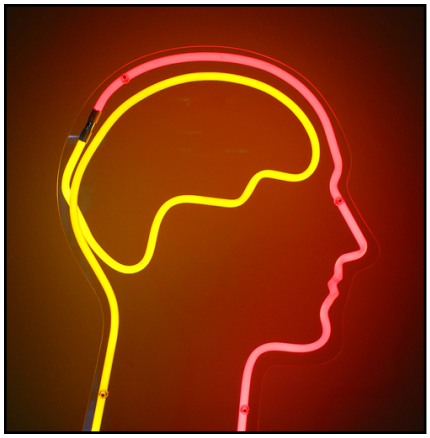
Technology Innovation Management Review

December 2011



Brain by Dierk Schaefer
Image licensed under CC BY

Intellectual Property Rights

Welcome to the December 2011 issue of the *Technology Innovation Management Review*. The editorial theme of this issue is Intellectual Property Rights. We invite your comments on the articles in this issue as well as suggestions for future article topics and issue themes.

Carleton UNIVERSITY

www.timreview.ca

Publisher
The *Technology Innovation Management Review* is a monthly publication of the Talent First Network.

ISSN
1927-0321

www.timreview.ca

Overview

The *Technology Innovation Management Review* (TIM Review) provides insights about the issues and emerging trends relevant to launching and growing technology businesses. The TIM Review focuses on the theories, strategies, and tools that help early-stage technology companies succeed.

Our readers are looking for practical ideas they can apply within their own organizations. The TIM Review brings together diverse viewpoints – from academics, entrepreneurs, companies of all sizes, the public sector, the third sector, and others – to bridge the gap between theory and practice. In particular, we focus on the topics of managing innovation, technology entrepreneurship, economic development, and open source business.

Upcoming Issues

- *January:* Open Source Business in 2012
  Guest Editor: Leslie Hawthorn
- *February:* Entrepreneurship Theory
  Guest Editor: Tony Bailetti
- *March:* TBD
- *April:* Social Innovation
  Guest Editor: Stephen Huddart

We welcome input from readers into upcoming themes. Please visit timreview.ca to suggest themes and nominate authors and guest editors.

Contribute

Contribute to the TIM Review in the following ways:

- Read and comment on past articles and blog posts.
- Review the upcoming themes and tell us what topics you would like to see covered.
- Consider writing an article for a future issue; see the author guidelines and editorial process for details.
- Recommend colleagues as authors or guest editors.
- Give feedback on the website or any other aspect of this publication.
- Sponsor or advertise in the TIM Review.
- Tell a friend or colleague about the TIM Review.

Please contact the Editor if you have any questions or comments: timreview.ca/contact

Editorial: Intellectual Property Rights

Chris McPhee, Editor-in-Chief

Peter Carbone, Guest Editor

From the Editor-in-Chief

It is my pleasure to introduce Peter Carbone, our guest editor for the December issue of the *Technology Innovation Management Review* (TIM Review). The editorial theme of this issue is Intellectual Property Rights and Peter has assembled an excellent line-up of authors to offer their perspectives on this important topic.

In January, the guest editor will be Leslie Hawthorn from Oregon State University's Open Source Lab and the editorial theme will be Open Source Business in 2012. This will be followed by February's issue on the Entrepreneurship Theory, presented by guest editor Tony Bailetti. We encourage you to suggest themes you would like to see covered in future issues.

We hope you enjoy this issue of the TIM Review and will share your comments on articles online. Please also feel free to contact us (http://timreview.ca/contact) directly with feedback or article submissions.

Chris McPhee
Editor-in-Chief

From the Guest Editor

Welcome to this special, year-end issue of the TIM Review, where we will explore the topic of Intellectual Property Rights (IPR) from a number of stakeholder perspectives.

In our knowledge economy, one of the most valuable assets created by research and development investment is now intellectual property. From the recent publicity and activity around major acquisitions, such as the Nortel patent portfolio for $4.5B and the Motorola portfolio for $12.5B, it is clear that intellectual property is indeed a potent weapon for large companies; however, as you will see in this issue, it can be a very valuable asset for small companies as well.

The driving force behind IPR is the ability to extract competitive value from proprietary knowledge/intellectual property. However, the motivation for IPR depends very much on the constituency. For example, standards bodies are looking for compliance and normalization, and so they wish access to IPR not to be unreasonably encumbered – hence the licensing models that focus on fair and reasonable (or free) access. Research entities are more interested in sharing knowledge to facilitate collaboration and advancement of the topic that they are researching. Businesses tend to be looking to gain commercial advantage either by having exclusive rights to a product for a period of time, as seen in the pharmaceutical industry, or by trading patents to prevent lawsuits that may hinder market access.

This issue of the TIM Review explores the perspective of a few of these major stakeholder groups, with the goal of providing some new insights into how IPR can be leveraged to derive value for both large and small companies.

Angela de Wilton, patent agent and founder of de Wilton IP Inc., presents an informative perspective on the strategic value of intellectual property, along with a description of the capabilities of patenting as a tool and how best to wield it. She provides an insightful business perspective for startups, which advocates building an IPR strategy into the overall business strategy for the company, and she suggests a number of best practices for developing and executing the IPR strategy.

Editorial: Introducing the TIM Review

Chris McPhee

Patrick Cohendet and Julien Pénin from the University of Strasbourg explore a different way to think of patents by presenting their research into how patents can be also be used to include other heterogeneous stakeholders, thereby stimulating collaboration and facilitate coordination of research. They argue that this approach is critical in a knowledge economy, where often innovation is a team outcome, not an individual outcome.

Monica Goyal, a lawyer and founder of My Legal Briefcase, provides a contrarian view of the current patent system, which she argues is flawed and should not be applied to software technology. By reviewing a number of examples, she asserts that fairly radical changes to the patent process would be beneficial to properly reflect the dominance of software in new innovations (over traditional hardware/widget businesses). Some of the potential changes suggested might be evaluated by companies who are in the process of defining an IPR strategy.

Daniel Henry, VP of Business Development at WiLAN, takes an industry view on the monetization of IPR as a new and vibrant class of assets and describe a context for the aggressive and dynamic activity in the market today. By studying the evolution of the patent system over time, he describes the conditions that have birthed some new IPR-centric companies in the market today, and he reinforces the view that intellectual property is indeed an asset worth leveraging for all companies.

Natalie Raffoul and Art Brion, from Clancy P.C. + Brion Raffoul, present a more operational approach to protecting IPR and provide a rationale for using the patent process, along with guidelines for filing successfully. They discuss a number of potential motivations for investing in patenting and how to use the system to balance the costs with the goal of securing protection.

Although there are a number of different approaches and motivations, the authors all agree that intellectual property is valuable, and, since it needs to be effectively leveraged, it should be incorporated as a part of the overall business strategy. I hope that you find the issue of benefit as you strategize around how to maximize the success of your initiative.

Peter Carbone
Guest Editor

About the Authors

Chris McPhee is Editor-in-Chief of the *Technology Innovation Management Review* and is in the Technology Innovation Management program at Carleton University in Ottawa. Chris received his BScH and MSc degrees in Biology from Queen's University in Kingston, following which he worked in a variety of management, design, and content development roles on science education software projects in Canada and Scotland.

Peter Carbone is a successful executive known for his thought leadership, business acumen, and technology leadership. He is often called on to address new business and technology challenges. Peter is a pathfinder with a track record of creating innovative solutions, strategically managing technology and innovation, successfully launching and running new businesses, and leading business development initiatives. Peter has held CTO, R&D, and senior business positions in several high-tech companies, and he has led or been directly involved with several technology company acquisitions. Peter has been engaged as technical advisor to startups, is part of the faculty of an entrepreneur development program that has created >100 new companies, and has been on the boards of US-based Alliance for Telecommunications Industry Solutions (ATIS) and Coral CEA. He is past Vice-Chair of the Executive Committee of the Information Technology Association of Canada (ITAC) and Chair of an ITAC committee, which is focused on the Global Competitiveness of Canada's Knowledge Economy. Peter is also a member of the Advisory Board and Review Board of the *Technology Innovation Management Review*.

Citation: McPhee, C. and P. Carbone. 2011. Editorial: Intellectual Property Rights. *Technology Innovation Management Review*. December 2011:3-4.

Patent Value: A Business Perspective for Technology Startups

Angela de Wilton

> *"Opportunities multiply as they are seized."*
>
> Attributed to Sun Tzu (6 BC)
> *The Art of War*

In the last year, news headlines have highlighted record patent infringement settlements, multibillion dollar auctions of large corporate patent portfolios, and ongoing patent battles between key technology industry players. Despite this acknowledgment of the significant value of patents for large corporations, many small technology companies are understandably more focused on the near-term costs of obtaining a patent rather than future value. Costs may seem prohibitive to an early stage technology startup. Some software startups question whether patents are relevant to their business.

In practice, effective intellectual property (IP) strategy and management is dependent on many factors, such as technology or industry sector, size and maturity of the business, technology lifecycle, and the business and market environment. IP strategy must be aligned to business strategy from the outset. By considering IP in the broader context of the overall business plan and the competitive environment, opportunities for generating increased return on R&D investment and added business value through patents or other forms of IP can be recognized early on. This approach ensures that a decision about whether or not to patent is driven by business reasons rather than budget constraints.

This article examines the costs and benefits of patents from the perspective of early-stage technology startups and growing businesses, and it provides some general guidance on best practices for developing an IP and patent activity plan and for building a patent portfolio that appropriately supports business objectives.

Introduction

Intangible assets such as intellectual capital and intellectual property (IP) account for a significant part of the value of technology companies (Flignor and Orozco, 2006: http://tinyurl.com/7dxd3wc; KPMG, 2009: http://tinyurl.com/7nc4fwj; Ocean Tomo, 2011: http://tinyurl.com/449uhdu). Intangible assets include forms of intellectual property with statutory protection (e.g., trademarks, patents, designs and copyrights, trade secrets) and other forms of knowledge that have business value (e.g., proprietary information and know-how). Intangible assets also include what may be referred to as reputation (e.g., goodwill, and brand value.)

Charting an appropriate IP strategy and IP management plan, and understanding how a patent portfolio, in particular, can be valuable, depends on: i) understanding how IP fits within the company's business strategy and ii) understanding how IP is used in the market environment, for example by competitors, customers, partners, and suppliers. It requires bringing together relevant technology, business and law perspectives with an understanding of the competitive landscape and market environment (Figure 1).

IP is central to a technology startup, but is only one factor in ensuring business success in a competitive market environment. In practice, defining an effective IP strategy and management plan is dependent on many factors, such as the technology or industry sector, size and maturity of the business, technology lifecycle, and the business and market environment.

Firstly, considering the technology sector and the nature of a company's product or service, recent sur-

Patent Value: A Business Perspective for Technology Startups

Angela de Wilton

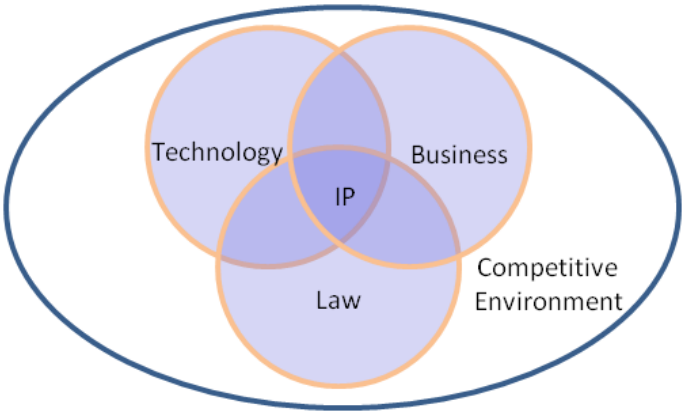


Figure 1. Factors that determine business success

veys have confirmed a marked difference in IP focus between, for example, biotech or medical device startups and software startups (Graham et al., 2009: http://tinyurl.com/c2mtby3; Greenberg, 2010; http://tinyurl.com/c8cpmwy). Biotech startups tend to consider patents as most important, whereas software startups tend to rely more on trade secrets, other forms of confidential information, and copyright. Both studies show that VC-funded startups, even in the software area, tend to file more patent applications than startups relying on other sources of funding. Clues to what form of IP is important to a particular technology sector may be found by observing what other companies are doing in the same technology sector.

Aspects of Patent Value

Initially, patenting costs may be a significant expense relative to costs of R&D and product commercialization. However, these costs must be evaluated relative to the potential commercial value of products or services embodying the invention, such as potential product revenues that a future patent may protect or incremental value that may be created by owning a patent or group of patents. One important near-term consideration, for many startups in particular, is the ability to attract investment.

Table 1 summarizes four aspects of patent value: defensive value, offensive value, strategic/business value and technology leadership. These are not mutually exclusive. Each can contribute to maintaining a competitive advantage, or more generally, "freedom to operate".

