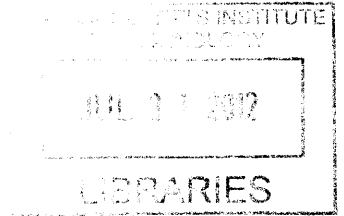


# Intellectual Property - Strategy and Policy

ARCHIVES

By  
Rishi Ahuja  
B.E., Electronics Engineering  
University of Pune, 1997



Submitted to the System Design and Management Program  
in Partial Fulfillment of the Requirements for the Degree  
of  
Master of Science in Engineering and Management  
at the  
Massachusetts Institute of Technology  
February 2012

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## Abstract

The thesis that follows is an attempt to gain a deeper understanding of intellectual property from a policy as well as a strategic perspective. While the discussion that follows is applicable to intellectual property in general, the focus of this thesis is on a particular aspect of intellectual property i.e patents. Policy and strategic perspectives are covered in section I and II respectively.

The section on policy explores the origin and evolution of intellectual property related policies by discussing key legislation and court cases. The two questions that were most relevant when exploring the policy side of the patent system were:

- Is the intellectual property system hindering or encouraging innovation?
- What changes, if any, are required to make the system more effective?

The section on strategy looks at IP strategies (or lack thereof) of three leading companies, Apple, Google and Microsoft. These three companies were selected because of their apparently differing strategies and this cursory judgement was confirmed when the strategies of the companies were put under a microscope. The question that were central while exploring the strategic aspects of intellectual property were:

- How are these three companies coping with the patent system as it exists today?
- What changes can make the strategies employed more effective?

The summary section at the end tries to reconcile these two different ways of looking at the intellectual property system into a coherent whole.

*Thesis Supervisor: Joe Hadzima*

*Title: Senior Lecturer, MIT Entrepreneurship Center*

*Thesis Supervisor: Pat Hale*

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## Acknowledgements

The motivation for this thesis came from the lectures of Professor Eric Von Hippel that I had the good fortune of attending. Prof. Eric Von Hippel made me fundamentally question the patent system and its merits. The question gained more relevance with the realization that firms today rely more on intellectual property and other intangible assets than they do on physical assets like plants and machinery. Having understood the increased reliance of modern societies on intellectual property but not understanding how this asset should be treated (as a commons or private property akin to physical assets) created a dichotomy in my mind. Thesis seemed like an ideal opportunity to delve into this debate.

Prof. Hadzima and Pat Hale were kind enough to act as advisors and support me through this endeavor. I am especially thankful to Prof Hadzima for his guidance on the strategic aspect of the patent system. The guidance came in the form of discussions as well the tools he provided to explore patent portfolios in greater detail. Other scholars that have helped shaped my opinion towards intellectual property in general and patents in particular include Prof. Dan Ravicher (Public Patent Foundation), Marshall Phelps (Author. ex-VP of Intellectual Property Policy & Strategy at Microsoft), David Kline (Author), Prof. Michael Meurer (Boston University), Prof. James Bessen (Boston University) and Prof. John Palfrey (Harvard).

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## Part I: Intellectual Property and Policy

## Overview

Intellectual property (IP) is a term that is used to refer to the creations of the mind like inventions, literary/artistic works, symbols, names, images, and designs used in commerce. The recognition of these creations as “property” also confers on these creations the rights and privileges we normally associate with tangible property. In case of the U.S. these rights are enshrined in the Constitution’s copyright clause (Article 1, Clause 8, Section 8). This clause empowers the U.S. Congress to “promote the progress of science and useful arts, by securing for limited time to authors and inventors the exclusive right to their writings and discoveries”. Intellectual property exists in varied forms with each form afforded different rights and privileges. The list below explains primary types of intellectual property rights:

## Copyright

Copyright grants the owner the right to prevent others from copying original works of authorship including literary, musical etc. In the U.S. copyright is granted for the author’s life plus an additional 70 years.

## Trademark

Trademark is the right to use a distinguishing word, phrase, symbol, design, sound, color or combination thereof to identify the source of goods or services. Unlike patents trademarks can be renewed forever.

## Trade Secret

Trade secret is any valuable information (inventions, ideas, or compilations of data) which is not generally known or reasonably ascertainable and provides a business with an economic advantage over competitors. Law disallows



appropriation of trade secrets through breach of contract, violation of confidence, use of surreptitious surveillance, or other improper means.<sup>(ref18, ref19)</sup>

## Patent

Patent is a government granted exclusive property right to exclude others from making, using, selling, offering for sale or importing the *invention* on which the patent is granted. This right is granted for a limited time (20 years) in exchange for public disclosure of the invention. For any invention to be patentable it has to be new, useful and non-obvious. The patent law does not put the patent holder under any obligation to make, sell or use the patented invention.

Patents can be thought of as a solution to a collective action problem, i.e., a problem where the interest of individual/small group of people is in conflict with the interest of the society at large. The collective action problem that is of interest here is the conflict between the inventors and society at large - inventors are reluctant to publicly disclose their invention in order to extract maximum rent from their invention whereas society is better served by having knowledge of the invention and building upon it.

Law makers have to be mindful that patent laws create legal monopolies that can potentially stifle innovation rather than encourage innovation. Resolving this conflict between providing incentives for innovation (patent law) and avoiding monopolies (anti-trust laws) is a continual balancing act.

## Evolution of IP Law

### Monopoly to Property

While it is common to refer to copyrights, trademarks and patents as Intellectual Property (IP), it is worth remembering that this was not always the case. It was rare to use intellectual property as shorthand for copyrights, trademarks and patents prior to the Second World War. The term “intellectual property” gained currency once the mind creations these rights protect came to be viewed fundamentally the same as tangible property. Prior to the “propertization” of these rights it was common to refer to them as “monopolies”. In fact England’s 1624 Statute of Monopolies ([ref20](#)), which is considered to be the first manifestation of modern patent law, describes patents as monopolies. This change of terminology (monopoly to property) very succinctly captures the transition and evolution of laws surrounding these rights. When the legal discourse pivoted around “monopoly” to describe these rights, the rights were more restrictive compared to today when the term “intellectual property” has gained dominance. It is worth noting that there are scholars today who are not comfortable with the status of “property” that has been conferred on the creations of the mind. These scholars argue that creations of mind unlike physical/tangible property are non-rivalrous (multiple people can use them simultaneously) and lack clear boundaries. These distinctions, as per the scholars opposed to the use of property in describing the creations of the mind, make application of laws analogous to physical property laws unsuitable. It would be appropriate to mention here that the expansion of the entitlements associated with intellectual property has also been accompanied with an expansion of the patentable subject matter. It is hard to miss the fact that the trend in general has been more favorable towards parties owning intellectual property.

The dramatic expansion of intellectual property rights makes one wonder about the factors that have influenced this expansion. There have been a host of factors that have slowly but surely led us to where we stand today in the area of intellectual property law. The most prominent among these factors has been the transformation of the American economy from agrarian (18th century) to industrial (19th century) to information based (20th century). Each transition reflects greater reliance on intellectual assets as opposed to physical assets and hence the perceived need for greater intellectual property protection. The transition of the American economy also resulted in the transformation of the U.S. from a net consumer to a net producer of intellectual property. This transformation has made the U.S. more willing to enforce intellectual property rights than it had been in the past. The following quote from Professor Fisher on the history of the ownership of ideas in the U.S. <sup>(ref1)</sup> aptly captures the U.S. attitude towards intellectual property in the early nineteenth century.

*In the early nineteenth century -- as Charles Dickens learned to his dismay -- the American government was deaf to the pleas of foreign authors that American publishers were reprinting their works without permission."*

The U.S. today is one of the most vigorous champions of intellectual property rights in the world. A lot of other countries in the world are in the midst of a transformation similar to the one the U.S. made (from net consumer to net producer) in the past.

In addition to the functional rationale, ideology has also played a key role in the expansion of intellectual property rights. One of the ideological arguments that

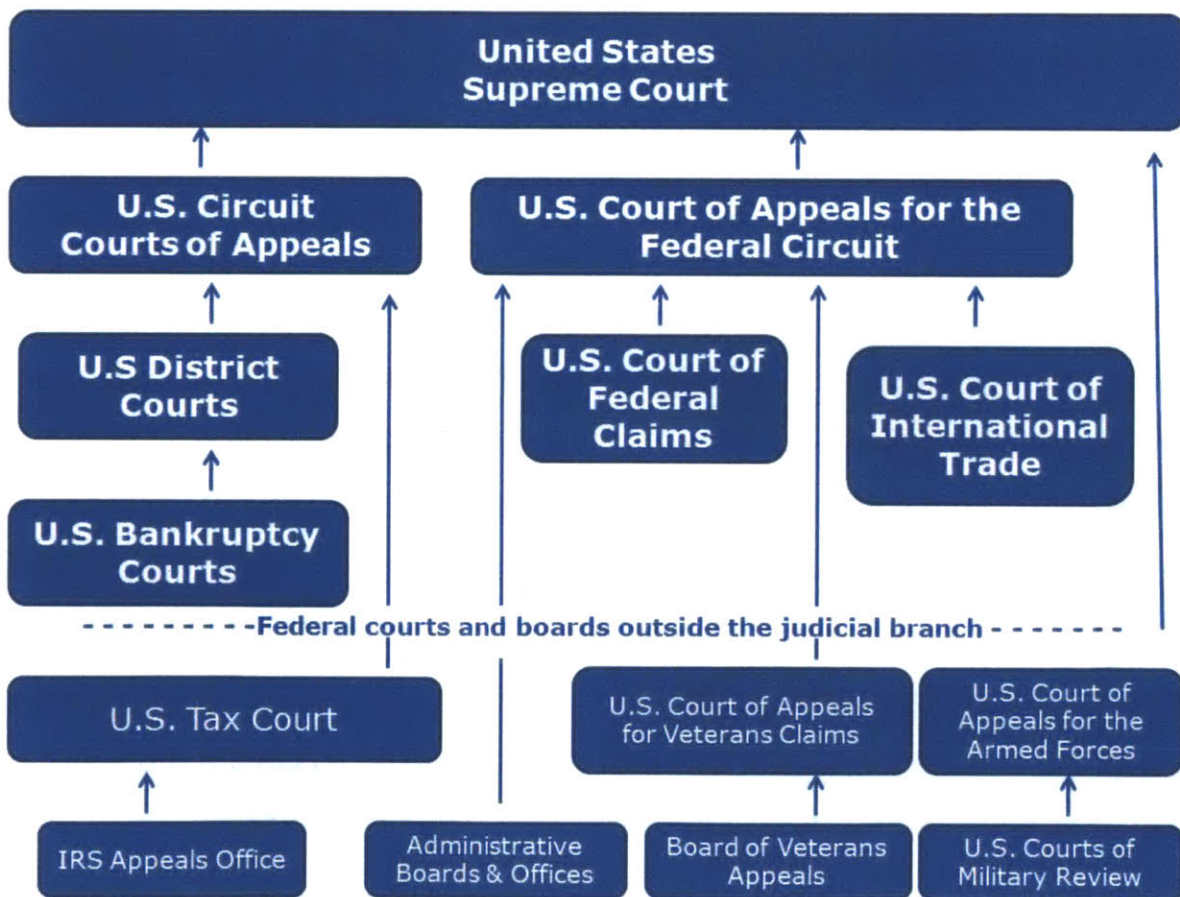
has been particularly influential is the “labor theory of property/appropriation/ ownership” postulated by John Locke in the late seventeenth Century as The Second Treatise of Civil Government [\(ref21\)](#). John Locke believed that a person should have ownership rights over something that he has created through his labor and reflection of this treatise can be seen in intellectual property laws practiced today. The expansion of intellectual property rights has been reinforced in the recent past by new theories and ideologies. In the 1960’s and the 1970’s the focus of legislation was to establish anti-trust laws and hence the laws were more antagonistic towards patents. In the 1980’s and 1990’s the “law and economic movement” with Chicago Law School as one of its main proponents gained traction. This movement or school of thought takes a position that financial/economic benefit should be the basis for laws rather than morality since morality is arguable [\(ref2\)](#). This ideology has provided additional fuel to further expand intellectual property rights .

