by patenting may have drawn numerous other players to the field, perhaps hurting the Ball Brothers' market share. The Ball Brothers may have been incentivized to generate their own innovations and patent them, both for offensive royalties and to defend against competitors.

Although it is hard to say what may have happened, it is fair to say that Mason's success would have been tied to the scope of claims permitted by the USPTO, his ability to raise capital, the ability and strategy employed by his counsel to license or litigate, and the relative rational business dealings of his competitors. Today's landscape is thus considerably more complex than when patents were mere mantle trophies. It is inherently more just for patentees and less predictable for large industry as the system has decidedly shifted to promote protection. However, the present system is not easily dismissible as better or worse for either industry or society without benefit of predilection.

[64] Examination of financial business method inventions of Class 705 fall under Ms. Wynn Coggins, Director of Groups 3620 and 3690. Workgroup 3690 (Finance and Banking), includes four (4) Art Units 3691, 3692, 3693 and 3694 of examiners. Workgroup 3620 similarly includes various Art Units (USPTO 1999).

[65] Average pendency length for business method inventions is unusually long compared to inventions in other areas of the USPTO. At mid-year 2007, the length of pendency to mailing of a first office action by the USPTO in class 705 was 44 months. Pendency to issuance or abandonment was 54 months, indicating an average active prosecution period of approximately 10 months, once examination was commenced.

[66] *Ex parte Lundgren*, Appeal No. 2003-2088 (Bd. Pat. App. & Inter. 2005).

[67] The USPTO has provided its own reasoning. It has argued that many of the cases filed in 2000-2001 belong to Internet based start-ups which likely sought broad protection, while more recently filed cases have narrower claims (Coggins 2007), to which it attributes the recently increasing allowance rates.

[68] 06-1286 (Fed. Cir. 2007).

[69] *In Re Bilski*, 2007-1130, February 15, 2008 Federal Circuit order *sua sponte* granting rehearing *en banc* RE: US Patent Application 08/833,892, relating to managing the risk of bad weather through commodities trading. The CAFC raises the issue of whether a process must result in a physical transformation or be tied to a machine. Oral argument is scheduled for May 8, 2008, 2pm in Courtroom 201.

[70] *See, e.g.*, US Patent 7,054,830 filed October 5, 1999 and issued May 30, 2006.

[71] In fact, during this time period, the number of business method patent applications being appealed to the Patent Board of Appeals and Interferences swelled to in excess of all other cases being appealed in other classes, combined. In 2006, the Business Method Group shifted to a policy of second-eye review by the SPE in the same art unit as the examiner responsible for a case, improving dramatically the process of prosecuting the case to issuance or abandonment. According to Ms. Coggins, today an examiner has an allowance conference or appeal conference with his or her own SPE to review the case prior to allowance or appeal.

[72] According to Ms. Coggins, the USPTO has developed in-house training for its examining corps which is specific to business method patents. Increased hiring of examiners was planned to increase examiners finance art units from 48 examiners in the beginning of fiscal year 2007 to 100 examiners by the end of fiscal year 2007 (midyear 2007 there were 68 finance art examiners, with plans to add 37 more by the end of the fiscal year), and the number of finance art units are to increase from four in 2007 to eight in fiscal year 2008. In aggregate, the USPTO employs about 4,800 examiners as of the end of the 2006 fiscal year.

[73] Ibid., p. 7.

[74] The numbers are fewer than in Fig. 1 as the USPTO has removed redundancies and double counts.

[75] In 1999, 2658 patent applications were filed in Class 705.

[76] As noted, prior to Class 705, business methods occupied business and cost/price sections of the computer classes 395 and 364.

[77] These findings should be compared to findings of Lerner (2006).

[78] Examples include a patent for using a neural network for portfolio selection to Barr and Mani, patents related to actively managed ETF to Gastineau and Weber, a patent for using re-sampled efficient frontiers

to optimize a portfolio to Michaud *et al.*, and a patent protection process of asset allocation during retirement using fixed and variable life annuities to Peng and Milevsky.

[79] "Inventions . . . cannot, in nature, be a subject of property. Society may give an exclusive right to the profits arising from them, as an encouragement to men to pursue ideas which may produce utility, but this may or may not be done, according to the will and convenience of the society, without claim or complaint from anybody . . . . Considering the exclusive right to invention as given not of natural right, but for the benefit of society, I know well the difficulty of drawing a line between the things which are worth to the public the embarrassment of an exclusive patent, and those which are not."

[80] The reader may recall John Donne's phrase from *Death Be Not Proud*: "Thou art slave to fate, chance, kings, and desperate men."

[81] The international Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS), administered by the World Trade Organization (WTO), provided certain minimal standards for protection of intellectual property by member states. Though not specifically addressing business method patents, TRIPS requires "patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application." Accordingly, scholars have noted that if the tests are met, BMP protection must be afforded. The International Chamber of Commerce has taken a strongly supportive view of BMPs so long as such classical tests of novelty, non-obviousness and industrial applicability under TRIPS are met (ICC 2001). Similarly to TRIPS, the European Patent Office does not protect business methods per se, but affords protection to software patents implementing business methods – so long as there is a "technical effect." In Canada, like Europe, though officially unpatentable, BMP software patents directed to a useful end result have been granted, as opposed to those solely making calculations or presenting solutions. Like the U.S., Japan explicitly recognizes business methods as patentable subject matter, with the legal standard that the method constitute "a highly advanced creation of technical ideas by which a law of nature is utilized" (Furutani 22003). The business method is considered patentable when it contains a sufficiently technical or tangible aspect, which may be satisfied by use of a computer. However, though the patent includes technical subject matter, Japan has gone to lengths to improve the sophistication of its searches and involvement with experts in the business community. Additionally, the relative level of obviousness, termed "inventive step," has been set relatively high to prevent well known procedures from becoming patentable despite combination with a computer. "An invention enabling receipt of orders via the Internet, for instance, which were taken by fax or telephone in the past, will not be regarded as having inventive step".

[82] 550 U.S. ___ , 127 S. Ct. 1727 (2007).

[83] 549 U.S. ___, 127 S. Ct. 764 (2007).

[84] 547 U.S. ___, 126 S. Ct. 1837 (2006).

[85] The test includes: demonstration of injury, that monetary damages will not be sufficient, that the hardships favor injunction, and that public interest would be best served.

[86] Misc. Docket No. 830 (Fed. Cir. 2007).

[87] 548 U.S. ____, 126 S. Ct. 2921 (2006)(Breyer, J., dissenting from dismissal, joined by Stevens, Suter, JJ.).

[88] 06-1286 (Fed. Cir. 2007).

[89] The patent involved a process for implementing mandatory arbitration.

[90] In a related case, Bernard Bilski devised a method of using hedge contracts to reduce the risk that a commodity's wholesale price may change. In his patent, however, there are no use of computers calculations to generate hedge prices, or use of processors to implement the hedging claimed. The question before the Federal Circuit in In Re Bilski, Fed. Cir., No. 2007-1130, October 1, 2007, is whether business methods completely divorced from technology are patentable.

[91] "Patent Reform Act of 2007." H.R. 1908.