Offensive vs. defensive value

It may take several years from filing of a patent application until a patent is issued and becomes enforceable, meaning that it provides the patent owner with the right to exclude others from making, using, selling, or importing the claimed invention. Since most major patent offices have a significant backlog of applications, it is unlikely that an early stage-company will already have issued patents to enforce.

Exercising the right to exclude others entirely from the market may seem like the ultimate power of patents. In practice, in today's networked business environment, particularly in technology areas where any particular product may depend on technology acquired from many sources, more creative solutions may be required. Certainly, there may be an opportunity to license out patents and technology to third parties in exchange for a lump sum, periodic payments, or ongoing royalties. Licensing out may be desirable if a company chooses not to, or cannot, supply the entire market, or if it lacks market channels in particular countries. Considering that business relationships can be part of quite complex networks, a competitor in one respect may be a customer, supplier, potential partner for marketing, for example, in other respects. Therefore, before contemplating offensive tactics such as suing a potential infringer or barring importation, it is important to consider what type of ongoing business relationship may be needed and consider whether patents can assist in opening doors to a different and valuable type of arrangement, such as cross-licensing technology or partnering in some aspect of business development.

In fact, the defensive value of a strong patent portfolio may allow the ultimate "freedom to operate", for example by deterring potential competitors from either copying or imitating a product or forestalling third parties from asserting their own patents because of perceived competitive advantage (i.e., perceived quality and strength of the portfolio), thereby reducing the opponent's chance of success. To paraphrase further words of wisdom from Sun Tzu: "the ultimate victory is not to win 100 battles, but to succeed in not fighting at all" (http://tinyurl.com/7gtllvj).

Technology leadership and strategic business value

If partnering is needed to access third-party technology, a patent portfolio may assist in demonstrating credibility, technology leadership, and ownership, and

Patent Value: A Business Perspective for Technology Startups

Angela de Wilton

Table 1. Aspects of patent value: patents as corporate assets and commercial tools

Aspect	Value
Offensive	• generate patent license revenues • increase market reach • support technology licensing • establish monopoly • litigation and enforcement • protect market share
Defensive	• deter others from copying • discourage potential infringers • improve balance of patent power • forestall third-party lawsuits
Strategic	• acquire venture capital • improve chances of securing other investment • improve negotiating position • licensing/cross-licensing of third-party technology • license for other business value • improve quality of liquidity • assist in initial public offering or other exit event, such as merger or acquisition
Leadership	• enhance product/quality image • underscore innovation culture • demonstrate technology leadership • establish technology ownership

it thus provides strategic value, such as a stronger negotiation position or more favourable terms for contracts, licensing-in, cross-licensing, and collaborative activities.

In the near term, one of the most important aspects of strategic value for technology startups is gaining access to funding. The above-mentioned surveys confirm that companies that are funded with venture capital are more likely to have larger patent portfolios and place more importance on patenting. Whether this is a cause or effect is not clear. However, these studies also indicate that a patent portfolio is influential in securing financial support from other sources, including commercial banks, angel investors, and even "family and friends".

The value (i.e., scope and quality) of a patent portfolio is also likely to be under considerably scrutiny in an exit event involving a merger or acquisition. For example, the acquirer may be looking to fill a technology gap, accelerate a competitive entry to a new market segment, enter a new growth market, or broaden its portfolio offering (Carbone, 2011; http://timreview.ca/article/490). In a worst-case scenario, where a business ceases operation, patents may potentially be auctioned for residual value. More optimistically, a favourable patent position may have positive influence for an initial public offering.

Third-party patents

Patent searching can supplement a search of the scientific and technical literature for useful technology. Expired patents can be a source of technical information that is already freely available in the public domain.

While third-party rights must be respected, active patents may provide insight into alternative solutions or problems to be addressed. Patents with narrow claims

Patent Value: A Business Perspective for Technology Startups

Angela de Wilton

may provide opportunities for solutions that work around or improve on existing patent claims. In some cases, "leapfrogging" or taking advantage of earlier developments, or licensing-in patented technology that has not yet been successfully developed or commercialized by others, may be more cost effective than starting from scratch or developing a work-around.

Joint development and open innovation

In industries where open innovation and open source software prevail, a culture of sharing may lead to a philosophical decision not to pursue patent protection or a misperception that, for example software-implemented inventions are not patentable. Companies that do pursue patenting of software-implemented inventions may fall into the trap of inadvertently licensing their proprietary software by building on an open source software platform, without appropriate partitioning of patentable or proprietary technology. Joint R&D programs or open-innovation partnerships require careful management of IP to mitigate complex issues of joint ownership in exploiting jointly owned IP and to provide for a division of assets if the partnership does not work out (Cronin and Shore, 2008; http://tinyurl.com/c3ka83o).

Other factors to consider are the size and maturity of the business and the technology lifecycle. Where technology results from substantial R&D investment over an extended time period and there is potential for significant product revenue, particularly if the product can readily be copied or imitated, investing a few percent of R&D costs in patenting can potentially provide opportunities for establishing a monopoly position, licensing others to increase market reach, or otherwise generating business value.

Examples of Patent Value

Records were set this year for patent auctions of the Nortel portfolio to the Rockstar Consortium: US $4.5B for 6000 patents and applications, or an average of $750K per patent/application (Frizzell, 2011; http://tinyurl.com/6mfokpx). This auction was followed soon after by the purchase by Google of the Motorola Mobility business for $12.5B with 17,000 patents. If, as reported, half that value was associated with the patents, it equates to an average of about $400K per patent/application (Lohr, 2011; http://tinyurl.com/3ebmltp). These values are said to be multiples of average auction prices for patents in recent years. Some now consider patents as a distinct financial asset class (Wilhelm and Finnegan, 2005; http://tinyurl.com/7ngtt8w).

Of course, these large patent portfolios result from multibillion dollar R&D investments by each of these companies over the many years that it has taken to build these portfolios. Moreover, it is well established that issued patents that are a) directed to established technology (i.e., tried and tested in existing products), b) proven through litigation or licensing, or c) have been demonstrated to be standards essential or standards relevant, will command significantly higher value than pending applications or patents directed to speculative or emerging technologies or products that have not yet been commercialized.

A small company patent success story

For startups working on software solutions, a recent decision of the United States Supreme Court will be of interest. A relatively small Canadian company, Infrastructures for Information Inc. (i4i), prevailed in a patent infringement suit against Microsoft Corporation. The i4i patent application entitled, "Method and system for manipulating the architecture and the content of a document separately from each other", which relates to structured XML, was filed in 1994 and the US patent issued in 1998. When Microsoft implemented this feature in its Word software, i4i sued for infringement. Microsoft challenged the validity of the patent. In the end, after a four-year battle, the validity of the i4i patent was upheld, and damages of $300M were awarded in 2011. For further details, see Hartley (2011; http://tinyurl.com/c3srpd4).

A lost opportunity

In a blog post entitled "Avoiding patent pitfalls: our billion-dollar lesson" (http://tinyurl.com/d4f5k3k), Steve Lamb, the current CEO of Nevex Inc., relates how in a previous venture, Border Network Technologies Inc. (another Canadian company) developed a feature called Network Address Translation (NAT). At the time, this feature was seen as a necessity rather than an industry changing idea and patenting was low on the priority list. It was only with hindsight that it was realized this technology has since been widely adopted in almost every router, and investing in patenting could potentially have been a very worthwhile decision.

Patenting Costs

Based on my experience, patenting costs amount to US $25K to $35K per patent, per country, over the 20-year life of a patent. In practice, costs vary considerably by country or region, and are dependent on numerous factors, including the complexity of the technology. Recent surveys indicate costs may be in the region of $30K or more per

Patent Value: A Business Perspective for Technology Startups

Angela de Wilton

country (Graham et al., 2010: http://tinyurl.com/d4vsbfa; Jaiya and Kalanje, 2006; http://tinyurl.com/73utj9f).

Initial costs for preparing a patent application may be quoted from a few thousand dollars for a very simple "widget" to significantly more than $20K for a complex system with multiple embodiments (instantiations) or multiple "aspects". Aspects of an invention relating to a communications system may include, for example, a network architecture; a system; devices, apparatus, or system elements; methods or software products, and perhaps elements of a user interface.

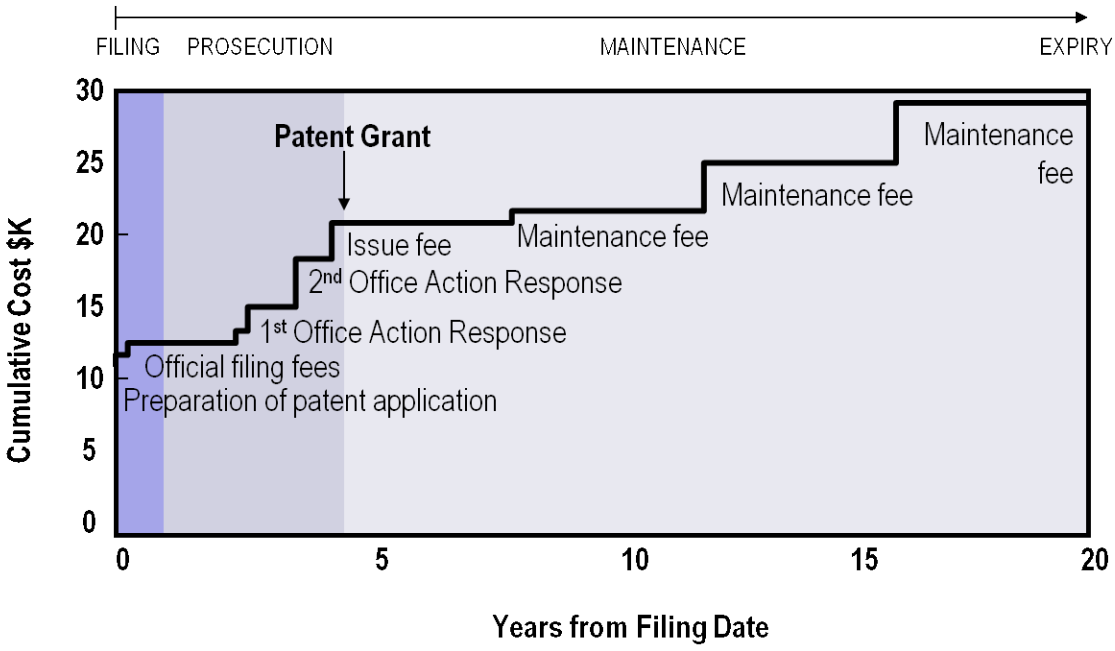
Patenting is a substantial multi-year investment and must be planned and budgeted accordingly. As an example, Figure 2 illustrates a timeline for typical costs of obtaining a US patent. Initial costs include, in large part, the professional costs of a patent agent or attorney for preparing (drafting) the initial application. This example assumes a drafting cost of $10K. There are also official patent office fees for filing the application and associated documentation, for example recording a patent assignment. After filing, there are further professional time costs and official fees relating to examination, prosecution (i.e., providing arguments or amending the application to overcome objections) and, if successful, for issue of a patent. Subsequent annuities, or maintenance fees, are required to keep the patent in force, for a term of up to 20 years from filing.

Costs can be substantially higher if there is an excess number of claims or if complex issues arise (e.g., close prior art necessitating substantial amendments or arguments, an appeal process, or opposition proceedings). Translation costs may be a significant factor for foreign applications. Annuities in some countries increase substantially each year as the patent matures.

Maintenance of a patent for the full term of 20 years is not unusual for biotechnology and pharmaceutical inventions. In other high-tech sectors, where technology lifecycles are shorter, if the invention becomes obsolete or is superseded, a patent may be allowed to expire earlier.

Patents are territorial rights. A patent application must be filed in each region or country where protection is required. While discussion of a foreign filing plan is beyond the scope of this article, most startup companies with limited funding must focus resources on a limited number of countries, for example five key countries where they focus on their core technology or "crown jewels". Instead of filing multiple patent applications in different countries or regions at the outset, a US provisional patent application, or a PCT international patent application may be used to keep options open and defer some of the initial costs, for a limited time.

Figure 2. Cost timeline for obtaining and maintaining a sample U.S. Patent over its 20-year lifetime



Patent Value: A Business Perspective for Technology Startups

Angela de Wilton

Establishing an IP/Patent Plan

Focusing on prototyping and commercialization of a product is critical to business success. However, patenting takes time and effort. It will not be completed on time unless it is budgeted and scheduled as a deliverable in R&D activities. Ideally, a member of the management team should be designated to coordinate IP activities and act as a primary interface with external resources (e.g., to facilitate meetings or communications between a patent agent and inventors).

A patent plan will help to focus resources on features of core technology that differentiate the company's offering from the competition and provide market advantage. Patenting ideas that are peripheral to, or outside, the plan is likely to stretch resources too thinly. Inventive solutions with commercial value typically arise from focusing on a problem to be solved or market need to be addressed, rather than purely academic research. Key patents should relate to distinctive and valuable improvements or features that represent significant competitive advantage.