### Patent Eligibility

Patent eligibility is a question that is central to the patent system. Various agencies - legislature, the U.S. Patent and Trademark Office (USPTO) and Court system have tried to clarify what subject matter is patent eligible but clarity in this matter has been rather elusive. The evolving nature of technology has continuously raised new questions thereby keeping the definition of patent eligible subject matter in a state of constant flux.

Since the U.S. courts play a key role in settling patent infringement cases they have often had to provide clarification on whether a given subject matter is patent eligible or not. Two courts, namely the Supreme Court and the Court of Appeals for the Federal Circuit (CAFC) have played a critical role in providing this much

needed clarification. CAFC is a unique court that unlike most other courts in the U.S. has jurisdiction over subject matter rather than geographic location. The subject matter that comes under the jurisdiction of this court includes patents, trade, veteran claims etc. The court hears appeals from all the U.S. district courts and only the U.S. Supreme Court has the authority to supersede the decisions of the Federal Circuit. The unique setup of Federal Circuit means that there are no circuit-splits and a decision of the Federal Circuit is the final word unless the Supreme Court decides to review a case at its discretion.



Source: <http://widenerharrisburg.blogspot.com/2011/08/us-court-system.html>

The clause that the courts have struggled to clarify is contained in Section 101 of Title 35 of the U.S. Code. This is what it says about patent eligible subject matter:

*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.*

Courts have interpreted the above language to mean that anything made by man is patentable but a law of nature, a natural phenomenon or abstract idea is not patentable subject matter.

The most recent court ruling in regard to patent eligible subject matter was issued by Supreme Court in Bilski v Kappos, 130 S. Ct. 3218, 561 US\_\_\_, 177 L.Ed. 2d 792 (2010). The case revolved around a patent application filed by Bernard Bilski for a method of hedging seasonal risks of buying energy. Prior to the case landing in Supreme Court's chamber, the Court of Appeals for Federal Circuit (CAFC) had rejected the patent application on the basis of the machine-or-transformation test. Machine-or-transformation test is a patent eligibility test that dates back to nineteenth century and its articulation was influenced by cases like Corning v Burden, 56 U.S. 252, 14 L.Ed. 683 (1853) <sup>(ref22)</sup> and Cochrane v. Deener, 95 U.S. 355, 24 L.Ed. 514 (1877) <sup>(ref23)</sup>. As per this test a process can be patented if it is:

(1) implemented with a particular machine devised and adapted to carry out the process in a way that is neither concededly conventional nor trivial or

(2) transforms an article from one thing or state to another

The Supreme Court affirmed the judgement of the Federal Circuit and rejected the patent application because the method under consideration was an “abstract” investment strategy that was too broad and hence not patentable subject matter. Even though the Supreme Court reached the same decision as the Federal Circuit, the Supreme Court rejected the Federal Circuit’s rationale for the decision i.e the machine-or-transformation test. Supreme Court held that the “machine-or-transformation” test should not be the only test used for determining patent eligibility but rather one of the tests used for that determination. The Supreme Court did not specify as part of its judgement what those other tests should be. This lack of specificity regarding patent eligibility implies continued confusion in this area and another look at the issue of patent eligibility before long is predicted.

## Challenges

The patent system faces several challenges today and these challenges have prompted many scholars and industry practitioners to question whether the patent system is achieving its intended goal of encouraging innovation. As part of my research for the thesis I came across several cases where patent system's flaws were debated vigorously. One question that I heard again and again was that the patent system is broken beyond repair. For example Professors Bessen and Meurer from Boston University argue [\(ref3\)](#) that in most industries, with the pharmaceutical industry being the exception, the cost of the current patent system exceeds the benefits. The professors believe that resources that should be spent on bringing new ideas to market are being expended on the protection of old ideas. If this is indeed the case then there is reason to believe that the patent system has failed and such a conclusion also justifies a major overhaul or even abandonment of the current patent system. In order to arrive at a more informed answer to this fundamental question I decided to compile a list of major challenges with possible solutions.

## Software Patents

Opponents of software patents argue that software is an expression of mathematical algorithm, an abstract idea that is not patentable. This makes perfect sense because denying other people the use of math goes against one's sense of justice and therefore one is inclined to agree that patents should not be granted on software. But if one was to delve a bit further into this issue one would be confronted with the fact that today's software is taking on a lot of functionality that was performed by hardware in the past and hardware innovations have always been patentable. With this insight the relevant question becomes if the same functionality when physically embodied by hardware is patentable then why



should the same functionality implemented in software be denied a similar right? Are software patents really different from hardware patents? The answer to these questions seems to be “NO” as Title 35 of the U.S. Code makes no such distinction between software and hardware patents. This makes sense because at the most fundamental level every invention, hardware or software, is manifestation of math and its principles. The logical conclusion of this line of inquiry leads one to reach the same conclusion as Paul Graham did in his essay on this subject ([ref4](#))

*“people who say ‘software patents are evil’ are saying simply ‘patents are evil’ So why do so many people complain about software patents specifically.”*

Nilay Patel echoed the same sentiment regarding software patents but in a more animated manner: ([ref5](#))

*“‘If the patent system is broken’ is a lazy rhetorical cheat, then ‘software patents shouldn’t be allowed’ is the most completely vacuous intellectual cop-out possible. The problem isn’t software patents -- the problem is that software patents don’t actually exist”*

### Patent Quality

A lot of criticism has been directed towards the U.S. Patent and Trademark Office (USPTO) for the quality of the patents it has been granting. In most of the cases, the criticism is well deserved as there have been a slew of patents that have been issued where the ideas behind the patents were either obvious or prior art

existed [\(ref6\)](#) that should have caused the patent application to be rejected. The problem is two fold:

- (1) Patent office is unable to keep pace with the fast pace of technology.
- (2) The huge prior art database makes it very challenging for patent examiners to do a thorough and exhaustive search.

A possible solution for both the problems is the involvement of external community [\(ref6\)](#) to assist the patent office in this process. Peer to Patent is an example of an organization that is trying to involve the community to improve the quality of patents [\(ref37\)](#).

### Notification Issues

Tangible property, like real estate, is a rival good that in a well functioning property system has clearly marked boundaries. This makes detection and prosecution of infringement more or less straightforward. Unfortunately that is not the case for intellectual property where the property is neither rivalrous nor has clearly marked boundaries. These unique characteristics of intellectual property make detection of infringement difficult, resulting in confusion and litigation that is more or less absent in the case of tangible property. This notification problem is central to the case that Professors Meurer and Bessen make against the patent system in their book Patent Failure [\(ref3\)](#).

Poor and vague claim construction along with the volume of data that needs to be searched to detect infringement are major factors that have exacerbated the problem of improper notification. While there are no easy solutions here, possible solutions include modifying the system to encourage/mandate better claim

construction along with patent office making better use of technology and external expert help in prior art searches.

### Patent Trolls

A “patent troll” is an entity that buys and enforces patents against infringers in an aggressive and opportunistic manner, without any intention to develop or market the patented invention itself. Such entities are often projected, and correctly so, as thuggish organizations whose sole purpose is to extort licensing fees.

Banning entities that do not practice the patented technology seems to be the easy and obvious solution to implement but may not be the correct one. Not only does preventing someone from asserting their “property” rights has the smell of unconstitutionality, it also impacts universities and research organizations that engage in similar behavior, i.e., license technology without rather than manufacture or develop the innovation. A middle ground solution that mandates patents if not practiced should be licensed at commercially viable rates is worth exploring. Compulsory licensing is already practiced in countries like Australia

[\(ref7\)](#)

## Part II: Analyzing IP Strategies of Apple, Google and Microsoft

## Introduction

To better understand the intellectual property system it is important to analyze the policy side of the equation and in parallel also explore how businesses are coping with the existing set of policies. Having indulged in a policy debate in the previous section, this section explores the strategies being used by businesses to function and thrive in the current intellectual property regime. The idea here is to gauge the effectiveness of intellectual property strategies adopted by different companies. The methodology chosen to do so is the case study of IP strategies of three prominent companies Apple, Google and Microsoft.