Quality, Timing, and Content

A well-written patent application with a carefully constructed set of claims and adequate description will stand up to scrutiny, but takes time and effort to prepare, and it costs more. A patent based on a low-cost, or imprecisely drafted, application may not withstand the test of time. Generally, narrow claims that are easily worked around, because there are many alternative solutions, or claims that are insufficiently supported by the description, may have limited value. On the other hand, an incremental improvement and narrower claims to a specific invention may nevertheless have high value in some instances, for example, if the improvement has significant commercial value, solves a longstanding problem, relates to a standards-essential feature, or has wide user appeal relative to other known solutions.

Thus, a valuable patent application requires a careful analysis of the inventive features, problems to be solved or needs to be addressed, how the invention provides advantages, who will make or use the invention, and its potential value to the company and to competitors. Preferably, a tree of claims is constructed, ranging from a high-level, broad claim for key elements of the invention, to more specific narrower claims covering various features of alternative implementations or embodiments that provide advantages over prior solutions, providing a fallback position in case an unexpected prior art reference knocks out one of the broader claims. By considering potential alternatives to the preferred embodiments, claims can be drafted to make it more difficult for a competitor to work around and avoid the claimed invention.

An experienced patent agent will assist in finding a balance between timing and content, in other words, establishing an early priority date in a first-to-file patenting system versus disclosing sufficient information to allow the issued patent to withstand future challenges to validity.

Manage Confidential Information to Avoid Unintentional Loss of IP Rights

One of the most important ways to protect IP, for little or no cost, is to avoid inadvertent or unplanned public disclosure. Release into the public domain, whether by publication, presentation, posting on a website, blogging, discussion with potential customers or suppliers, for example, before a patent application has been filed, can result in a statutory bar (i.e., a total loss of the right to obtain a patent).

A limited grace period for prior disclosure is available in only a few countries (notably Canada and U.S.). However, once potential competitors learn about new technology, they can potentially leapfrog with their own legitimate improvements on the original invention. Non-disclosure agreements (NDAs) may be used to maintain confidentiality and protect rights if disclosure to third parties is necessary for good business reasons.

Care must also be taken in communications under an NDA with respect to *receiving* confidential information from the other party. Any use of such information must respect existing agreements or IP rights.

Ownership Matters

Last, but not least, patent rights can be asserted only by the rightful owner(s) of the patent. It is critical to ensure that assignments of rights to inventions and subsequent patent applications are properly executed. For example, inventors may initially apply for patents and transfer ownership through an assignment to the company. Investors in a startup company will almost certainly require that the company has clear ownership of

Patent Value: A Business Perspective for Technology Startups

Angela de Wilton

any patent applications or patents in the portfolio. Just as a real estate lawyer will conduct a title search for purchase of a home or other real property, a prospective investor or licensee will conduct a search and analysis, known as "due diligence", to check that there is a proper chain of title from the inventors to the current owners through one or more assignment documents. These assignments must be consistent with agreements, such as employee/employer agreements, contractor agreements, and joint R&D agreements.

When a new company is founded by a group of inventors, formal employee or contractor agreements with assignment of IP rights may not exist. Sometimes these issues are overlooked or agreements to assign IP to the company may not be formalized in writing until later. Oral agreements may be difficult to enforce if there is a parting of ways, a founder-inventor leaves, or memories fade in less favourable circumstances. Joint ownership can also significantly dilute potential value. Any of these scenarios can lead to ownership issues that are difficult to correct retroactively and/or can significantly jeopardize rights to exploit the invention or enforce patents (Ball, 2008; http://tinyurl.com/7ez9bf6).

It is not uncommon for inventors from different countries or organizations to collaborate. However, there may be significant differences in the laws of other countries relating to employer/employee rights in inventions and rights of joint owners of inventions. These differences must be taken into account when applying for a patent, in assignment of ownership, and eventually, in enforcing rights.

Writing clear agreements on IP ownership and promptly executing assignments for each patent application are important first steps in protecting and enforcing patent rights.

Conclusion

For most technology startups, with a few exceptions, patents represent a key corporate asset and commercial tool. By considering patents and IP strategy at the outset, in the context of the overall business plan, the focus for decision making shifts from cost constraints to value opportunities. A patent activity plan helps to provide focus for protecting core technology, effective management of long-term patenting costs, protection of confidential information, and matters of ownership and assignments. A well-timed plan enables value or revenue generating opportunities to be recognized at the appropriate moment.

Recommended Reading

World Intellectual Property Organization (WIPO)
www.wipo.org
- e.g. Resources for SMEs: http://tinyurl.com/ozuobd

Canadian Intellectual Property Organization (CIPO)
www.cipo.gc.ca
- e.g. A guide to patents: http://tinyurl.com/dk9cpf

United States Patent and Trademark Office (USPTO)
www.uspto.gov
- e.g. Patent process: http://tinyurl.com/34ealwm

Licensing Executives Society (USA and Canada)
www.lesusacanada.org
- e.g. The Basics of Licensing: http://tinyurl.com/6nmbg7r

About the Author

Angela de Wilton holds a B.Sc. Honours (Chemical Physics) from the University of Bristol, England, and a Ph.D. from Carleton University in Ottawa, Canada. She is registered as a Patent Agent by the United States Patent and Trademark Office and the Canadian Intellectual Property Office, is a Fellow of the Intellectual Property Institute of Canada, and is a member of the American Intellectual Property Law Association and the Licensing Executives Society. Angela is a founder of de Wilton IP Inc., which assists small to medium-sized technology companies in developing an IP strategy and building and managing a cost-effective patent portfolio. Angela draws on past experience in the Nortel IP Law department developing IP Strategy, and as Director of Intellectual Property, where she was responsible for a global patent program and supported patent licensing and litigation programs. Angela has also been involved in patent agent training, management development programs and has prior postdoctoral industrial R&D experience.

Citation: de Wilton, A. 2011. Patent Value: A Business Perspective for Technology Startups. *Technology Innovation Management Review.* December 2011: 5-11.

Patents to Exclude vs. Include: Rethinking the Management of Intellectual Property Rights in a Knowledge-Based Economy

Patrick Cohendet and Julien Pénin

> *"[Patents] are, in the conditions of the perennial gale, incidents, often unavoidable incidents, of a long-run process of expansion which they protect rather than impede. There is no more of paradox in this than there is in saying that motorcars are traveling faster than they otherwise would because they are provided with brakes."*
>
> Joseph Schumpeter (1883–1950)
> Economist and Political Scientist

Traditional patent theory emphasizes the importance of patents for excluding imitators. This view is far too restrictive and is at odds with many empirical and theoretical works. Therefore, we propose an analysis of patent management that considers the properties of knowledge-based economies explicitly. Patents are thus shown to be critical instruments for coordinating innovative activities between firms. They not only exclude potential infringers, but also "include" all the heterogeneous stakeholders of the innovation process. Patents facilitate coordination via two mechanisms: they encourage the emergence of markets for technology (market coordination) and they play an important role in formal and informal inter-firm collaboration (non-market coordination). We also link firms' patenting strategy with the characteristics of the technological regime of their sector.

Introduction

The traditional economic framework considers invention as an individual, isolated act and therefore emphasizes the importance of patents to exclude imitators and preserve individual incentives to invent (Arrow, 1962; http://tinyurl.com/7n4rg2y). However, this view is far too restrictive and runs counter to most of the empirical and theoretical research conducted in the past three decades (Levin et al., 1987: http://tinyurl.com/mwwegm; Cohen et al., 2000: http://tinyurl.com/8ynxuzw).

Empirical studies unanimously suggest that firms do not consider patents to be efficient devices for excluding infringers and protecting inventions. Nonetheless, more and more patents are issued each year. It is therefore paradoxical that the more firms criticize the efficiency of patents as tools of exclusion, the more they apply for patents (Kortum and Lerner, 1999: http://tinyurl.com/7x99zjz; Bessen et al., 2007: http://tinyurl.com/7lsh8p6).

The only way to escape this paradox is to shift the focus from the traditional economic framework and embrace a wider framework that would consider the properties of knowledge and innovation more explicitly. This new framework specifies a dual role for patents: patents can increase incentives to innovate but they can also mitigate the specific coordination difficulties linked to open innovation (Chesbrough, 2003; http://tinyurl.com/ce6bsy8). According to the principles of open innovation, it is fundamental for firms to exchange knowledge and technologies and to collaborate formally and informally. However, this exchange and interaction process is complicated by the properties of knowledge (its tacit dimension, for instance) and by the existence of information asymmetries. In other words, a firm willing to develop an open innovation strategy is likely to encounter problems in the search for partners and the exchange of knowledge and technologies. The patent system can help solve those coordination problems. We show that, according to the context, the main role of the patent system is not to effectively exclude rivals but to "include" all the stakeholders in the innovation process.

The remainder of the paper is organized as follows. We first discuss the role of coordination of patents; in particular, we distinguish market and non-market coordination. Next, we provide an analytical framework to

Patents to Exclude vs. Include: Rethinking the Management of IPR

Patrick Cohendet and Julien Pénin

explain when patents should be used primarily to rather include than exclude. We conclude by suggesting avenues of future research.

Patents as Instruments of Coordination

Patents facilitate interactions among actors in the innovation process because they hold two important properties concurrently: they both protect and disclose an invention. The coupling of these two properties allows patents to ease interactions among innovators at two levels: first, they facilitate technology transfer through the exchange of licenses on markets for technology (market coordination) and second, they play a key role in framing collaborations and alliances (formal and informal) among heterogeneous organizations (non-market coordination).

Market coordination: patents to favour technology trading
Patents help technology and knowledge trading on markets for technology (Arora et al., 2001: http://tinyurl.com/cj8kwrq; Arora and Gambardella, 2010: http://tinyurl.com/7vdzqrm) (Box 1). The combination of the two properties of protection and knowledge disclosure notably favours indeed sustained market trading of technologies. The disclosure of knowledge allows technology sellers to signal and to advertise their products, whereas the protection granted by the patent system also prevents buyers from free riding. In other words, the patent system softens Arrow's paradox (1962), thus favouring the transfer of both codified and tacit knowledge in markets for technology.

By supporting the formation of markets for technology, patents induce the development of a new type of firm specialized in knowledge production (Arora and Merges, 2004; http://tinyurl.com/6qebd73). One of the main assertions of classical economic theory is that markets entail division of labour and vertical specialization. Thus, markets for technology support the emergence of fabless firms (or technological firms) that work upstream in the production of new technology that they then transfer to manufacturing firms, located downstream on the value chain. The latter use those technologies in their products. This new industrial organization has major positive normative implications: it facilitates the division of labour and allows each firm to specialize where it is most efficient. It also enhances the distribution of technologies, which ensures that innovations are used by those that can generate the most value from them. Finally, it prevents costly duplication of research.

Box 1. Markets for Technology

Even in presence of patents, the emergence of markets for technology is not straightforward because there are still major obstacles to such markets (Teece, 1986; http://tinyurl.com/7s43qsg). To respond to a need for lower transaction costs on technology markets, new actors have recently emerged – such as Innocentive (http://innocentive.com), Yet2.com (http://yet2.com), and Ocean Tomo (http://ocean-tomo.com) – often assisted by new information and communication technologies. The role of those patent brokers is to organize and facilitate exchanges between technology sellers and buyers. To do so, they provide technical assistance, audit, and perform diagnostic tests to assess the value of a given technology. Most importantly, they facilitate the circulation of information (Yanagisawa and Guellec, 2009: http://tinyurl.com/7usbboy; Dushnitsky and Klueter, 2011; http://tinyurl.com/7g4fvat).

Patents are not always exchanged for money. They can also be used to barter for other patents (within cross-licensing agreements). Patents are often used defensively as bargaining chips to protect their holders from uncertain and risky lawsuits and to acquire the right to use specific technologies, thus preserving the freedom to operate (Grindley and Teece, 1997: http://tinyurl.com/ccso2v3; Rivette and Kline, 2000: http://tinyurl.com/bv4lcr6). For instance, in complex technological sectors, innovation typically combines several technologies. Its implementation often requires the combination of several overlapping patents. In such a case it is likely that the patent held by one individual infringes several other patents, and vice versa (thus, freedom to exclude and freedom to use do not converge). Anticipating such situations, firms are induced to gather large patent portfolios that serve as "legal bargaining chips" (Hall and Ziedonis, 2001; http://tinyurl.com/7bzmqvt).

Non-market coordination: patents to collaborate and form alliances
Even more than as a defensive tool aimed at protecting its holder against legal attacks or negotiating better licensing agreements, patents can be used in an explicitly cooperative manner. For isolated actors who need to collaborate, a patent can be a way to signal the abilities of the holder and to negotiate partnership agreements. In this case, patents intervene fairly early in the

Patents to Exclude vs. Include: Rethinking the Management of IPR

Patrick Cohendet and Julien Pénin

innovation process and their role goes beyond merely allocating existing resources. They help to structure formal or informal collective modes of knowledge creation (networks, research consortium, research joint venture, informal exchanges, etc.). A patent can be of use during several steps in the collaboration process between different organizations.

First, as stated before, in the early stages of collaboration, patents can allow actors to signal their competencies, thus mitigating the problems of incomplete information and facilitating the search for a partner. They also tend to reduce the risks linked to cooperation caused by free riding by one of the partners (Ordover, 1991; http://tinyurl.com/85lr829), therefore increasing the incentives to participate in the venture. Patents can also play a key role when determining the terms of the collaboration. They allow the skills of each partner to be assessed (i.e., they provide a benchmark that enables firms to compare their relative strengths). Without patents, firms would find it more difficult to evaluate their relative abilities and consequently to agree on the terms of the collaboration. Patents also allow firms to enforce their claims because they represent a credible threat that could block an agreement. In this sense, patents are central devices in determining the bargaining power of each party. After the collaboration, patents may also be used as instruments for sharing the outcome of the collaboration, through a joint application, for instance (Hagedoorn, 2003; http://tinyurl.com/725zu6c).

A peculiar case of the use of patents to foster collaboration is when a firm uses the patent system to release a technology free of charge (or at almost no cost). In such cases, firms use patents not to exclude imitators but to foster the large-scale distribution and use of the technology. An example of this sort of open-patent strategy can be seen in network industries when firms seek to benefit from network effects of standard implementation. In this case it is most important for firms to distribute their technology widely, which may require releasing it for almost free (Corbel, 2003; http://tinyurl.com/7vfjnmr). Here, firms use patents to try to impose the use of their own technology rather than to prevent its use. (Note: This is in contrast with scientific publication, which might also lead to broad dissemination of the technology but at a lower cost. A patent has the advantage of allowing control of improvements.) Another example of this peculiar use of the patent system lies in open-source utilization of intellectual property. It is indeed possible to use the patent system in a copyleft way (i.e., not to exclude but to prevent exclusion and to secure open access to the knowledge base) (Pénin and Wack, 2008; http://tinyurl.com/826npmq).

To conclude, reconsidering the properties of the innovation process entails rethinking the role of patents. In parallel to their traditional role as tools of exclusion an equally important second role is emerging: to coordinate actors in the innovation process. Initially construed as being designed to reward the independent innovator, industrial property is consequently viewed as a structuring element of open innovation, to use the now-famous terminology of Chesbrough (2003; http://tinyurl.com/ce6bsy8).

An (Exploratory) Analytical Framework for Understanding the Diverse Roles of Patents

Because a patent is a flexible instrument that can be used either to exclude or to include, choosing the optimal patenting strategy for the firm is a central issue. When should firms rely on exclusive strategies versus more collaborative ones? This choice is largely influenced by the technological regime of the sector (Nelson and Winter, 1982; http://tinyurl.com/7mf2v7s). Obviously, the nature of the firm (its size, experience, etc.) and the nature of the competitive regime might also influence the patenting strategy. For instance, small firms are less able to rely on exclusive strategies because they need to collaborate with holders of complementary assets. Nonetheless, those conditions matter less than the nature of the technology. Table 1 summarizes the effect of the technological regime's characteristics on firms' optimal patenting strategies.

The tacit versus codified nature of the knowledge base
The more codified the knowledge, the easier it is to exchange it voluntarily (via market arm's length transactions) or involuntarily (via spillovers) (Teece, 1986; http://tinyurl.com/7s43qsg). Therefore, when the knowledge base is highly codified, firms mostly tend to use patents in the traditional way either to exclude competitors and to secure a monopoly position on their product market, or to trade their invention on technology markets. Conversely, the more tacit the underlying knowledge, the more difficult it is to transfer and exchange, and therefore the more firms will be tempted to use patents to foster collaboration with suppliers, rivals, etc.

Emerging versus stabilized situations
This distinction encompasses the tacit vs. codified dimension discussed above but cannot be limited to it.

Patents to Exclude vs. Include: Rethinking the Management of IPR

Patrick Cohendet and Julien Pénin

Table 1. The influence of the technological regime on the optimal patenting strategy

Characteristics of technological regime*	Impact on patenting strategy
Tacit knowledge base	Makes imitation and communication harder *Favours the non-market coordination role of patents*
Codified knowledge base	Facilitates imitation and technology exchanges *Favours an exclusive role or a market coordination of patents*
Emerging (versus stabilized) technology	Increases the need to build shared codes and common knowledge base *Favours the coordination role of patents*
Complex (versus simple) technology	Reduces the freedom to operate *Favours a defensive use of patents*
Modular (versus integrated) technology	Increases the division of labour of inventive work *Favours the coordination role of patents*
Existence of network effects	Increases the gains linked to the diffusion of the technology *Favours an open and non-exclusive use of patents*

*Note: The characteristics in this table are not ordered by importance. The effect of each characteristic must be interpreted *ceteris paribus*.

Winter (1993; http://tinyurl.com/6rntnzz) underlined the fact that aggressive use of patents may generate inefficiencies during the first phases of the innovation process, when a pool of innovators explores a new trajectory. Winter's argument referred to an important issue that has been widely neglected to date, and which deals with the distinction between emerging and stabilized phases of innovation introduced by Callon (1999; http://tinyurl.com/7zjyj79). For Callon, it is important to distinguish two phases within the innovation process: an emerging phase, during which knowledge is mostly tacit and uncertainty at all levels prevails, and a stabilized phase, during which knowledge has been codified and market and technology perspectives are clearer. Within such a framework it is apparent that the aggressive use of patents to exclude rivals occurs mostly in stabilized phases. Conversely, in emerging phases, the need to build a common knowledge base is strong and therefore collaboration strategies tend to supersede strategies of exclusion. Thus, the primary aim of actors is to collaborate and to find partners, which induces them to use patents accordingly. However, as innovations become more mature and situations are stabilized, the importance of patents as instruments of exclusion increases.

The simple versus complex nature of the technology base

This dimension fundamentally affects firms' patenting strategy because it deals with the freedom that patent holders have in the use of their patent rights. The distinction between complex and simple technologies is linked to the difference between the right to exclude infringers, which is the right given by a patent, and the right to use a technology. When a technology is simple (mono-component) those two rights converge. In other words, the patent holder has the right to use the patented invention (this use does not infringe other patents). (An example of a simple technology can be found in chemical-based technologies. A molecule, for instance, is usually protected by one single patent. A pharmaceutical company that has a patent on a molecule can therefore exclude infringers and use its monopoly power

Patents to Exclude vs. Include: Rethinking the Management of IPR

Patrick Cohendet and Julien Pénin

over the medicines based upon the protected molecules. Rivals can thus be excluded.) When a technology is complex (multi-component), however, it is possible (and sometimes likely) that those two rights do not correspond (i.e., a patent holder cannot use his invention because by using it, it infringes patents held by other firms.) Hence, complex and simple technologies induce very different strategic behaviours with respect to patents (Grindley and Teece, 1997; http://tinyurl.com/ccso2v3). As Kingston (2001; http://tinyurl.com/czhllg7) asserts, in complex sectors, firms tend to use patents defensively (to secure operating freedom) while in simple sectors, they tend to use patents offensively (to exclude imitators).

The existence of network effects

Network industries are characterized by specific patenting strategies. Given that the value of the good increases with the number of users, it is critical in those industries to achieve compatibility and to implement a standard, ideally a unique one (Cusumano and Gawer, 2002; http://tinyurl.com/cze2tdo). However, to implement a standard, firms must provide open access to their technologies. Secrecy and exclusive behaviours are inefficient strategies if the goal is to ensure compatibility. Hence, in network industries, patent holders have strong incentives to use their patent in an open, non-exclusive way to foster the adoption of their invention and to increase its chances of becoming the industry standard (Corbel, 2003; http://tinyurl.com/7vfjnmr).

The modular versus integrated nature of technology

Linked to the former point, the modular nature of a technology also affects the optimal patenting strategy. Basically, when a technology is highly modular, actors in the innovation process benefit greatly from maximally decentralizing the production process to derive the specialization gains that arise from the division of labour (Brusoni and Prencipe, 2001; http://tinyurl.com/coapzg7). In those cases, where firms are highly interdependent, compatibility issues are again prevalent and firms might have strong incentives not to use their patent portfolio to exclude but rather to coordinate this collective innovation process. The case of genetically engineered vaccines analyzed by Bureth and Pénin (2007; http://tinyurl.com/ctest7p) is particularly illuminating.

Conclusion

This work proposed a new framework for understanding the way firms manage their patent portfolio in a knowledge-based economy. A patent is not a tool dedicated solely to the exclusion of potential imitators. It is also used to facilitate coordination and interaction among the actors in an industry. This point has been emphasised by many authors in the field of innovation and knowledge (Teece, 1986: http://tinyurl.com/7s43qsg; Mazzoleni and Nelson, 1998: http://tinyurl.com/bml2pbk; Jaffe, 2000: http://tinyurl.com/cj9y6ej; Chesbrough, 2003: http://tinyurl.com/ce6bsy8) but has largely been underestimated in the "traditional" economic and managerial literature.

Our analysis, although it will need to be improved upon, provides insight into the main differences in patenting behaviours across industries. Pharmaceuticals, electronics, software, networks, and aeronautics all rely on very different technological regimes, which largely explains their disparate patenting strategies.

This view of patents as an instrument central to resolving coordination problems in the early stages of the emergence of a technology has many implications for management sciences. Here are some "hot spots" on which our work may shed new light: first, firms must adapt their intellectual property strategy to their business context. A winning strategy in one specific context (a strategy of exclusion, for example, to protect the market of a blockbuster drug) may have disastrous consequences in another context (the birth of a new technology). Second, because contexts may change, firms must be willing to re-evaluate their intellectual property strategy from time to time. In particular, a strategy of coordination that has been successful in emerging phases may have to be changed to a strategy of exclusion as the situation becomes more stable. Third, practitioners who want to develop open innovation strategies must not neglect the issue of intellectual property are a central element of such a strategy. Open innovation does not mean innovation without patents; on the contrary (Laursen and Salter, 2006: http://tinyurl.com/ct9t9wo; West, 2006: http://tinyurl.com/cfgvgk; Lichtenthaler, 2010: http://tinyurl.com/d9kwoc2).

Finally, from a policy-maker perspective, our view of patents leads to prefer a US patent system with its one-year grace period rather than a system without such grace period. The existence of a grace period enables inventors to signal their invention at an early phase, thus favouring interactions, exchanges, and a collective development of inventions while the European system, without such a grace period, induces inventors to preserve secrecy, thus impeding such a collective dynamics.

Patents to Exclude vs. Include: Rethinking the Management of IPR

Patrick Cohendet and Julien Pénin

About the Authors

Patrick Cohendet is Professor of Economics at HEC Montréal business school in Canada. He was previously a professor at the University of Strasbourg, France. His research interests include the economics of innovation, technology management, knowledge management, theory of the firm, and the economics of creativity. He is the author or co-author of 15 books and over 60 articles in refereed journals. He has conducted a series of economic studies on innovation and economics of knowledge (measurement of spin-offs, evaluation of the economic benefits of R&D projects, evaluation of technology transfer, etc.). These studies were carried out by his research laboratory BETA of the University of Strasbourg, and MOSAIC at HEC Montreal for different European and North American organisations such as the European Commission, the EU, OECD, Council of Europe, and the Canadian Space Agency.

Julien Pénin is Associate Professor at the University of Strasbourg, France, and is a researcher at BETA (Bureau d'Economie Théorique et Appliquée). His research interests include economics and management of patents, open innovation, and open source innovation. He has authored and coauthored over 20 articles in refereed journals. Julien also teaches economics and management of innovation and intellectual property rights at the department of economics and management of the University of Strasbourg.

Citation: Cohendet, P. and J. Pénin. 2011. Patents to Exclude vs. Include: Rethinking the Management of Intellectual Property Rights in a Knowledge-Based Economy. *Technology Innovation Management Review.* December 2011: 12-17.

Software Patents: Current Challenges and Future Solutions

Monica Goyal

> *We petition the Obama administration to:*
>
> Direct the Patent Office to Cease Issuing Software Patents
>
> *The patent office's original interpretation of software as language and therefore patentable is much closer to reality and more productive for innovation than its current practice of issuing software patents with no understanding of the patents being issued.*
>
> *Under the patent office's current activity, patents have become a way to stifle innovation and prevent competition rather than supporting innovation and competitive markets. They've become a tool of antitrust employed by large companies against small ones.*
>
> *To return sanity to the software industry – one of the few industries still going strong in America – direct the patent office to cease issuing software patents and to void all previously issued software patents.*
>
> Signed by 14,862 US citizens
> http://tinyurl.com/3u72683

Software patents for years have been used in the software industry to suppress innovation, kill competition, and generate undeserved royalties. This article considers whether software patents maintain the right "bargain between the inventor and the public" where, in exchange for disclosure of the invention to the public, the inventor receives a limited monopoly and the exclusive right to exploit the invention. This article argues that they do not and then explores possible solutions to address the problems identified. Those solutions include streamlining the patent process, making it more difficult to patent software innovations, making it easier to invalidate software patents, and shortening the patent protection from 20 to 10 years. The article closes with a call to action for people to work collectively to effect change in the industry.