## Apple

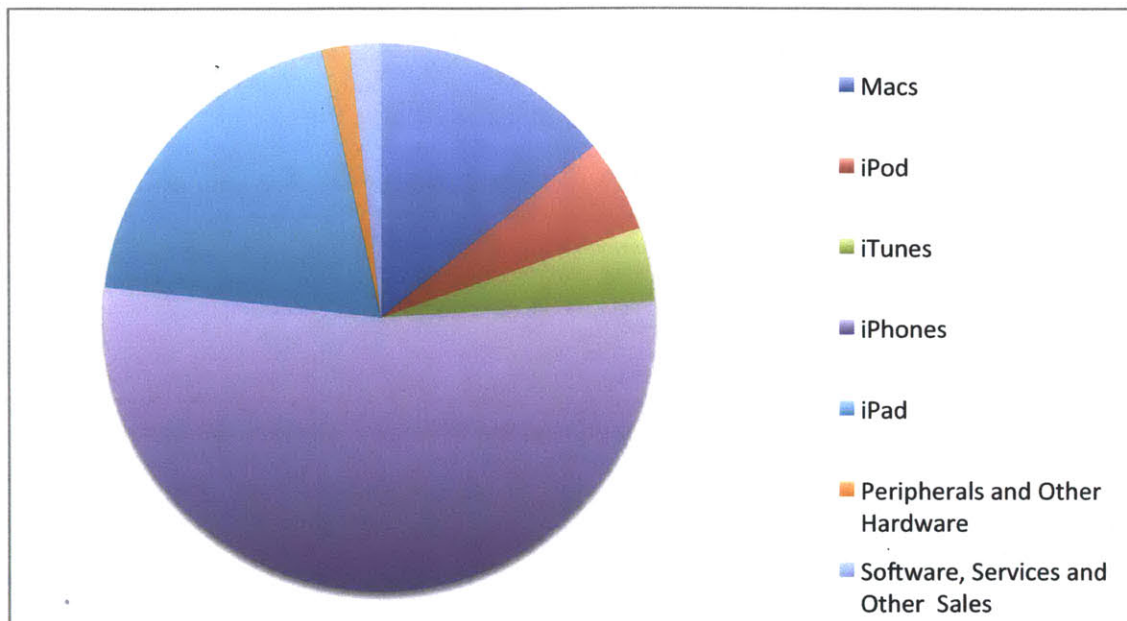
### Business Model and Patents

While Apple started off as a personal computer company it is not the case any longer as it has branched out into other areas like personal music players, smartphones and tablet computers. Apple's decision to drop "Computer" from its name in 2007 is a reflection of the identity change Apple has gone through. Based on the roster of products Apple is selling today it would be more appropriate to classify it as a consumer electronics company.

Apple as a company is well known to have a strong focus on delivering a differentiated user-experience. Apple's strong focus on providing quality user experience dictates or shapes Apple's business strategy. Delivering a quality user experience requires Apple to maintain tight control over aspects of the product/service that directly impact customer experience. This need for tighter control lends itself to a more vertically integrated business model that Apple follows. This means that Apple is as much a hardware company as it is a software company. This model is in contrast to other companies like Google and Microsoft which are primarily software product and services companies.

Apple's major innovation has been to take existing ideas and technologies, often disparate and raw, and combine them to create a well refined product that often sets the quality and innovation benchmark for its peers. This strong association of Apple's brand with quality and innovation has allowed it to charge premium prices and maintain higher profit margins (>20%) than its peers. Apple derives most of its revenues and profits from hardware/product sale rather than sale of follow-on software. Apple's business model goes against the grain of the often

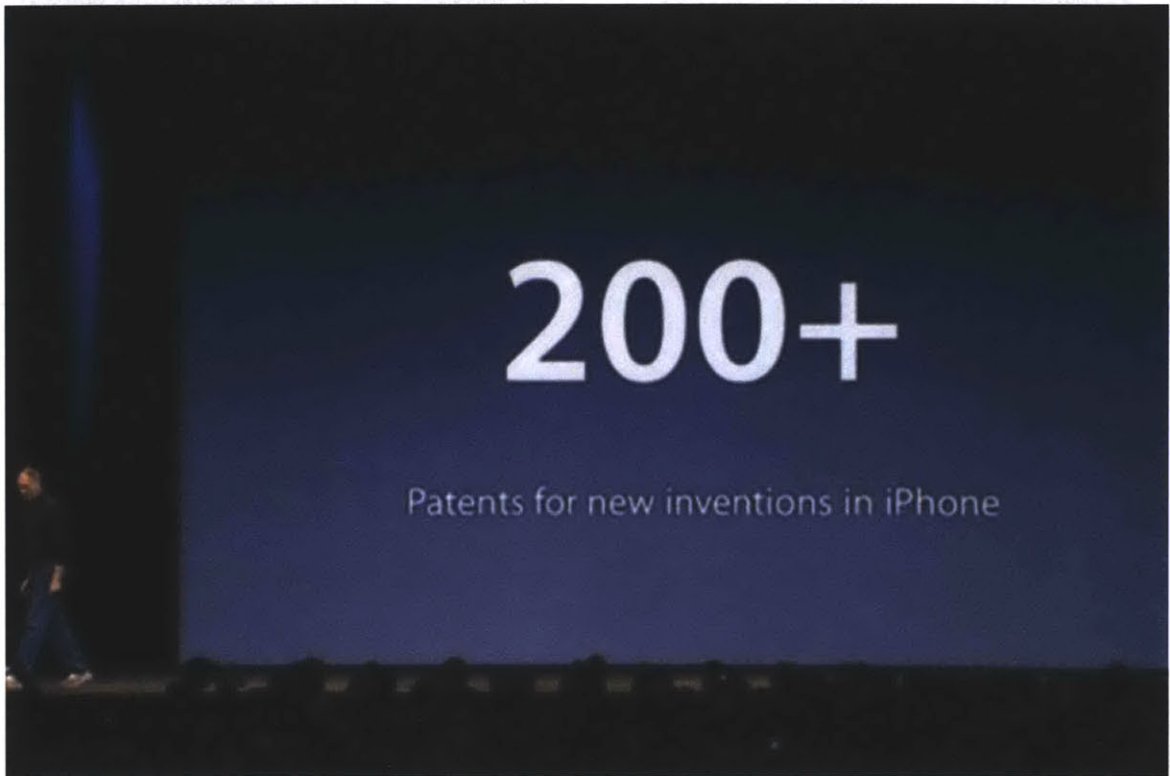
quoted and well studied “razor-blade” model which assumes the opposite, i.e., give the hardware (razor) for free and generate revenue and profits on follow-on software (blade) sales. The chart below provides the revenue breakdown that apple generated from various product lines in Q1 FY2012 ([ref34](#)) and illustrates the point that product sales rather than software sales dominate the revenue mix.



The following two components while important for most businesses have been and continue to be critical for Apple’s current strategy and success:

- (1) Continuous Innovation: Apple has to keep its innovation engine running to stay ahead of the competition in bringing new innovations to the market. Apple has a good track record on this front and products like iPod, iPhone and iPad showcase the output of its innovation engine.
- (2) Product Differentiation: In order to maintain a differentiated user experience Apple has to prevent commoditization of its innovations.

Apple has been conscious of this and has been diligently filing and defending patents. While introducing the multi-touch interface Steve Jobs warned the competitors by saying *“Boy, have we patented it”*





## Patent Portfolio

The table below lists Apple's acquisitions [\(ref8\)](#) over the years and was constructed using USPTO's database of issued and published applications.

Number	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
1	Mar 1988	Network Innovations	Software		0	0
2	Jun 1988	Orion Network Systems	Satellite Comm. Systems		0	0
3	Jun 1988	Styleware	Software		0	0
4	Jun 1988	Nashoba Systems	Software		0	0
5	Jan 1989	Coral Software	Software		0	0
6	Feb 1997	NeXT	OS Software	\$404,000,000	18	0
7	Sep 1997	Power Computing-Clone Making	Clone Computers	\$100,000,000	0	0
8	Jan 1999	Xemplar	Software	\$4,926,000	0	0
9	Nov 1999	Raycer Graphics	Graphic Chips	\$15,000,000	26	0
10	Jan 2000	NetSelector	Software		2	0
11	Apr 2001	Astarte	DVD Authoring Software		0	0
12	May 2001	bluebuzz	ISP		0	0
13	Jul 2001	Spruce Technologies	Graphics Software		2	0
14	Dec 2001	PowerSchool	Student Information Services	\$62,000,000	0	0
15	Feb 2002	Nothing Real	Special Effects Software	\$15,000,000	0	0

Number	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
16	Apr 2002	Zayante	FireWire	\$13,000,000	24	0
17	Jun 2002	Silicon Grail	Video Effects Software		0	0
18	Jul 2002	Emagic	Music Production Software	\$30,000,000	0	0
19	Mar 2005	SchemaSoft	File Format Translator		0	0
20	Apr 2005	FingerWorks	Gesture Recognition		16	16
21	Oct 2006	Silicon Color	Video Editing		0	0
22	Dec 2006	Proximity	Media Software		0	0
23	Apr 2008	P.A. Semi	Semicond.	\$278,000,000	51	8
24	Jul 2009	Placebase	Maps		0	0
25	Dec 2009	Lala.com	Music Streaming	\$17,000,000	0	0
26	Jan 2010	Quattro Wireless	Mobile Advertising	\$275,000,000	0	3
27	Apr 2010	Intrinsity	Semicond.	\$121,000,000	161	3
28	Apr 2010	Siri	Voice Activated Search		0	0
29	Jul 2010	Poly9	Web Based Mapping		0	0
30	Sep 2010	Polar Rose	Face-Recognition	\$29,000,000	1	3
31	Sep 2010	IMSense	Photography		0	0
32	Jul 2011	Nortel Patent Portfolio	Telecom		2,906	687

Number	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
32	Aug 2011	C3 Tech	3D Mapping	\$267,000,000	0	0
33	Dec 2011	Anobit	Flash Memory	\$500,000,000	23	25
34		Misc (a)			4,376	2,136
					7,606	2,881

a: This includes all patents and published applications with Apple as the Original Front Page Assignee

- In terms of numerical strength Apple's patent portfolio lies between those of Google (low end) and Microsoft (high end). Google and Microsoft patent portfolio's are described in later sections.
- Apple's patent portfolio has a strong organic component - 4376 patents and 2881 patent applications. This is in contrast to Google's patent portfolio which has a relatively small organic component. (Organic here refers to patents and patents applications filed by the company in contrast to patents and patent applications acquired via acquisition of companies or patent portfolios)
- IEEE published patent scorecard ([ref9](#)), that combines qualitative and quantitative aspects of the patent portfolio, ranked Apple as having the most powerful patent portfolio in consumer electronics segment for the year 2010. This analysis was based on Apple being granted 566 patents in 2010 (five times more than in 2009), its patents being cited as prior art 70% more frequently

than average and its patents being 37 percent more generally applicable (cited by patents from different fields as compared to the same field) than average.

- The acquisition table also highlights the relatively fewer acquisitions Apple has made in comparison to Google and Microsoft. A preliminary analysis shows that some key technologies that have become Apple's hallmark have come from these acquisitions. These include NeXT (OS X), FingerWorks (multi-touch) and most recently Siri (Personal Assistant with Natural Language Interface). Acquisitions of these key technologies supports the strategy of keeping key technologies to itself to maintain product differentiation.
- Apple's acquisition of Nortel's patent portfolio in collaboration with Microsoft, Research in Motion, Sony, Ericsson and EMC was a strategic move primarily aimed to denying its main challenger (Google) the right to own these patents.
- Apple has acquired approximately 32 firms over the years and in the process has amassed 324 patents and 58 patents applications for an average of approximately 10 patents and 2 patent applications per acquisition (Nortel patent portfolio acquisition was not included in these calculations). The combined (patent and application) average of 12 is higher than that observed for Google and Microsoft. This data is of limited value as it does not normalize the price paid per acquisition since price paid for each acquisition was not disclosed publicly.
- The acquisitions do not show a definite co-relation between the price paid for an acquisition and the acquired company's patent portfolio. This suggests that patents and patent applications were not a prime factor in most of the

acquisitions. There are some obvious exceptions, like Nortel patent portfolio acquisition, where the prime focus of the acquisition was the patent portfolio.

### Miscellaneous Developments

- Apple believes Android is engaged in “grand theft” of its intellectual property and this was expressed in no uncertain words by ex-CEO Steve Jobs to his official biographer Walter Isaacson ([ref10](#)) when he said:

*"I will spend my last dying breath if I need to, and I will spend every penny of Apple's \$40 billion in the bank, to right this wrong. I'm going to destroy Android, because it's a stolen product. I'm willing to go thermonuclear war on this."*

Apple has initiated multiple court cases in multiple jurisdictions against Android manufacturers to execute on the above sentiment. On the other hand Google argues Apple is avoiding real competition from Android and hiding behind the patent shield. Apple has had limited success in court cases but the battles are expected to be long drawn and hence it is too early to predict the final outcome.

- Apple was sued for patent infringement by Nokia and after a bitter fight settled the matter by agreeing to pay Nokia for past infringement, royalties on future sales as well as cross licensing ([ref24](#)).
- Apple has also been sued by Kodak for infringing digital imaging patents and is currently fighting that battle.

## Summary

Apple's patent strategy has been focussed on product differentiation and an effective implementation of such a strategy requires Apple to play hardball with competitors. Apple has been doing so by filing cases/complaints against the alleged infringers in various jurisdictions around the globe. Apple's line of thinking is reflected in the following quote from Steve Job [\(ref10\)](#)

*"I don't want your money," Jobs reportedly said to Schmidt. "If you offer me \$5 billion, I don't want it. I've got plenty of money. I want you to stop using our ideas in Android, that's all I want."*

While this scorched earth policy seems justified considering Apple's overarching objective of product differentiation, it might be to Apple's advantage to consider use of IP in other ways like selective licensing and revenue extraction from its patent portfolio. Such a multi-pronged strategy was also advocated by Nigam Arora in a recently published article in Forbes titled "Open Letter to Apple CEO" [\(ref11\)](#). "Selective" is the key word here as Apple would want to be selective both in terms of patents it licenses as well as the companies it licenses them to. Apple could keep the core patents exclusive but strategically license other patents to hurt the dominant players in the opposing camp. Such a strategy could bring in additional revenue, weaken the market position of its main challengers while letting Apple maintain a differentiated user-experience.

## Google

### Business Model and Patents

Google's business model is to sell advertisements that are displayed along with search results, email, web content and applications. Google's value addition is in the form of relevant search results and context sensitive advertisements that are more valuable to both the end consumer and the advertiser. Google is able to provide context sensitive advertisements by creating a profile of users based on the information it gathers about users. In the year 2011 Google is expected to make more than \$30B in revenue from advertising. The three main technologies that enable the business model to work are:

- Search Algorithms
- Algorithms to create an accurate user profile
- Algorithms to auction advertisements

Due to the money making potential of the products enabled by the above set of technologies they can be thought of as crown jewels in Google's portfolio.

Google can only extract revenue from its crown jewels if there are roads that lead to the museum housing the crown jewels. Traditionally companies like Microsoft, Apple, Firefox have paved the path to Google's crown jewels by providing operating systems and browsers. Google is cognizant of its dependency on these organizations to pave the path. To reduce this risks to its business model Google has started paving new roads in the form of operating systems (Android) and browsers (Chrome). Google is not charging a toll for the use of these newly paved roads in the hope that users would stop by at Google's search museum. The business model is a clever one and one needs to look at the complete

picture to understand the significance of individual components of the picture. The following 2009 quote from Microsoft's CEO Steve Ballmer underscores the mistakes one is prone to make if one looks at Google in part rather than as a whole:

*"I don't really understand their strategy. Maybe somebody else does. If I went to my shareholder meeting, my analyst meeting, and said: 'Hey, we've just launched a new product that has no revenue model!' I'm not sure that my investors would take that very well. But that's kind of what Google's telling their investors about Android."*

In summary, Google's business model is not that different from the familiar "razor blade" model where the razors are provided at a low cost or free of charge and money is made from the sale of blades.

Google seems to have a nuanced opinion on whether technology should be open source or not and this nuance is reflected in its business model which has both the open source (Android) and closed source (Search/Advertising) products. The following quote from the blog post "Meaning of Open" by Google employee Jonathan Rosenberg captures this nuance ([ref12](#)):

*While we are committed to opening the code for our developer tools, not all Google products are open source. Our goal is to keep the Internet open, which promotes choice and competition and keeps users and developers from getting locked in. In many cases, most notably our search and ads products, opening up the code would not contribute to these goals and would actually hurt users. The search and advertising markets are already*



*highly competitive with very low switching costs, so users and advertisers already have plenty of choice and are not locked in. Not to mention the fact that opening up these systems would allow people to "game" our algorithms to manipulate search and ads quality rankings, reducing our quality for everyone.*

Broadly speaking Googles products can be classified into two categories:

- Revenue Generators (Search and Advertising)
- Supporting Products (Android, Chrome etc)

Products that generate revenue at Google tend to be closed source and the supporting products tend to be open source. This makes one wonder whether it is a coincidence that revenue generating products do not meet the standard Google has set for open source?

## Patent Portfolio

- The table below lists Google's acquisitions ([ref13](#)) over the years and was constructed using USPTO's database of issued and published applications.

Number	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
1	Feb 2001	Deja	Usenet		1	4
2	Sep 2001	Outride	Search		0	0
3	Feb 2003	Pyra Labs	Blogging		0	0
4	Apr 2003	Applied Semantics	Online Advertising	\$102,000,000	3	0
5	Apr2003	Neotonic Software	CRM		0	0
6	Sep 2003	Katlix	Search		0	0
7	Oct 2003	Sprinks	Online Advertising		0	0
8	Oct 2003	Genius Labs	Blogging		0	0
9	May 2004	Ignite Logic	HTML editor		0	0
10	Jul 2004	Picasa	Photo Management		2	0
11	Sep 2004	ZipDash	Traffic Analysis		0	0
12	Oct 2004	Where2	Mapping		0	0
13	Oct 2004	KeyHole	Mapping		2	1
14	Mar 2005	Urchin Software	Web Analytics		5	2
15	May 2005	Dogdeball	Social Network		0	0
16	Nov 2005	Akwan Information Technologies	Search		0	0
17	Jul 2005	Reqwireless	Mobile Browser		0	0
18	Jul 2005	Current Comm. Group	Broadband Over Power Lines		0	0

Number	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
19	Aug 2005	Android	Mobile Software	\$50,000,000	0	0
20	Nov 2005	Skia	Graphics Software for Mobile Devices		0	0
21	Dec 2005	Phatbits	Widgets		0	0
22	Dec 2005	allPAY GmbH	Mobile Software		0	0
23	Dec 2005	bruNet GmbH	Mobile Software		0	0
24	Jan 2006	DMarc Broadcasting	Radio Advertising	\$102,000,000	14	15
25	Feb 2006	Measure Map	Blogging		0	0
26	Mar 2006	Upstartle	Word Processor		0	0
27	Mar 2005	@Last Software	3D Software		1	1
28	Apr 2006	Orion	Search		0	0
29	Jun 2006	2Web Technologies	Spreadsheet		0	0
30	Aug 2006	Neven Vision GmbH	Vision		0	0
31	Oct 2006	YouTube	Online Video	\$1,650,000,000	0	0
32	Oct 2006	JotSpot	Web Collaboration		1	0
33	Dec 2006	Endoxon	Mapping	\$28,000,000	0	0
34	Feb 2007	Adscape	In-game Advertising	\$23,000,000	1	30
35	Mar 2007	Trendalyzer	Analytics		0	0
36	Apr 2007	Tonic Systems	Presentation Software		0	0
37	Apr 2007	Marratech AB	Video Conferencing	\$15,000,000		5
38	Apr 2007	DoubleClick	Online Advertising	\$3,100,000,000	13	13
39	May 2007	Green Border	Security		4	2

Number	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
40	Jun 2007	Panoramio	Photo Sharing			
41	Jun 2007	FeedBurner	Web Feed	\$100,000,000	1	2
42	Jun 2007	PeakStream	Parallel Processing		2	9
43	Jun 2007	Zenter	Presentation Software		0	0
44	Jul 2007	GrandCentral	VoIP	\$45,000,000	0	1
45	Jul 2007	ImageAmerica	Aerial Photography		2	0
46	Jul 2007	Postini	Security	\$625,000,000	28	14
47	Sep 2007	Zingku	Social Networking		0	0
48	Oct 2007	Jaiku	Blogging		0	1
49	Jul 2008	Omnisio	Online Video	\$15,000,000	0	0
50	Sep 2008	TNC (Tatter and Company)	Blogging		0	0
51	Aug 2009	On2	Online Video	\$133,000,000	18	19
52	Sep 2009	reCAPTCHA	Security		0	0
53	Nov 2009	AdMob	Mobile Advertising	\$750,000,000	0	16
54	Nov 2009	Gizmo5	VoIP	\$30,000,000	0	0
55	Nov 2009	Teracent	Online Advertising		0	3
56	Dec 2009	AppJet (EtherPad)	Web Collaboration		0	0
57	Feb 2010	Aardvark	Social Networking	\$50,000,000	0	0
58	Feb 2010	reMail	Email		0	0
59	Mar 2010	Picnik	Photo Management	\$5,000,000	0	0
60	Mar 2010	DocVerse	Web Collaboration	\$25,000,000	0	0
61	Apr 2010	Episodic	Online Video		0	0
62	Apr 2010	PlinkArt	Visual Search		0	0