Introduction

We have lost sight of the true meaning and purpose of patents. Patents were created in order to encourage innovation, not kill it. They were meant to protect the inventor, not further strengthen those with power. Patents have instead been used for years now in the software industry as a blunt weapon to suppress innovation, kill competition, and generate undeserved royalties. It is time to revisit the value of patents as they relate to software and test some of the policy reasons for awarding patents in the software context.

A patent is a "bargain between the inventor and the public" (*Free World Trust v. Électro Santé Inc., 2000*; http://tinyurl.com/cjvksfj) where, in exchange for disclosure of the invention to the public, the inventor receives a limited monopoly and the exclusive right to exploit the invention. The patent is a way for the inventor of a new device or method to reveal that device or method to the public so that, through the sharing of new ideas, other inventors, businesses, researchers, and academics can make developments in their own fields. In exchange for disclosing the fine details of their invention, the inventor receives the right to stop others from making, using,

Software Patents: Current Challenges and Future Solutions

Monica Goyal

or selling that invention for 20 years. It is said that, without the possibility of patent protection, people would not take the risk of time and money to create new products. The rights granted under a patent are very powerful, and when viewed against our free trade, or free economy principles, the effects are said "to take away free-trade, which is the birthright of every subject" (*Free World Trust v. Électro Santé Inc.*, 2000).

A common criticism regarding software patents is that software is not meant to be patentable and is not an invention as defined in the *Patent Act* (http://wikipedia.org/wiki/Patent_Act_(Canada)). Other critics claim that identifying software components that are novel or not obvious is difficult. Others state that the investment of time and cost is too small to warrant the quid pro quo of the monopoly granted with a patent. Still others point to the royalty and legal costs and the escalating restraints on trade to argue against the patenting of software.

Despite the admirable policy reasons underlying the *Patent Act* and the desire to award inventors with protection, the act currently fall short of its goals. Further, the implementation of the system is susceptible to manipulation. In this paper, we will first consider the patentability of software, then the costs of patent protection, the importance given to software patents by inventors, and the limits and consequences of the patent system. We will then canvas solutions and discuss the strengths and weaknesses of those proposals.

The Patentability of Software

The primary technical objective of the patentability of software is whether it qualifies as an invention as defined in the *Patent Act*; that is, any new and useful improvement or "any new and useful art, process, machine, manufacture or composition of matter" (http://tinyurl.com/c3vh9fp). Not all innovations or inventions are accorded patent rights. For example, mathematic algorithms, scientific theorems, and designs are not patentable. The difficulty is that a software program can use complex systems to emulate what would be physical processes or a machine, and thus it can become difficult to determine whether to classify the software program as a new invention or an algorithm or a design. The machine-or-transform test articulated by the US Courts and confirmed in *In re Bilski* (http://tinyurl.com/bqvk5wj) asks whether the software is tied to a machine that is not trivial or not conventional, or whether the software transforms an article from one thing to another. This kind of test highlights the difficulty the courts have in trying to draw a line between software as a patentable invention versus software as a design or concept.

Patents are Expensive

To play the patent game, one needs to have money. The cost of filing patents is estimated at $5,000 to $15,000 (Quinn, 2011; http://tinyurl.com/c6bus3m), where software patents tend to cost closer to the higher end of the spectrum. The cost of patent litigation is estimated prior to a trial at $1 million, and for a full patent defence, $2.5 million (http://tinyurl.com/3wj69c6).

Often, inventors starting out have very little capital. For example, a startup with even $100,000 in seed money that then pays $10,000 to $15,000 for patent protection has to make extremely difficult financial tradeoffs to do so. Not surprisingly, a survey of 1332 early-stage technology companies found that only 24% of software startups filed a patent (Graham et al., 2009; http://tinyurl.com/m9x65h). The most vulnerable are unable to afford patent protection, let alone file for a patent in the first place.

Those startups that do patent will often dream up ways to decrease costs. As a result, they may only file a provisional patent or fail to conduct an exhaustive patent search. In the latter case cutting corners can have significant impact on the effectiveness or "strength" of the patent and its enforceability.

Enforceability is where the real problem lies. A patent is not worthwhile unless you can enforce it. The cost of litigation is staggering. The only companies that can afford to enforce patents are those with deep pockets, and that very rarely describes a software startup, even if backed by venture capital. Very few companies can afford to defend a patent, and, as a result, many businesses weigh the costs and decide to pay the royalties demanded, even for what may be an invalid patent. To make matters worse, even the whiff of patent infringement is enough to quash a merger, acquisition, or business venture, which provides further incentive to pay royalties.

Software Patents: Current Challenges and Future Solutions

Monica Goyal

Innovate First and Patent Last

A reason for awarding patents and the ensuing monopoly is that "without the possibility of patent protection, many people might not take the risk of investing the time or money necessary to create or perfect new products," as stated in the Canadian Intellectual Property Office's "A Guide to Patents" (http://tinyurl.com/bty9vn8). Patent protection is generally an afterthought to engineers or computer scientists in the software industry at small or large companies alike. Instead, rapid prototyping and being first to market are orders of magnitude more important. Furthermore, lack of patent protection does not impede companies from entering a market or competing in that market. For example, consider Facebook's 800 million users, 75% of which live outside of the United States (http://tinyurl.com/356y6s), with users in countries such as India, Turkey, and Brazil. Lack of patent protection has not impeded Facebook from operating and being successful in these countries. Another example can be seen in the mobile app space, where a developer can create an iPhone app that becomes available for download anywhere in the world through Apple's App Store. The lack of patent protection does not stop people from creating and publishing new apps. What these examples highlight is that other solutions, including other business models (as seen in the App Store example or with the freemium model), can be used as effective ways of maintaining a competitive edge, and they can be more effective than patent protection.

There Are More Losers Than Winners

Today, it seems to be common rhetoric that if you are successful, you will eventually be sued. If you have conducted business in this industry for any length of time, you likely know of a company that has become the target of a software patent suit. At times, the persons who come knocking on the door are those whose only business assets are patents - they do not actually make any products. They usually seek some form of royalty from a legitimate business enterprise. Intellectual Ventures, for example, is reported to own 35,000 patents and earned $700M in revenue in 2010 (http://tinyurl.com/3wj69c6). For companies like Intellectual Ventures, the business model is to acquire and protect (and perhaps even sell) patents rather than produce and try to sell the products themselves.

It is Not Just the Patent Troll

Let us consider the bargain again: the inventor receives a patent in exchange for disclosure, but if their patent is invalid (i.e., it does not teach anything that was not known beforehand), then the bargain fails. However, we have a patent system where the cost to invalidate a patent far exceeds the cost of the patent itself. It is no surprise, then, that big companies aggressively patent ideas, even for things incidentally related to their business. Table 1 ranks the top organizations that were granted the most US patents in 2010; the list reads like a who's who of the technology industry. The big companies are just as guilty of heavy-handed tactics, but are surprisingly also victims of the system. For example, in second quarter of 2011, Microsoft earned three times more from Android than from Windows Phone 7 (http://tinyurl.com/3wj69c6). Microsoft thus benefits more from enforcing their patent then from creating a competing product.

Table 1. Organizations with the most patents granted in 2010*

Rank	Organization	Patents
1	IBM	5866
2	Samsung	4518
3	Microsoft	3086
4	Canon	2551
5	Panasonic	2443
6	Toshiba	2212
7	Sony	2130
8	Intel	1652
9	LG	1488
10	Hewlett Packard	1480
11	Hitachi	1447
12	Seiko Epson	1438
13	Fujitsu	1276
14	General Electric	1222

*Data source: United States Patent and Trademark Office: Patenting by Organizations 2010 (http://tinyurl.com/7zp5tm6)

Software Patents: Current Challenges and Future Solutions

Monica Goyal

Solutions

This section examines four possible solutions to remedy the problems with software patents by analyzing the strengths and challenges of each.

1. Make it less expensive

Solution: Streamline the patent process to make the filing and enforcement process less expensive.

Assumptions: This solution assumes that one could devise a simpler, lower-cost filing and dispute resolution system. It also assumes that enough democratic interest could be generated to do so. Furthermore, it assumes that the changes made would not lead to a more cumbersome system than the one we currently have.

Strengths: Such a solution would benefit all patentees, even non-software patents, and it would address a pain point felt by all companies now.

Challenges: The primary impediment to the cost issue is legal fees. There are very few people who have the knowledge and expertise to be a patent agent, and as such they command high rates. Secondly, legislative change may fail to be comprehensive and the sad reality is that this type of change is susceptible to lobbying by those with special interests.

2. Make it harder to patent

In the US and Canada, there have been attempts by the Commissioner of Patents, and the Courts to restrict the number of software patents. Take for example Amazon's "one-click" ordering system patent (http://wikipedia.org/wiki/1-Click#Patent), which was the subject of a patent infringement lawsuit in 1999. Amazon was responding to an "Express Lane" shopping checkout feature implemented by Barnes & Noble and which featured a one-click ordering method. Many programmers cite this as an example of what is wrong with the patent system. On the surface, it seems like an obvious feature to programmers and thus not deserving of a patent. The Commissioner of Patents agreed and the patent was denied (although through a successful appeal to the Federal Court the patent application was sent for a second review).

Solution: Award fewer software patents.

Assumptions: This solution assumes that there are qualified people with the right expertise to make the right decision, or else that there is a set of strictly defined parameters that can be set to aid in the decision-making process.

Strengths: This solution would reduce the number of software patents without taking the potentially untenable position to deny all patent applications.

Challenges: It is not clear that the requisite expertise exists to execute this solution. There seems to be difficulty in establishing consensus between the Commissioner of Patents, the Courts, and Legislatures, as evident by the recent Amazon decision in Canada and the *Bilski* decision in the United States, as described earlier.

3. Make it easier to invalidate patents

Every computer engineer or programmer in the industry has had at some point in their career a moment where they sit back in disbelief that someone somewhere thought to patent something obvious and certainly not novel. To be fair, this may be more a case of clever lawyering than a deficiency with the patent office. Regardless, when someone can play a system to his or her own advantage, that system loses credibility. And once a patent is awarded, it is difficult to invalidate. There was a recent US Supreme Court opinion where Microsoft (with Google and Apple) argued for patent invalidity to be proven through a preponderance of evidence (http://tinyurl.com/748hfp4). What the case does speak to is the "you got a patent for *what!*" effect that even the likes of Microsoft, Google, and Apple are not immune to.

Solution: Make it easier to invalidate patents.

Assumptions: There are many invalid patents awarded, or we can easily assess the invalidity of a patent.

Strengths: This solution would discourage people from filing invalid patents.

Challenges: There is a danger that legitimate patents will be invalidated, especially by those with the financial means to seriously challenge an otherwise valid patent.

4. Decrease patent lifetimes

The length of the monopoly is no longer sustainable in light of the rate of development. Twenty years in the software industry is two lifetimes, maybe three. Fifteen years ago we still listened to music on cassette tapes. It

Software Patents: Current Challenges and Future Solutions

Monica Goyal

was not long before CDs became the standard, then MP3 players, and then downloading music took over. Now we stream music through online services such as Spotify and Pandora. It is clear that 20 years is a long time, and the commercial lifespan of software could be as short as five years. The result is that we allow companies to have a complete monopoly over multiple lifetimes of a device.

Solution: Decrease the lifetime a patent is awarded from 20 years to 5 or 10 years.

Assumptions: Less time is needed to recover development costs.

Strengths: This solution reduces the restraints of trade and the incentives for patent trolls. It also strikes a different balance between the inventor and the public in an industry where the research and development costs may be lower, and where there are concerns over awarding invalid patents.

Challenges: This solution does not address the patentability of software issue or the costs issue related to patents.

Conclusion

The Canadian Patent system is justified by the idea that it promotes research and development and protects an invention. The assumption is that without the quid pro quo of patenting, inventors would not take on the risk of inventing. Instead what we see is that, regardless of patent protection, companies will still create and innovate software products, treating patenting as an afterthought. Those who are most vulnerable actually go without patent protection, and very few can afford the high costs of patent enforcement. In general, the cost of patents is staggering and essentially diverts resources from productive enterprises. We can no longer claim that the Canadian patent system is designed to benefit Canadians. It appears to be only useful to the handful of companies who can afford it. We are crippling innovation in the software industry with our own rules and reducing our competitiveness at a global level. We will need a multi-pronged approach to address reform as it pertains to software and it will have to be a collectively organized effort in order to thwart special interest groups. Because right now the status quo does not serve anyone well.

About the Author

Monica Goyal is a Toronto-based lawyer and a softwarenology entrepreneur who founded My Legal Briefcase (https://www.mylegalbriefcase.com), an online legal service firm focused on small claims court cases. After graduating from her undergraduate degree from the University of Waterloo, where she was a Dean's List Scholar, Monica attended Stanford University, where she earned her Master's degree in Electrical Engineering. Monica also holds a law degree from the University of Toronto. Monica's volunteer work with organizations such as Griffin Centre, Adventure Place, Downtown Legal Services, and Pro Bono Law Canada has given her insight into the accessibility and affordability of legal needs for the marginalized. She developed My Legal Briefcase to empower individuals going to Small Claims Court.