Number	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
63	Apr 2010	AgniLux	Server		0	0
64	Apr 2010	LabPixies	Widgets		0	0
65	Apr 2010	BumpTop	3D Software	\$30,000,000	0	0
66	May 2010	Simplify Media	Media Software		0	0
67	May 2010	Ruba.con	Travel		0	0
68	Jun 2010	Invite Media	Online Advertising	\$81,000,000	0	0
69	Jul 2010	ITA Software	Travel	\$676,000,000	55	109
70	Jul 2010	Metaweb	Search		4	10
71	Aug 2010	Zetawire	Mobile Payment		0	1
72	Aug 2010	Instantiations	Development Tools		3	0
73	Aug 2010	Slide	Social Gaming	\$228,000,000	0	1
74	Aug 2010	Jambool	Online Payment	\$70,000,000	0	2
75	Aug 2010	Like.com	Visual Search	\$100,000,000	9	7
76	Aug 2010	Angstro	Social Networking		0	0
77	Aug 2010	SocialDeck	Social Gaming		0	0
78	Sep 2010	QuikSee	Online Video	\$10,000,000	0	0
79	Sep 2010	Planr	Calendar		0	0
80	Oct 2010	BlindType	Onscreen Typing		0	0
81	Dec 2010	Phonetic Arts	Speech		0	0
82	Dec 2010	Widevine	DRM		18	24
83	Jan 2011	eBook Technologies	E-Books		0	13
84	Jan 2011	SayNow	Speech		1	1
85	Jan 2011	fflick	Online Video	\$10,000,000	0	0
86	Mar 2011	Zynamics	Security		0	2

Number	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
87	Mar 2011	BeatThatQuote.com	Price Comparison	\$60,000,000	0	0
88	Mar 2011	Next New Networks	Online Video		0	0
89	Mar 2011	Green Parrot Pictures	Online Video		0	0
90	Apr 2011	PushLife	Media Software		0	2
91	Apr 2011	TalkBin	Mobile Software		0	0
92	May 2011	SparkBuy	Price Comparison		0	0
93	Jun 2011	PostRank	Analytics		0	0
94	Jun 2011	AdMeld	Online Advertising	\$400,000,000	0	0
95	Jun 2011	SageTV	Media Software		0	0
96	Jul 2011	Punchd	Mobile Payment		0	0
97	Jul 2011	Fridge	Social Network		0	0
98	Jul 2011	PitPatt	Vision		1	1
99	May 2011	IBM Patents	DB, Chips, OO Programming		1,030	0
100	Aug 2011	DealMap	Digital Coupons		2	13
102	Sep 2011	Zave Networks	Digital Coupons		0	0
103	Sep 2011	Zagat	Restaurant Review	\$151,000,000	0	0
104	Sep 2011	DailyDeal	Digital Coupons	\$114,000,000	0	0
105	Sep 2011	IBM Patents	DB, Security, Payment		1,022	0
106	Oct 2011	SocialGrapple	Analytics		0	0

Number	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
107	Nov 2011	Apture	Search		0	4
108	Nov 2011	Katango	Social Network		0	1
109		Misc <sup>(a)</sup>			899	729
					<b>3,142</b>	<b>1,058</b>

a: This includes all patents and published applications with Google as the Original Front Page Assignee

- Google's organic portfolio of 899 patents and 729 published applications is very modest. (Organic here refers to patents and patents applications filed by the company in contrast to patents and patent applications acquired via acquisition of companies or patent portfolios)
- Analysis of Google's patent portfolio indicates that until recently patents were not a major consideration within Google. This policy manifested itself in the form of a weak patent portfolio, especially in the mobile smartphone and tablet space. The large number of lawsuits Google and its partners are fighting confirm that other companies realize Google's vulnerability. Beginning in 2011 Google has started taking very aggressive actions to plug this hole in its strategic arsenal. Google's slow embrace of patents can be explained by a multitude of factors:
  - Young age,
  - University pedigree where focus is on knowledge sharing rather than protection
  - Decision to file for patents primarily in its search/advertising line of business while making other lines of businesses like Android open source. The

patents in these areas were also limited because it did not want the search and auction algorithms to be gamed by publicly disclosing them.

- Google has recently become more aggressive with its patent filings and IEEE published patent scorecard <sup>(ref9)</sup> reflects that. In 2010 Google was granted 283 patents, its patents were cited 329 percent more often than average and its patents were 37 percent more generally applicable (cited by patents from different fields as compared to the same field) than average. This got Google listed as the second most powerful patent portfolio in communications/internet services segment, a huge improvement over 2009 when it was not even in the top 20.
- Google's portfolio is dominated by patents it acquired from other companies and majority of them from IBM
- IBM patent acquisitions happened in year 2011 and the acquisition appears to be in response to the pressure the Android ecosystem is facing from patent lawsuits by Apple, Oracle and Microsoft.



**Main Class Analysis of Hits 1-1628 of 1628 from search for: AN/Google in...**

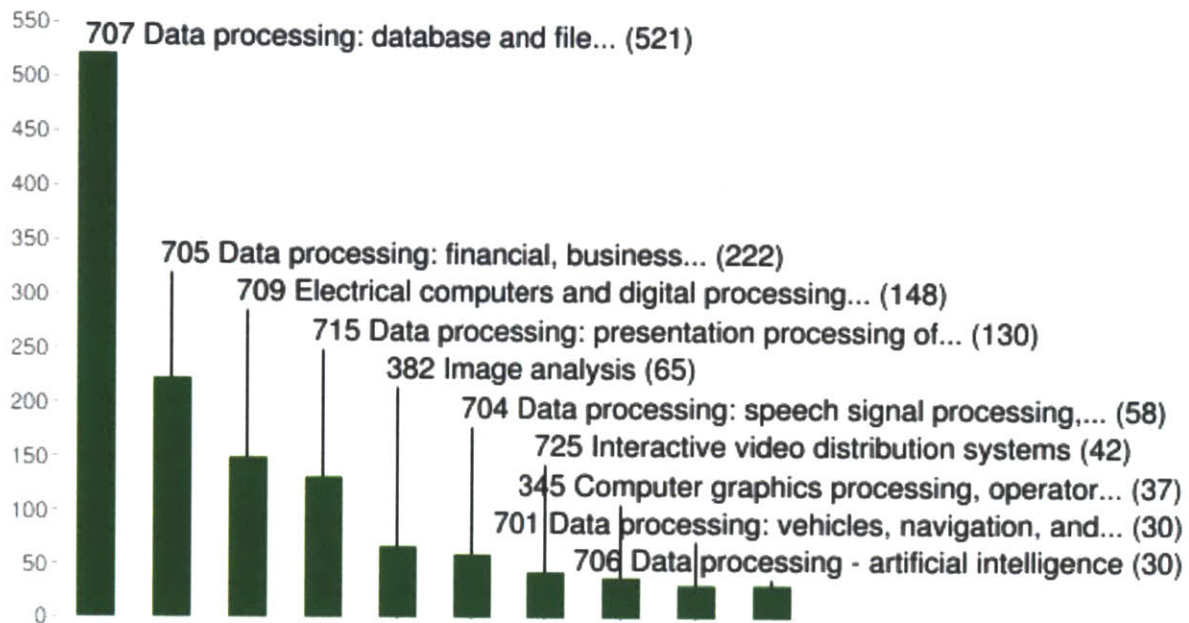


Figure: U.S. Patent Class Analysis of Google's Portfolio Sans Motorola and IBM Patents

**(3) Original Assignee - IBM (2138 on 11/26/11)**

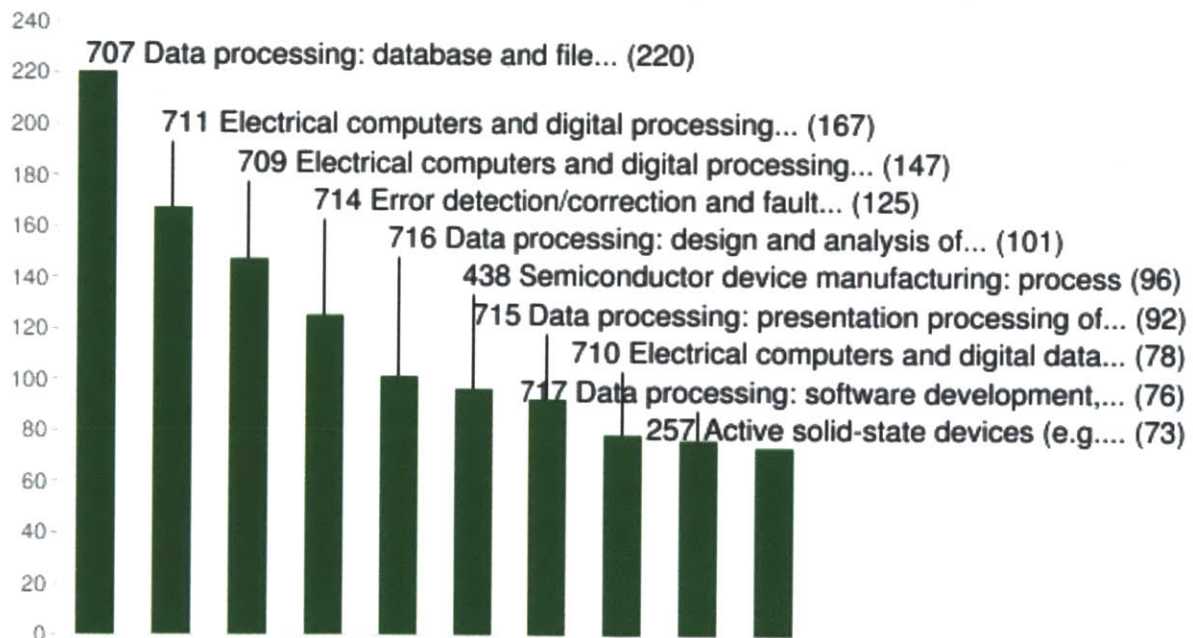


Figure: U.S. Patent Class Analysis of Patents Acquired from IBM

- Google's portfolio sans IBM patent acquisitions has maximum number of patents (~30%) in Class 707 - "Data Processing: database and file management" area. Patents acquired from IBM also have "database and file management" as the class with the maximum number of patents (~10%). Google's acquisition of IBM's patent portfolio seems to have reinforced Google's strength in the "database and file management" area.
- To gauge the strategic importance of the acquired IBM portfolio I decided to do a forward citation analysis of the portfolio, i.e., finding patents that cite the acquired patents as prior art. Preliminary forward citation analysis (light green bars) provides two names, Microsoft and Oracle-Sun, that make an immediate impression. These two companies have aggressively gone after Google and its Android ecosystem. This suggests that the acquisition is a way for Google to strengthen its legal position against these two organizations thereby convincing them to enter into a cross licensing deal.

### Citation Analysis of 2138 US Patents from USPTO Patents in subset ('707'...

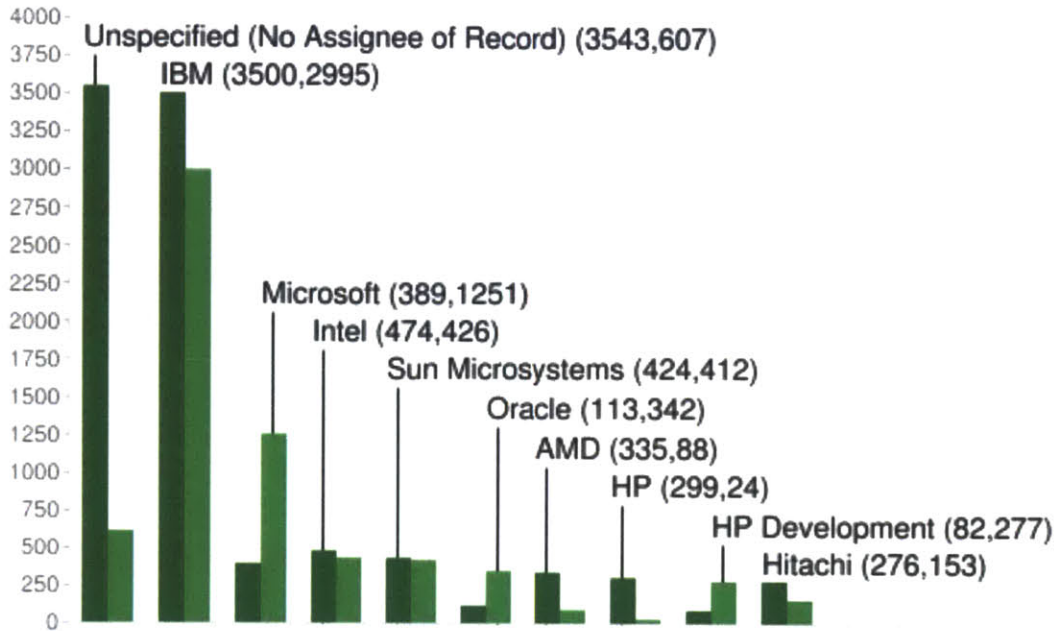


Figure: Forward Citation Analysis of Patents Acquired from IBM

Note: Dark Green Bars are the “backward citations”, i.e., the patents cited by the acquired IBM portfolio whereas light green bars are the “forward citations” i.e. the patents that cite the acquired IBM portfolio

- Google acquired approximately 106 firms and in the process amassed 192 patents and 329 patents applications. This amounts to close to 2 patents and 3 patent applications per acquisition (patents acquired from IBM were not included in these calculations). The combined average of 5 is lower than that observed for Apple and Microsoft. This data is of limited value as it does not normalize the price paid per acquisition since price paid for each acquisition was not disclosed publicly in all cases.
- Most of the acquisitions did not come with a strong patent portfolio and hence it appears that patents were not a big factor that Google considered in making the acquisition. The exception to this rule is the announced, but not yet completed,

acquisition of Motorola which was primarily made with the intent of acquiring Motorola's patent portfolio. Google's CEO Larry Page verbalized this intent in his blog post by saying [\(ref28\)](#):

*“Our acquisition of Motorola will increase competition by strengthening Google's patent portfolio, which will enable us to better protect Android from anti-competitive threats from Microsoft, Apple and other companies.”*

### Miscellaneous Developments

- Google and its (Android) partners are fighting a particularly intense patent infringement battle with Apple. Apple has accused Google of blatantly copying its innovations and is leaving no stone unturned to stop what it sees as a “grand theft” of its intellectual property. Apple recently won a small victory when International Trade Commission (ITC) passed the following judgement [\(ref14\)](#):

*“ Personal data and mobile communication devices and related software covered by claims 1 or 8 of the '647 patent that are manufactured abroad by or on behalf of, or imported by or on behalf of, [HTC and its affiliates] are excluded from entry for consumption into the United States, [...]”*

HTC can prevent this ban from taking effect by working around or removing the feature enabled by the patent in question. The patent in question is the “data tapping patent” which is a patent on an invention that recognizes and marks up phone numbers and email in an unstructured document. HTC is expected to make the necessary modifications but there is always the risk of impacting the user-experience by implementing these deviations, especially if Apple wins more of these patent battles.

- Microsoft has also been going after Android manufacturers for infringement of its patents. A lot of Android manufacturers have signed license agreement with Microsoft and as a result of this agreement are paying a royalty to Microsoft on a supposedly free and open source software. Motorola and Barnes & Nobles have been two notable holdouts and as a consequence have been drawn into a court battle with Microsoft. Microsoft recently scored a small victory against Motorola when an ITC judge found Motorola in violation a patent for generating meeting requests and group scheduling using Microsoft's ActiveSync technology. [\(ref39\)](#)
- While Google is involved in patent battles with Apple and Microsoft indirectly through its partners , it is fighting a direct battle with Oracle. Google has been accused of willful and reckless infringement of Java related copyrights and patents causing irreparable harm to Oracle [\(ref15\)](#)

*"Google's infringement was willful from the very beginning. [...] Indeed, even after Oracle's legal team presented patent infringement charts to Google's lawyers on July 20, 2010, Google continued to make Android available on its website and even created new versions of the platform. Management repeatedly signed off on Android releases notwithstanding Oracle's patent assertions. [...]"*

*"Android's incompatible forking of Java has caused irreparable injury to Oracle, and monetary damages are inadequate to compensate Oracle for the injury Android has caused to the value of the Java platform. An injunction is necessary to prevent Google from further fragmenting the Java platform and undermining Oracle's and others' investments in Java.*

An important piece of evidence in this case is the following email written by Google employee Tim Lindholm regarding licensing intellectual property related to Java <sup>(ref29)</sup>.

*From: Tim Lindholm*

*Sent: Friday, August 06, 2010, 11:05 AM*

*To: Andy Rubin, Benjamin Lee*

*Cc: Dan Grove, Tim Lindholm*

*Subject: Context for discussion: what we're really trying to do.*

*Attorney Work Product*

*Google Confidential*

*Hi Andy,*

*This is a short pre-read for the call at 12:30. In Dan's earlier email we didn't give you a lot of context, looking for the visceral reaction that we got. What we've actually been asked to do (by Larry and Sergei) is to investigate what technical alternatives exist to Java for Android and Chrome. We've been over a bunch of these, and think they all suck. We conclude that we need to negotiate a license for Java under the terms we need.*

*That said, Alan Eustace said that the threat of moving off Java hit Safra Katz hard. We think there is value in the negotiation to put forward our most credible alternative, the goal being to get better terms and price for Java.*

*It looks to us that Obj-C provides the most credible alternative in this context, which should not be confused with us thinking we should make the change. What we're looking for from you is the reasons why you hate this idea, whether you think it's a nonstarter for negotiation purposes, and whether you think there's anything we've missed in our understanding of the option.*

*-- Tim and Dan*

The email points out that Google was well aware of the need to license Java and eventually chose not to do so. If the email is admitted as evidence and Google fails to come up with a strong argument to justify its decision of not licensing Java, Google could find itself guilty of willful infringement. In cases of willful infringement damages are tripled and more importantly injunctions are common.

- Amazon has launched a tablet “Kindle Fire” that uses a customized version of Google’s road tested open source software Android. The customization includes substituting its own application store and browser instead of rival products from Google. This move enables Amazon to sell content and make money without involving Google but the bigger threat for Google seems to be the browser “Silk”. Browsing requests emanating from Kindle Fire are first intercepted by Amazon Web Services (AWS) which means Amazon and not Google has control of the user’s personal data. As mentioned in the “Business Model and Technology” section this data collection is critical for Google’s advertisement based business model to flourish. Additionally Google’s open source model gives it little control in what Amazon does with Android as an OS. The risk here is fragmentation of Android as Amazon seems to have created a fork that could very well have a life of its own. In summary Amazon could

leverage the work of Google without offering anything in return. This is a classic case one would expect intellectual property rights to protect. Unfortunately, for Google, there is little intellectual property ownership that it can leverage to exert some level of control over its creation.

- Google has also announced its plan to acquire Motorola Mobility for \$12.5 billion. This is primarily seen as a defensive move by Google as it tries to beef up its defenses in response to the increased assaults it is facing from the big guns, like Microsoft and Apple. Google stands to inherit close to 17,000 patents and is hoping that this would act as a nuclear deterrent.

### Summary

Google has more of a defensive patent strategy, i.e., it is using patents as a nuclear deterrent and not as a means of product differentiation or revenue generation. Google has both had a cavalier attitude towards patents (Lindholm email) and also has been slow in warming up to the need to file patents more aggressively. As a consequence Google is facing numerous lawsuits. It is also facing new threats to its business model (Amazon). Both lawsuits and emerging threats to its business model are a direct consequence of Google's IP strategy, or lack thereof.

Google is trying to correct the past mistakes by strengthening its patent portfolio. Google has a lot at stake in the ongoing court cases and the initial verdicts and feedback indicate that Google is in a tenuous position. It is not hard to imagine Google's partners abandoning and switching to other platforms if Android ends up on the losing side in these court battles. Hence it is imperative for Google to bring game changing innovations to the market and protect those innovations via



patents. Such protection should give Google a stronger position while negotiating cross licensing deals with competitors. Protection offered by patents should also allow Google to use these innovations exclusively, giving its products a unique identity.

## Microsoft

### Business Model and Patents

Microsoft is primarily a software company with majority of its revenue coming from licensing its marquee “Windows” operating system and “Office” productivity software. Microsoft holds a very dominant position (80%+ market share [ref25](#), [ref26](#)) in both the operating system and productivity software segments for desktop environments. The risk for Microsoft is that this dominance on desktop has not extended to the emerging and faster growing platforms like smart-phones and tablet computers where companies like Apple and Google are the dominant players. Microsoft is also seeing its traditional licensing model threatened by availability of free productivity software like OpenOffice and Google Docs.

Microsoft has recently embraced “software as a service” model and has started offering applications that are completely accessed over the internet on a subscription basis. The applications offered over the internet (cloud) include productivity software and other applications that Microsoft has traditionally offered under a license.