Citation: Goyal, M. 2011. Software Patents: Current Challenges and Future Solutions. *Technology Innovation Management Review*. December 2011: 18-22.

Intellectual Property Rights: Unlocking the Value of this New Asset Class

Daniel J. Henry

> *"Next came the Patent laws. These began in England in 1624; and, in this country, with the adoption of our constitution. Before these, any man might instantly use what another had invented; so that the inventor had no special advantage from his own invention. The patent system changed this; secured to the inventor, for a limited time, the exclusive use of his invention; and thereby added the fuel of interest to the fire of genius, in the discovery and production of new and useful things."*
>
> Abraham Lincoln (1809–1865)
> 16th President of the United States

Discussing the value of intellectual property (IP) has become a common theme in today's mainstream press and is now central to the business strategy of a growing number of technology companies, both large and small, domestically and internationally. This focus on IP and intellectual property rights (IPR) is a trend that has developed over the last several years as a result of a convergence of factors including the growth of the patent monetization industry, ongoing reforms to U.S. patent law, the emergence of China and other countries in the Far East as technology-production hubs, and the advocacy of the "knowledge-centric" economy. In this article, we look at the monetization of patents and the emergence of a vibrant industry based on IPR as a new and highly prized asset class.

Introduction

A patent is a form of intellectual property that consists of "a set of exclusive rights granted by a sovereign state to an inventor or the inventor's assignee for a limited period of time in exchange for the public disclosure of an invention" (http://wikipedia.org/wiki/Patent). National laws and international agreements govern how patents are granted and the extent of the rights conferred. Although details vary widely, patent rules generally require a patent application to describe the invention and to meet requirements, such as novelty and non-obviousness. Successful applicants are granted the right to prevent others from making, using, selling, or distributing the patented invention without permission.

Traditionally, the motivation for obtaining patents has been to protect an invention or innovation. This has been particularly true for startup enterprises. Filing for and securing patents around a product or service has been a necessary step to attracting investment capital. Potential investors did not necessarily understand the nuances of an invention, but they appreciated the exclusivity that a patent granted the holder.

In the last three decades, the driver for obtaining a patent has transformed. A growing number of inventors and companies have come to understand that a patent does not require the owner to practice the invention claimed. As manufacturing has been moved to the Pacific Rim or other low-wage, limited-regulation venues, it has become impractical and uneconomical for many companies to build their own products or develop their own services. The more efficient approach is to recognize the value in your "intellectual capital" and license its use to corporations that have the infrastructure and means of distribution to more efficiently distribute the invention in the worldwide market.

Intellectual Property Rights: Unlocking the Value of this New Asset Class

Daniel J. Henry

In this article, we begin with a brief snapshot of the present day's unprecedented level of IP transactions (i.e., the IP transaction cascade) that has cemented the shift in the role and value of IPR for today's businesses. We then explore historical paths that have led to this transformation and discuss the impact of new "patent paradigms" on the growth and sustainability of businesses today. Interspersed within the article are information boxes to help companies assess the potential value of IP (Box 1), assemble and manage a portfolio (Box 2), and balance the risks and rewards of monetizing their IPR (Box 3).

The IP Transaction Cascade

The focus on IP is a new trend that is perhaps best exemplified by the 2011 sale of the Nortel patent portfolio for an unprecedented $4.5 Billion (http://wikipedia.org/wiki/Nortel). Undertaken by a consortium of technology companies led by Apple, Ericsson and Microsoft, the purchase had an immediate catalyzing effect in the market. Noted investor Carl Icahn urged Motorola Mobility to investigate selling its patent portfolio. Within weeks, Google made a $12.5-billion bid for the entire company (http://wikipedia.org/wiki/Motorola_Mobility), the presumed impetus being Motorola's portfolio of 17,000+ patents. Kodak engaged Lazard Ltd., the financial advisory and asset management company that had advised Nortel on its patent sale, to help with a potential sale of 1,100 imaging patents (http://tinyurl.com/d46oepq). This cascade of IP-based transactions would have been inconceivable even a decade ago. What has changed and how can IPR holders benefit from this transformation?

Historical Paths: Corporations and Inventors

To understand how to unlock the value of today's IPR, it is necessary to take a look back at the last several decades. The growing prominence of patents in the current business landscape is the result of the convergence of two distinct historical paths: one corporate-led, the other inventor-led.

From a corporate standpoint, IBM and the development of its intellectual property rights group in the late 1970s was pivotal to considering patents as assets with revenue potential. The break-up of "Ma Bell," the AT&T-led system that was broken up into separate companies and regional phone systems by a U.S. Justice Department mandate in the early 1980s, is another important corporate example (http://wikipedia.org/wiki/Bell_System_divestiture). Ma Bell owned a voluminous patent portfolio developed by its R&D centre, Bell Labs. As a monopoly, Ma Bell was prohibited from generating value from its IPR. After its dismantling, AT&T – and, later, a number of its spin-offs, notably Lucent Technologies – began securing patent licenses and royalties from companies in Silicon Valley, the Pacific Rim and Europe that were using Ma Bell's patented technology by incorporating it into their own products. These licensing agreements generated hundreds of millions of dollars.

Box 1. How to assess the potential value of IPR

The question of how the value of intellectual property can and should be measured is the subject of great interest and debate. A compelling, yet frustrating aspect of IPR is that there is no agreed upon process by which to quantify their value.

Differing technologies aside (e.g., for life sciences, physical sciences, medical devices, information technology), it is challenging within the same technology silo to properly value IPR. This is because each asset has *unique* features that make it patentable and distinct from its predecessors, at least theoretically. By focusing on the business objective of the exercise, the path ahead can be more easily defined.

The most straightforward method of gauging whether your IPR assets have value in the present or near term is to conduct a review to evaluate specific claims against the marketplace. Critical features of this assessment include the market, its size, and the technology; your IPR's competitive advantage or disruptive quality; and the impact of your IPR on the competition.

If you have the in-house capability to manage this review and have built your IPR in a pro-active and informed manner, this project should go quickly and yield positive results. Otherwise, engaging an outside professional is the logical next step. The optimum choice is a group or individual that brings expertise in your technology area, a broad understanding of the patent monetization process, and a willingness to create a program that is tailored to your specific needs.

Intellectual Property Rights: Unlocking the Value of this New Asset Class

Daniel J. Henry

In terms of the impact of individual inventors on patent value, Jerome Lemelson's assertion licensing program, which was initiated in the mid-1980s, is compelling (http://wikipedia.org/wiki/Jerome_Lemelson). Lemelson was a "garage" inventor who developed a portfolio of patents that anticipated a number of technologies that later became widely deployed (e.g., bar codes). He exploited the rules of the U.S. patent system to generate a portfolio that grew in potential value as market adoption of his inventions increased. Lemelson partnered with Jerry Hosier, an astute attorney from Chicago, Illinois, to monetize his IPR assets. Together, along with an excellent support team, they proceeded to generate over $1 billion dollars in settlements and licensing fees from companies that were infringing certain patents in the Lemelson portfolio. The success of the Lemelson program provided the impetus for other similarly situated inventors and patent owners to explore ways to generate revenues from their IPR. What these corporate and inventor programs had in common was success in generating revenues from their intangible assets. Patents were no longer just a plaque on the wall – they had become dynamic assets.

IPR Emerges as a Distinct Asset Class

The past decade has seen the monetization of patents expand and grow into a highly viable industry. New types of companies called non-practicing entities (NPEs) emerged. NPEs focused not on product development and commercialization, but on various aspects of IPR and how to foster and monetize these assets. Thought leaders in the intellectual property community and professional investors began discussing IPR as a distinct asset class. A number of articles posited how the value of trans-national corporations was mainly captured in their intangible assets (patents, copyrights, trade secrets and branding). Corporations established IPR groups as profit and loss centres, inspired by the licensing successes of IBM and AT&T. This paradigm shift meant a company's IPR departments could no longer count on access to the "general treasury" to fund the development, prosecution, and maintenance of the company's patent portfolio. Instead they had to fund their activities by monetizing the IPR assets they had already developed. Companies that adapted and became successful at this new approach included GE, Honeywell, Siemens, and Philips.

Simultaneously, the number of NPEs defending their patent rights increased and began to coalesce around a specific Federal District Court in Eastern Texas. This court adapted specific rules of discovery for patent litigations, establishing a timeline that provided IPR owners with the certainty that their allegations of infringement would likely be heard by a jury within 12 to 16 months. This clear path to a resolution provided tremendous leverage to the NPE and produced settlement agreements without having to go to trial.

These agreements did not go unnoticed by financial investors. A number of private equity groups and larger hedge funds were intrigued by the opportunity IPR presented and created specific entities to invest in or purchase patent assets. These entities had differing investment philosophies, but each one centered on how to invest in and generate returns from IPR. Collectively, they attracted several billion dollars in investment capital.

This pool of capital had an immediate effect on the patent market. The baseline value of patents began to increase. Patents that were possibly infringed became valuable. Patents that had the potential to read across widely deployed technologies, such as semiconductors or wireless phones, were even more valuable. Patents with claims that read on specific industry standards, such as CDs, MPEG, JPEG, DVDs, and "802" CDMA technology, were considered the most valuable. Companies selling products or services based on industry standards had little choice but to negotiate a license with the IPR owner.

Economic Downturn Creates New IPR Paradigms

The global economic collapse of 2008 slowed the growth of the IPR asset market. The bubble that had developed in IPR valuation burst, and the market went into stasis for the next year. While a number of experts predicted the demise of the patent monetization market, an unexpected turn of events resulted in two paradigm shifts that minimized the effect of the downturn in the IPR market and bolstered large corporations and startups alike.

In the midst of the downturn, large corporations found themselves in need of more revenue. Management was under growing pressure to find additional revenue streams to bolster the bottom line and to boost cash reserves as the economy continued to spiral downwards. Prior to the downturn, many large companies had characterized IP licensing as an unfair and exploitive nuisance – one that cost them billions of dollars in legal fees. In the face of dwindling product revenue, however, they arrived at an unexpected solution to their fiscal challenge: monetize the largely fallow assets

Intellectual Property Rights: Unlocking the Value of this New Asset Class

Daniel J. Henry

Box 2. How to assemble and manage a portfolio

Building, maintaining and monetizing IPR is as vital to the health of an organization as building products or services, and in a growing number of cases even more so. Therefore, when assembling a portfolio of intellectual property it is of paramount importance to establish and execute an effective process. This critical component of building a portfolio is often underestimated.

Hardwire IPR into strategy and operations
A key pillar in developing your IPR is to engage knowledgeable professionals who are abreast with technology, industry, and patent monetization developments. Hiring an experienced IPR manager or Chief Intellectual Property Officer (CIPO) is a good first step. An internally managed program is optimal because the IPR manager is engaged in the daily operations of the business and compensation can be structured to reflect the development of the IPR program. As a member of the management team, an IPR manager is immersed in the company's strategy and operations, which ensures the IPR program is in lock-step with business objectives while at the same time supporting innovation.

Further, by interacting with the IPR development team, the IPR manager has access to broader ideas that can be maintained as potential trade secrets or that can be included in future prosecution filings. To expand the portfolio and enlarge its footprint, this internal data flow can be coupled with external research, including: monitoring the United States Patent and Trademark Office (http://uspto.gov) and other patent offices to stay abreast of patent filings in your technology space; reviewing technology and trade journals; and participating in standards organizations, to name a few.

Build an expansive portfolio
A balanced portfolio needs to have an accordion quality: narrow in places to protect and expansive elsewhere to capture broader technology developments. A company's management team must acknowledge that "their solution" may not be the one that wins. Having an expansive IPR platform provides the opportunity for another revenue channel as you license those IPR assets that capture the technology that has won the market. Contrary to common practice, by which technology companies focus only on their own innovations, in this authors' estimation, an IPR manager's responsibility should not only be to build the company's IPR portfolio, but also to guide the company so it does not fall afoul of another's IPR.

By staying attuned to industry and technology developments, your IPR manager can ensure capital is used most effectively to build your IPR portfolio and prevent pursuing a technological dead end, or worse, a future patent infringement lawsuit.

Align with patent counsel
The IPR manager will also need to engage with patent counsel. Prosecution of patents is as much art as science. Having a seasoned professional coordinating and guiding this process is a critical feature in creating IPR with the greatest potential value for your company. This individual or firm should be well versed in your technology area and able to navigate the bureaucracy of the various patent offices you will be filing in. In regards to foreign jurisdictions, this means having a network of local patent counsel in each jurisdiction that is just as capable in delivering positive results.