In the last few years Microsoft has also tried to diversify from a software-only products to more integrated products like Zune and Xbox with limited success. Zune has not been able to make much of an impact in the personal music player category whereas Xbox has been more successful.

In 1991 this is what Microsoft’s Bill Gates had to say about patents and patent strategy that Microsoft should adopt going forward ([ref30](#)):

*“If people had understood how patents would be granted when most of today’s ideas were invented, and had taken out patents, the industry would be at a complete standstill today. I feel certain that some large company will patent some obvious thing related to interface, object orientation, algorithm, application extension or other crucial technique. If we assume this company has no need of any of our patents then [they] have a 17-year right to take as much of our profits as they want. The solution to this is patent exchanges with large companies and patenting as much as we can”*

The above quote indicates that Microsoft started thinking about patents early and at least initially did not have a favorable opinion of the patent system. In 1991 Microsoft might not have had a favorable opinion of the patent system but it realized it had to adjust (get as many patents as possible) to the realities on the ground. Recent statements from Microsoft give the impression that Microsoft might have eliminated a lot of the reservations it had about the patent system in 1991. Microsoft’s general counsel Brad Smith <sup>(ref31)</sup> has mentioned that the current situation in smart-phone market is not unique and is simply a repeat of similar episodes from the past. He mentions that inventors need to be compensated through reasonable patent royalties. He cites the \$4.5 billion licensing fee Microsoft has paid to its predecessors over last 10 years. As per Microsoft’s deputy attorney general Horacio Gutierrez <sup>(ref32)</sup> licensing is not some nefarious thing that people should be worried about. According to him licensing is, in fact, the solution to the patent problem that people are reacting so negatively about.

Microsoft's change of heart on patents and how its patent strategy has evolved over the years is documented in the well written account Burning the Ships <sup>(ref16)</sup> by Microsoft's ex-vice president for intellectual property Marshall Phelps along with author, journalist and IP consultant David Kline. The book shows how Microsoft's IP strategy evolved to view patents not only as defensive weapons or weapons to be used for blocking competition but also as financial assets and a vehicle for collaborating with other firms.

## Patent Portfolio

- The table below lists Microsoft's acquisitions [\(ref17\)](#) over the years and was constructed using USPTO's database of issued and published applications.

#	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
1	Jun 1987	Forethought	Presentation Software	\$1,400,000	0	0
2	Mar 1991	Consumers Software	Email	\$20,500,000	0	0
3	Jun 1992	Fox Software	PC Database Software	\$174,800,800	0	0
4	Feb 1994	Altamira	Image Editing		0	0
5	Nov 1994	NextBase	NextBase		0	0
6	Nov 1994	One Tree Software	Source Control Software		0	0
7	Feb 1995	RenderMorphics	3D Graphics Hardware		0	0
8	Jul 1995	Network Managers	Systems Design		0	0
9	Oct 1995	Blue Ribbon Soundworks	Audio Editing		1	0
10	Nov 1995	Netwise	Database		0	0
11	Dec 1995	Bruce Artwick	Flight Simulator		1	0
12	Jan 1996	Vermeer Technologies	Website Management	\$133,000,000	2	0
13	Mar 1996	Animation Software Division of VGA	Animation		0	0
14	Mar 1996	Colusa Software	Development Tools		0	0
15	Apr 2006	Exos	Video Game Controllers		3	0

#	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
16	Apr 1996	Aspect Software Engineering	Database	\$14,150,000	0	0
17	Jun 1996	eShop	Internet Shopping		0	0
18	Jun 1996	Electric Gravity	Online Gaming		0	0
19	Nov 1996	Panorama Software Sys Online	Database		0	0
20	Dec 1996	NetCarta	Website Management	\$20,000,000	1	0
21	Mar 1997	Interse	Website Management		0	0
22	Apr 1997	WebTV Networks	ISP	\$425,000,000	189	13
23	May 1997	Dimension X	Multimedia		0	0
24	Jun 1997	Cooper & Peters	Development Tools		0	0
25	Jun 1997	Linkage Software	Email		0	0
26	Aug 1997	VXtreme	Video Streaming		35	2
27	Dec 1997	Hotmail	Email	\$500,000,000	0	0
28	Feb 1998	Flash Communications	Instant Messaging		0	0
29	Apr 1998	Firefly Network	Music Recommendation	\$40,000,000	7	0
30	Apr 1998	MESA Group	Email		0	0
31	Aug 1998	Valence Research	Clustering and Load Balancing		0	0
32	Nov 1998	LinkExchange	Internet Advertising Cooperative	\$265,000,000	0	0
33	Jan 1999	FASA Interactive	Video Games		0	0
34	Mar 1999	CompareNet	Shopping Services		0	0

#	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
35	Mar 1999	Numinous Technologies	Graphics/ Media			
35	Apr 1999	Interactive Objects	Audio Player		0	0
36	Apr 1999	Jump Networks	Online Calendar		0	0
37	Jun 1999	ShadowFactor Software	Gaming		0	0
38	Jun 1999	OmniBrowse	Mobile Applications		0	0
39	Jun 1999	Intrinsa	Development Tools	\$58,900,000	8	0
40	Jul 1999	SendIt	Mobile Applications	\$125,420,000	2	0
41	Jul 1999	ZoomIt	Enterprise Identity Management		0	0
42	Jul 1999	STNC	Mobile Applications		0	0
43	Sep 1999	Softway Systems	Unix-Windows Interop.		0	0
44	Oct 1999	Entropic	Speech Recognition		4	0
45	Jan 2000	Visio Corporation	Drawing Software	\$1,375,000,000	6	0
46	Feb 2000	Peach Networks	Enhanced TV		0	0
47	Mar 2000	Travelscape	Travel Services	\$89,750,000	0	0

#	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
48	Apr 2000	Titus Communications	Cable/ Internet/ Voice Service Provider	\$944,000,000	0	0
49	Jun 2000	Bungie Software	Video Games		0	0
50	Jul 2000	NetGames	Online Gaming		0	0
51	Sep 2000	MongoMusic	Online Music	\$65,000,000	18	0
52	Sep 2000	Pacific Microsonics	Digital Signal Processing		10	0
53	Apr 2001	Great Plains Software	Enterprise Applications	\$939,884,000	0	0
54	May 2001	Intellisol International	Project Accounting		0	0
55	May 2001	NCompass Labs	Website Management	\$36,000,000	0	0
56	Jun 2001	Maximal Innovative Intelligence	Data Analysis	\$20,000,000	0	0
57	Jul 2001	Yupi	Online Portal		0	0
58	Mar 2002	Classic Custom Vacations	Travel Services	\$78,000,000	0	0
59	May 2002	Sales Management Systems	Retail Software		3	0
60	Jul 2002	Navision	Enterprise Applications	\$1,330,000,000	0	0
61	Sep 2002	XDegrees	Security		7	1



#	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
62	Sep 2002	Rare	Video Games	\$375,000,000	3	0
63	Oct 2002	Vicinity	Location Based Services	\$95,849,000	6	0
64	Feb 2003	Connectix	Virtualization Software		15	0
65	Mar 2003	DCG	Consulting and Integration		0	0
66	Apr 2003	PlaceWare	Web Conferencing	\$200,000,000	10	0
67	May 2003	G.A. Sullivan	Financial Software		0	0
68	Jun 2003	GeCAD Software	Security		0	0
69	Aug 2003	3DO - High Heat Baseball Game	Video Game Controllers	\$450,000	0	0
70	Apr 2004	Encore Business Solutions - IP Assets	Accounting Software			
71	Apr 2004	ActiveViews	Business Intelligence		1	2
72	Jul 2004	Lookout Software	Search		0	0
73	Dec 2004	GIANT Company Software	Security		0	0
74	Mar 2005	en'tegrate	ERP Services		0	0
75	Apr 2005	Groove Networks	Collaboration Software		21	1
76	May 2005	MessageCast	Messaging	\$7,000,000	0	0

#	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
77	May 2005	Tsinghua-Shenxun	Mobile Software and Services	\$15,000,000	0	0
78	Jun 2005	Sybari Software	Security		0	0
79	Aug 2005	Teleo	VoIP		1	0
80	Aug 2005	FrontBridge Technologies	Email		3	0
81	Sep 2005	Alacris	Access Management			
82	Nov 2005	media-streams.com	VoIP		0	0
83	Nov 2005	5th Finger	Mobile Marketing	\$3,153,000	0	0
84	Jan 2006	UMT - Software & IP Assets	Project Management		0	0
85	Feb 2006	MotionBridge	Mobile Search	\$17,858,000	0	1
86	Feb 2006	Seadragon Software	Graphics and Video Software		8	2
87	Mar 2006	Apptimum	Data/ Application Transfer		4	5
88	Mar 2006	OnFolio	Online Research Tool		1	5
89	Apr 2006	LionHead Studios	Video Games		0	0
90	Apr 2006	AssetMetrix	Inventory Management		1	0
91	May 2006	Massive Inc	Video Game Advertisement		1	2

#	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
92	May 2006	Vexcel	Imagery Software		22	0
93	May 2006	DeepMetrix	Web Analytics		0	0
94	Jun 2006	ProClarity	Business Intelligence		6	0
95	Jun 2006	iView Multimedia	Digital Asset Management		0	0
96	Jul 2006	Softricity	Application Virtualization		13	3
97	Jul 2006	Winternals Software	Diagnostic Software		0	0
98	Jul 2006	Whale Communications	Remote Access		3	0
99	Sep 2006	Gteko	Support Solutions	\$110,000,000	3	0
100	Oct 2006	DesktopStandard	Desktop Management		1	1
101	Oct 2006	Colloquis	Automated Service Agent		6	7
102	Mar 2007	Medstory	Health Search		9	5
103	Mar 2007	devBiz	Software Development Tools		0	0
104	May 2007	ScreenTonic	Mobile Advertisement		0	0
105	May 2007	Tellme Networks	Voice Services	\$800,000,000	32	7
106	May 2007	SoftArtisans	Business Intelligence		0	0
107	Jun 2007	Engyro	Enterprise Management		0	0

#	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
108	Jun 2007	Stratature	Data Management		1	0
109	Jun 2007	Savvis Inc - Data Centers		\$200,000,000	0	0
110	Aug 2007	AdECN	Advertising Exchange Platform		1	1
111	Aug 2007	aQuantive	Online Advertisement	\$6,333,000,000	3	4
112	Oct 2007	Jellyfish.com	Reverse Auction		0	2
113	Oct 2007	Parlano	Group Chat		2	0
114	Oct 2007	Global Care Solutions - Assets	Health Care		0	0
115	Nov 2007	HOB Business Solutions	ERP Services		0	0
116	Nov 2007	Musiwave	Mobile Music		0	1
117	Dec 2007	Multimap.com	Mapping		0	0
118	Jan 2008	Calista Technologies	Virtualization Software		1	3
119	Feb 2008	Caligari Corporation	3D Modeling		0	0
120	Feb 2008	YaData	Online Advertisement		0	0
121	Mar 2008	Rapt	Online Advertisement		8	1
122	Mar 2008	Komuku	Security	\$5,000,000	0	0

#	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
123	Mar 2008	90 Degree Software	Business Intelligence		0	2
124	Apr 2008	Farecast	Travel Services	\$75,000,000	4	7
125	Apr 2008	Danger	Mobile Computing	\$500,000,000	85	23
126	Apr 2008	Fast Search & Transfer	Enterprise Search	\$1,191,000,000	20	8
127	May 2008	Kidaro	Virtualization Software		1	2
128	Jun 2008	Quadreon	ERP Services		0	0
129	Jun 2008	Navic Networks	Television Advertising		0	0
130	Jun 2008	Mobicomp	Mobile Applications		0	0
131	Aug 2008	Powerset	Semantic Search		4	10
132	Sep 2008	DATAlegro	Data Warehouse		1	2
133	Sep 2008	Greenfield Online	Shopping Services	\$486,000,000	1	1
134	Mar 2009	3DV Systems	Motion Detection	\$35,000,000	21	5
135	May 2009	BigPark	Online Gaming		0	0
136	Jun 2009	Rosetta Biosoftware	Life Sciences Software		0	0
137	Sep 2009	Interactive Supercomputing	Parallel Computing		2	1
138	Dec 2009	Opalis Software	IT Process Automation	\$59,000,000	0	0
139	Dec 2009	Sentillion	Health Care Software		10	7

#	Date	Company	Line of Business	Value	Patents Issued	Patents Pending
140	Oct 2010	AVIcode	Application Monitoring		3	3
141	Oct 2010	Canesta	3D Sensing		48	24
142	May 2011	Skype	VoIP	\$8,500,000,000	16	169
143	Jun 2011	Prodiance	ERM		0	0
144	Jul 2011	Nortel Patent Portfolio	Telecom		2,906	687
145	Nov 2011	Videosurf	Video Search	\$100,000,000	3	7
		Misc			18,994	13,127
					22,602	14,154

- Microsoft has a big patent portfolio with a large organic component. (Organic here refers to patents and patents applications filed by the company in contrast to patents and patent applications acquired via acquisition of companies or patent portfolios) The large organic patent portfolio is a direct consequence of the conscious effort Microsoft and its senior leadership, starting with the CEO, made in this area. Ex-VP of intellectual property Marshall Phelps uses the following 2004 email from CEO Bill Gates to underscore this point in his book Burning the Ships ([ref16](#))

*I did my yearly review of the IP group yesterday. We had a goal of filing 2000 patents this fiscal year and will end up filing 2128. This is very impressive. This is a huge increase and a huge investment for everyone involved but very important for the company. The issue rate lags behind*

*the filing rate by about four years but Marshall has some ideas about getting that to move up faster as well.*

- IEEE power scorecard ranks Microsoft as having the most powerful patent portfolio in software segment. In 2010 Microsoft was granted 3117 patents, its patents cited 88 percent more often than average and its patents being 16 percent more generally applicable (cited by patents from different fields as compared to the same field) than average.
- Microsoft collaborated with Apple, Sony, Ericsson, Research In Motion and EMC to win the rights to Nortel's patent portfolio. A primary purpose of this acquisition appears to be to deny Google the right to the patent pool and thereby strengthen its defenses in the patent battles against Google and its partners.
- Microsoft has made approximately 144 acquisitions (excluding acquisition of Nortel's Patent portfolio) to amass 702 patents and 340 patent application for an average of 5 patents and 2.5 patent applications per acquisition. The combined average (patents and patent applications) of 7.5 is higher than that of Google (5) but lower than that of Apple (12). This data is of limited value as it does not normalize the price paid per acquisition since price paid for each acquisition was not disclosed publicly in all cases.
- The acquisition table shows that patents have not been a factor in Microsoft's acquisitions as there are multiple companies that came with a high price tag with no or minimal patents.

### Miscellaneous Developments

- Microsoft claims patent infringement by Android and has not been shy about extracting licensing fees from manufacturers of Android smart-phones. It is estimated that Microsoft stands to earn approximately \$450 million dollars next year, based on a licensing fee of \$3 to \$6 per phone ([ref33](#)). This strategy of licensing its patent portfolio seems to have a two pronged impact:

- (1) Provides Microsoft with a substantial revenue stream
- (2) Makes Android more expensive thereby blunting Android advantage of being a free OS compared to Microsoft's own competing product.

Microsoft has so far been very successful in negotiating licensing deals with the manufacturers without resorting to lawsuits. The major exceptions have been Barnes & Nobles and Motorola and Microsoft has filed patent infringement complaints against both.

- In the last few years Microsoft has been very active in signing patent cross-licensing deals with multiple firms including Cisco, Samsung, Autodesk, Citrix. Nortel, Nikon and Toshiba. ([ref16](#))
- Microsoft's in-house developed technologies (.NET, OS for mobile devices etc) provide Microsoft with a path that has supposedly few "patent" land mines.

### Summary

Microsoft seems to have the most evolved intellectual property strategy of the three companies evaluated. This is based on the fact that Microsoft is using



intellectual property as a flexible and a strategic business asset deployed as per the demands of the situation. For example Microsoft has used patents:

- As a collaboration tool by signing cross licensing deals with other firms
- As a revenue stream by collecting royalty from firms that are using Microsoft patented technology with limited or no patents to enter into a cross-license agreement
- As a legal threat by filing court cases to prevent misappropriation of its patented technology
- As a strategic tool to weaken the competition by demanding royalties and increasing competitors' cost of doing business

## Summary and Final Thoughts

Thomas Jefferson, considered to be the father of Patent Office, was initially opposed to the idea of patents and considered them to be an unfair monopoly and referred to patents as “*embarrassments to the public*” (ref35). While performing his duties as the first head of the patent office he realized the power of patents to encourage innovation and became a proponent of the patent system. He is reported to have said that the Patent Act of 1790 (ref27), which forms the basis of the patent system today, has “*given a spring to invention beyond my conception*” (ref35)

Like Jefferson I was somewhat skeptical of the patent system when I started researching material for the thesis but in the course of this journey I have come to believe the patent system in spite of its weaknesses provides the much needed incentive for innovation. Patent system provides an incentive to the common man to unleash his creative genius. The idea behind the patent system is to democratize innovation which was more or less restricted to the privileged class prior to the enactment of the patent act. Abraham Lincoln very succinctly captured the idea behind the patent system when he said that it “*added the fuel of interest to the fire of genius*” (ref36).

The patent system did unleash the creative genius of the common man and Marshall Phelps does a fine job of shedding light to this often overlooked fact in his book Burning the Ships (ref16). He mentions that until the 1930's individual inventors were the source of most of the inventions and corporations licensed or purchased these patented inventions for use in internal product development. The American patent system had created a marketplace for technology enabling

an unprecedented number of individual inventors to make a career in innovation. The situation lasted till about 1930's when the growing complexity of technology and increased resources required to conduct research made it difficult for individual inventors to thrive. In the 1930's internal R&D within corporations began to play a more prominent role in the innovation process. In the last few years the trend has been reversed as internet and the related technologies have once again made it possible for individual inventors to thrive without being on the payroll of a company. Having sustained the patent system through the industrial era where corporations were the major beneficiaries it does not make sense to scrap the system now in the knowledge economy where the individual inventor/innovator has a chance to take back some control and benefit from it.

It is imperative that the patent system be reformed as by no means it is perfect, in fact it is nowhere near perfection and has many deficiencies that have to be overcome. I think the following quote aptly captures the problems with the patent system of today [\(ref16\)](#):

*“The quality of patents has suffered, many are neither novel nor useful.  
And the courts are overwhelmed by patent infringements and validity suits”*

Now it is quite revealing to know this statement is not from the recent years but was made by the U.S. Senator John Ruggles in 1836. This reminds us that what we are facing today is not unique but is a challenge that we have successfully navigated in the past without scrapping the patent system and there is no reason to throw the baby with the bath water in our much needed and welcome efforts to resolve what we see as wrong with the patent system.

Today we are witnessing a transition from an industrial economy where knowledge, ideas and other intellectual assets dominate the traditional assets like manufacturing plants and tangible assets. Even though this transition is widely recognized and acknowledged little has been done to adapt systems and thinking that was more apt for the industrial economy. A prime example of this lack of adaption is the balance sheet, a relic of a centuries old accounting system, that fails to value intellectual assets. In addition management thinking that refuses to manage what it can not measure further compounds the problem. What this has meant is that intellectual assets lie untapped or under-utilized at many of the firms. It is a major challenge for firms to create a value paradigm for patents taking into account its similarities and differences with tangible property. It is important for firms to recognize and exploit IP as a flexible asset that could be used for multiple purposes, i.e., defensive purposes, product differentiation, licensing and/or collaborating with other firms. Management of the modern day firm has to realize that majority of their firm's value is tied in intellectual assets and by not effectively managing these assets they could be in breach of their fiduciary duty. Even firms who are philosophically opposed to patents and believe patents should not be legal need to separate the advocacy from practice. They need to realize that as per the current rules "patents are legal" and they have to abide by these rules until these rules are changed.

The case study of the three firms, studied as part of this research, highlights different ways the three companies have approached intellectual property. Apple has adopted more of a product differentiation strategy and is using its patents to block/delay competition. On the other hand Google initially took a cavalier attitude towards patents and seemed to lack a well thought out patent strategy. As a consequence it has been forced to play catch-up and now has more of a

defensive posture (nuclear deterrent). Both Apple and Google by some measure are still playing by the traditional playbook that encourages use of patents for defensive and/or blocking the competition. On the other hand Microsoft seems to have adopted a more flexible, context sensitive and multi-pronged strategy towards management of its patent portfolio. Microsoft is willing to license its technology, fight against firms which resist entering into a licensing deal, strategically weaken the competition by either increasing their cost of doing business or strategically denying them access to critical patents, and at the same time develop a strong intellectual asset base of its own so as to stay clear of other's patents. This multi-pronged and flexible approach towards patents enables a firm to adapt and choose a given strategy rather than rely on the traditional playbook rules which have failed to unleash the tremendous value that lies untapped in intellectual property.

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