This is a key investment and requires the IPR manager to have a comprehensive global strategy. The IPR strategy should work seamlessly with a commercialization strategy. Is your company planning to sell in Europe, and if so, in which countries? Brazil is a growing market; will you need to file for protection there? In the Far East China and India are large potential markets but when it comes to IPR they are not the same: can you file in one and not the other? These issues need to be addressed as early in the process as possible so the proper human and capital resources will be dedicated.

In short, IPR management needs to be an integral part of corporate strategy; not an afterthought as it has historically been. And as such, it requires long-term capital investment which is the bedrock to a successful IPR program.

Intellectual Property Rights: Unlocking the Value of this New Asset Class

Daniel J. Henry

of the company's IPR. These assets would be "found money" if properly deployed. Ironically, the very companies that had previously eschewed licensing the patented inventions of others' were now doing exactly that with their own IPR.

This new-found appreciation for IPR has not been restricted only to large patent holders. In the last three years, venture-backed startups have found that investment capital has dried up. Experienced startup executives, along with certain investors and IP professionals, have realized that a viable response to this challenge is to license their existing IPR to fund ongoing innovation. They have recognized that a company's IPR assets, even those that are nascent in their development, provide them with an opportunity to raise additional capital to support their ultimate goal of commercial success. Raising additional capital by licensing or divesting their IPR allows them to avoid the high price that an additional round of investment (if they can secure one) would demand.

Conclusion

There is no question that the industry is in the midst of a continuing evolution. How inventors and corporations think about their IPR assets and use the means available to unlock their value is a crucial factor to sustaining growth and fuelling innovation. The World Intellectual Property Organization (WIPO; http://wipo.int) has just released a report entitled World Intellectual Property Report: The Changing Face of Innovation

Box 3. Balancing the risks and rewards

Every IPR owner has a legal right to optimize the value of their assets. A complex undertaking, the monetization of IPR needs to be carefully considered. An IPR monetization program can be structured to have multiple options to reflect a company's risk profile.

The least risky program is to identify non-core or redundant assets and divest them. This can be done internally or through an IP broker. If engaging a broker, it is important to work with one who has an established reputation, a record of success, and works on a "success fee" basis. A successful sale will generate revenue and relieve the company of costs associated with maintaining the non-core or redundant IP.

The next option is to develop a licensing program. This can be done in-house, which would require hiring experienced personnel, or can be outsourced to a company that specializes in patent licensing. An outsourced program can be structured on a pure contingent basis or a hybrid fee structure. It can include an upfront or hourly fee with a cap and a success component.

The third option to monetize your IPR is to conduct an assertion licensing program. This requires filing a lawsuit in the proper venue against a company or companies who are using your IPR without a license. As with the other options, a thorough review and plan of action needs to be generated prior to initiation. The review should identify the risks, which will include potential counterclaims filed against your company and possibly broader consequences to your commercial business, such as some customers or suppliers electing to no longer do business with you.

In certain cases, assertion licensing may be a "bet the company" tactic necessitated by the severe negative consequences that the infringement of your IPR has produced. In pursuing this course, a company will need to engage with an outside legal counsel that specializes in IP litigation. A crucial factor will be under what structure you engage counsel – full fee, a partial contingency, or full contingency. The factors guiding this choice will include the company's cash on hand, future revenue flow, and aligning risk. Another possibility is to engage with a professional assertion licensing company that brings expertise, capital, and reputation.

Finally, you can retain the IPR within the company and have outside professionals manage its licensing program. The risk in this arrangement is that the company will be exposed to potential counterclaims, but if fully litigated, the infringer could be enjoined from selling any infringing product or service. This creates tremendous leverage for the IPR owner and would likely produce optimal results.

Monetizing IPR is not an easy matter. When balanced against the investment required to create these valuable assets in the first place, IPR are well worth defending.

Intellectual Property Rights: Unlocking the Value of this New Asset Class

Daniel J. Henry

(http://tinyurl.com/7fuv445), which indicates that worldwide royalty and licensing revenue from IPR has grown from $27B in 1990 to $180B in 2009. This is nearly a six-and-a-half-fold increase and should serve as a beacon for all IPR owners.

The path to growing a business has expanded beyond the single dimension of introducing a product or service into the marketplace. The past two decades has crystalized the need for a multi-faceted approach to growing a successful business and leveraging IPR assets are an essential component. The following four success factors are important considerations as companies seek to maximize the value of their IPR:

1. Defining an IPR development program. New and growing businesses need to have a defined and strategic IPR development program that covers patents, brands, trade secrets, and business intelligence. How these assets are developed, maintained, protected, and monetized can no longer be done on an ad hoc basis.

2. Investing in seasoned management. Hiring an IPR Manager or Chief Intellectual Property Officer (CIPO) should be an early development when assembling a management team. This individual should have a track record of successfully building an IPR position that supports the business while simultaneously covering the larger market.

3. Funding for the long term. Designating sufficient capital for IPR development is another critical step and should not be considered on an annual basis but on an extended timeline. IPR takes several years to mature and running short of capital three or four years out may result in cannibalization of the IPR program, materially reducing its value and the value of the company.

4. Enlisting expert advisors. Identifying the right external IPR advisors – those who have extensive experience with the relevant technology area, will be essential in avoiding any major pitfalls. Globalization and the rapid advancement of technology demands rigid discipline and vision when it comes to IPR assets.

Companies who innovate need to recognize that IPR assets are the natural outgrowth of their intellectual capital and stand as a testament to the company's value in the global marketplace. Failure to understand, nurture, and monetize IPR will lead to an outcome most recently exhibited in the Nortel bankruptcy where founders and shareholders alike were left wondering "if only…."

About the Author

Daniel J. Henry is Vice President, Business Development with WiLAN Inc., Canada's largest publicly traded IP licensing firm. A seasoned IP executive, he has extensive experience in corporate and IP law and business development. Before joining WiLAN Inc., Mr. Henry held the position of Senior Vice President with ICAP Patent Brokerage, where he advised clients on the sale and acquisition of valuable IP assets. Prior to ICAP, he was a Partner with Altitude Capital Partners, where he conceived and executed the firm's business development program and strategic relationships with corporate IP holders and other IP professionals. Mr. Henry is a practiced speaker on IP and value generation at conferences internationally and has been recognized by Intellectual Asset Magazine as one of the top 250 IP strategists in the world for the past three years.

Citation: Henry, D.J. 2011. Intellectual Property Rights: Unlocking the Value of this New Asset Class. *Technology Innovation Management Review*. December 2011: 23-28.

Reasons for Patent Protection and Cost-effective Patent Filing Options for SMEs

Natalie Raffoul and Art Brion

> *"The problem for ... Open Source developers ... is that their very success in constructing a commercially viable Internet has now spawned an on-line patenting gold rush of epic proportions. Small start-ups and giant corporations alike are racing to stake claims to proprietary positions along the booming e-commerce frontier."*
>
> Kevin G. Rivette and David Kline
> *Rembrandts in the Attic: Unlocking the Hidden Value of Patents*

Many innovative small and medium enterprises (SMEs) do not seek patent protection for their innovations, either because they are skeptical about the perceived benefits or wary of the perceived costs. However, by failing to protect their intellectual property with patents, SMEs leave themselves exposed to attack by other patent holders. This article explores arguments for patent protection as well as filing options that can protract the patenting process while simultaneously reducing patenting costs. By choosing their patent application filings wisely, SMEs can keep their patenting options open for as long as possible while delaying costs.

Introduction

Many SMEs turn their noses up at patents. A steady refrain of "we don't need them" or "we don't believe in them" emanates from such enterprises. Patents have also been accused of allegedly stifling rather than encouraging progress or competition. While there may be some truth to this argument, it should be noted that patents are, in the final analysis, merely an extension of the values of our capitalist society where private property is at the core of all that flows in commerce. Without private property and the laws to protect it, we are left to the harsh law of the jungle where property of any type, including intellectual property, can be taken with impunity. Reverse engineering has never been faster or cheaper. Those who think that their great idea cannot be replicated for a cheaper price by their competitor need to rethink their strategy.

Patents exist to protect a specific type of property – a unique, non-tangible, yet very valuable type of property: intellectual property. Intellectual property, especially the type protected by patents, has the interesting characteristic of being able to be simultaneously possessed by multiple people. Regular physical property can only be physically possessed by one person at a time – if person A is in possession of a chair, then person B cannot be in possession of the same chair at the same time. However, with intellectual property, person A *and* person B can be *simultaneously* in possession of the same property. As an example, if person A invents a new type of mousetrap and tells person B about that new mousetrap, both A and B are now both in possession of the *idea* of the new mousetrap. Both A and B can now create that new mousetrap, create a business around the new mousetrap, and, potentially, change the world. While a mousetrap may not change the world, one merely has to remember Alexander Graham Bell, the telephone, and the term "Ma Bell" to see how much of an impact a single idea can have.

If someone has an idea that can be turned into a profitable business, it behooves them to protect that idea, especially if they intend to start such a business. For this reason, high-tech startups should use patents and the protection they afford. For most high-tech startups, the company's starting value is tied to the idea or ideas that gave birth to the company. In some cases, the idea is

Reasons for Patent Protection and Cost-effective Patent Filing Options for SMEs

Natalie Raffoul and Art Brion

the company's *raison d'etre* and the more that idea is considered valuable, the higher is the potential valuation of the company. Concomitantly, better protection around that idea may also increase the viability of the company. Better protection provides a stronger deterrent against copycats stealing the idea since this protection can translate into dire consequences for the copycat. A patent portfolio surrounding that idea can therefore add *value* to the startup. In some cases, a patent portfolio can actually *multiply* a company's value – the value of a company's physical assets and the value of its personnel may actually be dwarfed by the value of its patent portfolio. It is partially for this reason that venture capitalists and angel investors usually look favourably on companies that have, at the very least, attempted to protect their ideas.

In addition to adding value to a company, one other reason for seeking patent protection relates to what can be done with patents. A patent (or a patent application) is an asset for a company and it should be used as such. Essentially, an asset can be used as a weapon of corporate warfare – it can be used to launch an attack on a competitor, it can degrade a competitor's market position, and it can be used to protect one's assets while generating revenues. Alternatively, an asset can be used in a more benign manner by generating that all-important revenue stream.

Corporate history is replete with examples of corporate warfare between large companies. Large companies such as Apple, Google, and Microsoft have long been shrill advocates of the current patent regime as, time and again, they have benefited from the advantages afforded by patents. As an important part of a company's arsenal in corporate warfare, patents have been used to deny access to important markets, disrupt business cycles, and generate large amounts of licensing revenue.

Examples of the use of patents to cut off access to markets are legion but some of the most eye-catching examples can be seen in the bruising corporate war between Apple and Samsung as that war progresses across various markets. As may be well-known, Apple has alleged infringement by Samsung of some of its patents (http://wikipedia.org/wiki/Apple_Inc._litigation). Samsung has recently been denied access, albeit temporarily, to the Australian market for its Galaxy products by an injunction obtained by Apple. Perhaps more importantly, Apple has been able to permanently deny Samsung access to the German market for that same product.

While patents may be used as a market-denial weapon, it may also be used to effectively shut down a competitor's channel of business. In fact, a patent need not even be perfect to do so - it merely needs to be issued. One example of this comes from the infamous "one-click" patent from Amazon.com (http://wikipedia.org/wiki/Amazon.com_controversies). In 1999, Amazon alleged infringement of its "one-click" patent by Barnes & Noble. Amazon.com was able to obtain an injunction to prevent consumers from ordering through Barnes & Noble's website during the lucrative Christmas season using a similar one-click system. Even though this injunction against Barnes & Noble was eventually overturned after the Christmas season, substantial disruption to Barnes & Noble's Christmas business was caused by Amazon.com's brilliant, if ruthless, use of its patent. Even though a substantial portion of the coverage of the "one-click" patent was subsequently restricted, Amazon.com had, arguably, received its money's worth out of its patent.

From the above, one may get the impression that patents are the exclusive purview of the well-heeled or the well-funded. Such is not the case – smaller companies and startups may also take advantage of the patent regime to protect their inventions and generate large sums of money. The small Toronto company i4i took on the behemoth that is Microsoft and won (http://wikipedia.org/wiki/I4i). i4i was a small startup in 1993 when it was working in the XML space. Microsoft allegedly misappropriated i4i's XML technology and, in 2007, i4i sued Microsoft for patent infringement. i4i won a US$290 million judgment against Microsoft. As was expected, Microsoft pursued the case all the way to the US Supreme Court and, unfortunately for Microsoft, lost all of its appeals. If i4i's example stands for anything, it shows that the patent system works, even for small companies and that infringers should beware.

As another example of small companies taking advantage of their patent portfolios, there are companies which, it would seem, sue others on patents for a living. These companies, notable examples being the Ottawa-based MOSAID (http://mosaid.com) and Wi-LAN (http://wi-lan.com), obtain large patent portfolios for use as virtual clubs against infringers. These companies buy up large patent portfolios or create intellectual property with a view to licensing such intellectual property for large amounts of cash. As an example of what can be achieved by a large patent portfolio and the services of aggressive US patent lawyers, for the 3rd

Reasons for Patent Protection and Cost-effective Patent Filing Options for SMEs

Natalie Raffoul and Art Brion

quarter of 2008, MOSAID had licensing revenues of $14 million with a projected $55 million in licensing revenues for all of 2008. These numbers are quite impressive for a company that, in 2010, only had 47 employees and did not manufacture anything.

Regardless of the above examples, patents are not necessarily only tools of corporate warfare. They can also be used to generate income without threat of legal action hovering in the background. Patents can be sold, licensed, transferred, and even parcelled out, all for sometimes enormous amounts of money.

Patents can be used to generate income for a company, even after that company has been considered dead or bankrupt. Nearly everyone has heard of Nortel Networks and the famous auction of its patent portfolio. Even though Nortel was considered a dead company, the auction raised $4.5 billion from the sale of its patents (http://wikipedia.org/wiki/Nortel). As well, quite a few dead companies from the telecom boom days of the late 1990s and early 2000s seemingly live on through their still very much alive patent portfolios. Patents and their value can therefore even survive the demise of the company that generated them. In some cases, the patent portfolio may be the only surviving asset of defunct companies. These patent portfolios may then be used by those who sunk their money into those companies, as a means of recovering their investment.

From the above, patents can therefore be used to attack competitors, disrupt their operations, and generate large revenues. For at least these reasons, protecting one's innovations through patents is not only a good idea but may actually be required for some high technology startups.

Patents May Be Necessary

Even given the above, there are those who still opine that patents are too expensive, that they do not have the deep pockets to defend their patents, or that they do not believe in the patent system. To these naysayers it must be pointed out that, given today's business climate, they may not have an option regarding patents. For at least some of the reasons given above, most venture capitalists (VCs) require startups to have some sort of patent protection before any investment is made in a company. Once VCs enter the picture, the cost of patenting can usually be off-loaded to the VCs or, in some instances, be paid for by government funding. If a "patent pending" line in a corporate report is required for a VC investment, it can be argued that the money spent to obtain the "patent pending" is money well spent.

Regarding the defence of patents and the deep pockets required to fund such efforts, startup executives need to consider a longer view with respect to their exit strategy. If a startup desires to be bought out by a larger entity, the costs for the defense of the patents (and in many cases the downstream costs for obtaining those patents) will very often fall on that larger entity. Alternatively, instead of waiting for a buyout from a large company, a startup with a suitable patent portfolio may be able to recruit a licensing firm to pursue infringers. These companies, whose business is primarily the licensing of intellectual property, may take on such a task in exchange for a share of portfolio licensing revenues.

Finally, to those who say that they simply do not believe in the patent regime, it must be pointed out that, unless there is profit to be had, the business world is concerned with how things *are* and not how things are *supposed* to be. Like it or not, the presence of megacorporations with burgeoning patent portfolios has made it almost a requirement for small companies to protect their market share by any means possible. Unfortunately for the purists and the high-minded, patents provide one of those means. One merely has to look at the example of i4i and consider what would have happened to that company if it did not have its patent to bludgeon Microsoft with.

Patents as Assets

As noted above, patents are assets to a company and they should be used as such. Used properly, a patent portfolio can be used to obtain important tools for a company. Complementary technology, funding, and even more assets can be had by judicious use of a patent portfolio.

Since patents are assets for a company, they should be leveraged to obtain what that company (especially if it is a startup), may need at a given time. Consideration should be given to licensing or selling a patent for a technology that may not be key to the company`s survival. While licensing the technology would be ideal, a sale where the seller retains a license from the purchaser for the technology can still be quite useful. Other patented technologies that are not actively being used by a company may also be candidates for a licensing scenario.

Reasons for Patent Protection and Cost-effective Patent Filing Options for SMEs

Natalie Raffoul and Art Brion

In a licensing scenario, a company may, instead of receiving licensing revenues from its licensees, seek a license to technology controlled by its licensee. Such a deal may open up new avenues of development, research, and even products for a company. This cross-licensing option may be of particular use for companies that are in need of other technologies to improve their product or service offerings. Of course, depending on the situation, a combined licensing revenue and technology cross-license may also be possible.

Leveraging a patent portfolio may also be accomplished by partnering with a patent licensing firm. Use of a patent licensing firm with an aggressive enforcement strategy may yield useful results, especially for a company whose technology forms the basis for spin-off technologies. Depending on the circumstances, the company may wish to sell its inactive patents to the licensing firm or the company may use the licensing firm as a proxy for their enforcement.

It should be noted that while the above discussion mentions patents, patent applications are also assets and, again depending on the circumstances, may be exploited much like an issued patent, albeit to a lesser extent.

Obtaining Patents

Much like other creatures of the law, a patent application must be carefully considered before proceeding with the process. For startups, this careful consideration may be even more important given that resources tend to be scarce for such companies. What follows are some suggestions, as well as a patent process, that is not only strategic but should also delay costs while simultaneously reducing the up-front patenting costs.

Note that, while the suggestions below are tailored to delay patenting costs, this approach may not work for all companies. Each company's situation is different and what may work for one company may not work with another. Startups should therefore work closely with their patent counsel to determine which strategies work best with their business goals, available resources, and timelines. To this end, a startup's patent counsel should be tightly integrated into the company's structure so that the IP strategy can, from the start, be crafted into a potential income stream and not arise as a mere afterthought.

A patentability search and opinion
Those desiring a patent may want to consider a "patentability prior art search" for their invention. Knowing the patent landscape in the particular field of invention can be important for a number of reasons. It might be discovered that the invention reads on another patent and, as such, there might be a need to assess a potential infringement or to consider taking a licence from the prior art patent holder. One might also discover whether there are prior art patents/applications that anticipate the invention or render the invention obvious. This step is very important in pre-empting any surprises that might arise during the examination of the patent application(s).

Drafting the patent application
Once it has been determined that the invention is likely patentable, a draft patent application can then be prepared. Since the costs of drafting a patent application vary widely among patent agents and firms, a survey of available options prior to selecting a firm or a patent agent/attorney is always recommended. It is also highly advisable to select a patent agent/attorney with a technical background that relates to the field of invention.

In addition to their technical background, it is also highly advisable to select a patent agent/attorney who understands the unique needs and situation of a startup. A business-aware patent agent/attorney who understands the company can help craft an overall strategy that takes into account, not just the technology and the law, but also what is possible given the available resources and long-term goals of the company.

Filing a first patent application and the Paris Convention Treaty
After the application has been drafted, a decision must be made as to where to file the patent application. This decision must be made after careful consultation with the chosen patent agent/attorney and after careful consideration of the business goals, available budget, and projected market.

Note that there exists the Paris Convention Treaty to which most countries are signatory. This treaty enables a patent applicant to file a first application in one of the signatory countries and then file subsequent patent applications in other jurisdictions up to one year after the initial filing. This one year period is known as the *priority year*.

A US provisional application
One of the more popular options for start-up companies and those for whom up-front costs are an issue is a US provisional patent application. The government filing costs can be quite minimal and the paperwork required is also minimal. While the application will need to be re-filed within a year, it does allow the applicant

Reasons for Patent Protection and Cost-effective Patent Filing Options for SMEs

Natalie Raffoul and Art Brion

to advertise that they are "US patent pending" for a relatively low cost. A US provisional application qualifies as a patent application under the Paris Convention and, as such, a US provisional application can be the application upon which subsequent applications are based.

An international patent application through the Patent Cooperation Treaty (PCT)

At the end of the priority year, a patent applicant may be contemplating more than just a few countries or regions in which to file patent applications. The Patent Cooperation Treaty (PCT) may be used as an international patent filing deferral strategy. The PCT permits an applicant to delay filing in any country or region that is signatory to the PCT for up to 42 months from the earliest filing date (i.e., the priority date or the PCT international filing date). While the PCT international patent application does not result in a world patent, the PCT process does involve an International Search Authority (ISA) and an International Preliminary Examining Authority (IPEA), such as the one at the Canadian Intellectual Property Office. These authorities perform a search for prior art relating to the invention as well as a substantive examination of the patent application. The examination gives the patentee an early indication as to whether the invention, as defined in the claims in the application, is novel and non-obvious in light of the prior art found.

European Patent Office (EPO) applications

Regional patent offices, such as the EPO, can also provide a significant cost savings. If patent protection is considered in three or more European countries, the EPO is a more cost-effective, streamlined approach to the patent process in Europe. The EPO performs a binding substantive examination of the European patent application and the resulting European Patent only needs to be validated, for a small fee, in the various European countries in which the patentee seeks patent protection. The EPO can be entered through the PCT process.

Conclusion

When used properly, patents can provide a useful means to obtain technology, funding, and other assets that a company may be in need of. Historically, they have been used as corporate weapons and, in quite a few cases, have been quite successful in denying markets and opportunities to competitors. As well, patents have been used to add value to a company whether it be through the sale or the licensing of a company's patent portfolio. Obtaining patent protection need not be overly expensive – an effective patent filing strategy that leverages the existing international patent treaties can defer patenting costs.

About the Authors

Natalie Raffoul is a founding partner of CLANCY P.C. + BRION RAFFOUL. As a registered patent agent and lawyer with a background in electrical engineering, she has extensive experience in drafting patent applications for technologies including: electronics, wireless and optical communications and networking, telecommunications switching, optical components and manufacturing processes, optical fibre manufacturing processes, satellite components, fuel cell technologies, security devices and software processes for supply chain management. Natalie is also experienced in filing and prosecuting Canadian, U.S., and PCT international patent applications. She provides advice to her clients, in English and in French, on worldwide patent filing strategies and portfolio management. She is also a frequent speaker on intellectual property matters.

Art Brion is a computer engineer, lawyer, and a U.S. and Canadian patent agent. Since 1998, he has assisted clients ranging from multinational corporations to high-tech startup companies to lone inventors. Prior to founding CLANCY P.C. + BRION RAFFOUL, Art practiced with two IP boutique firms in Ottawa. His practice centers on not just the drafting and prosecution of patent applications worldwide but also on providing advice regarding portfolio management and worldwide patent filing strategies. He also provides advice on intellectual property mining and licensing strategies. Art's fields of specialization include software/Internet-based technologies, wireless technologies, communications and computer and networking and related systems, optics/electro-optic communication systems, cryptography/encryption based technologies, semiconductors and business method systems. A former Editor-in-Chief of the UNB Law Journal, he enjoys the thrust and parry of patent prosecution as it mirrors one of his main preoccupations: fencing.

Citation: Raffoul, N. and A. Brion. 2011. Reasons for Patent Protection and Cost-effective Patent Filing Options for SMEs. *Technology Innovation Management Review*. December 2011: 29-33.

Issue Sponsor

Author Guidelines

These guidelines should assist in the process of translating your expertise into a focused article that adds to the knowledge resources available through the *Technology Innovation Management Review*. Prior to writing an article, we recommend that you contact the Editor to discuss your article topic, the author guidelines, upcoming editorial themes, and the submission process: timreview.ca/contact

Topic

Start by asking yourself:

- Does my research or experience provide any new insights or perspectives?
- Do I often find myself having to explain this topic when I meet people as they are unaware of its relevance?
- Do I believe that I could have saved myself time, money, and frustration if someone had explained to me the issues surrounding this topic?
- Am I constantly correcting misconceptions regarding this topic?
- Am I considered to be an expert in this field? For example, do I present my research or experience at conferences?

If your answer is "yes" to any of these questions, your topic is likely of interest to readers of the TIM Review.

When writing your article, keep the following points in mind:

- Emphasize the practical application of your insights or research.
- Thoroughly examine the topic; don't leave the reader wishing for more.
- Know your central theme and stick to it.
- Demonstrate your depth of understanding for the topic, and that you have considered its benefits, possible outcomes, and applicability.
- Write in a formal, analytical style. Third-person voice is recommended; first-person voice may also be acceptable depending on the perspective of your article.

Format

1. Use an article template: .doc .odt

2. Indicate if your submission has been previously published elsewhere. This is to ensure that we don't infringe upon another publisher's copyright policy.

3. Do not send articles shorter than 1500 words or longer than 3000 words.

4. Begin with a thought-provoking quotation that matches the spirit of the article. Research the source of your quotation in order to provide proper attribution.

5. Include a 2-3 paragraph abstract that provides the key messages you will be presenting in the article.

6. Any quotations or references within the article text need attribution. The URL to an online reference is preferred; where no online reference exists, include the name of the person and the full title of the article or book containing the referenced text. If the reference is from a personal communication, ensure that you have permission to use the quote and include a comment to that effect.

7. Provide a 2-3 paragraph conclusion that summarizes the article's main points and leaves the reader with the most important messages.

8. Include a 75-150 word biography.

9. If there are any additional texts that would be of interest to readers, include their full title and location URL.

10. Include 5 keywords for the article's metadata to assist search engines in finding your article.

11. Include any figures at the appropriate locations in the article, but also send separate graphic files at maximum resolution available for each figure.