



**NTNU – Trondheim**  
Norwegian University of  
Science and Technology

# Intellectual Property Strategy

With main focus on patents and licensing of  
patents

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Project Management

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## List of acronyms

3GPP	3rd Generation Partnership Project
ACARD	Advisory Council for Applied Research and Development
ADR	Alternative Dispute Resolution
AIA	Leahy–Smith America Invents Act
ANSI	American National Standards Institute
ARM	ARM Holdings
AST	Allied Security Trust
CCPA	United States Court of Customs and Patent Appeals
CJEU	Court of Justice of the European Union
CTM	Community Trademark
CTO	Chief Technology Officer
DEDO	Delaware Economic Development Office
ECTS	European Credit Transfer and Accumulation System
EE	Electrical Engineering
EEA	European Economic Area
EPC	European Patent Convention
EPO	European Patent Office
FRAND	Fair-Reasonable-Nondiscriminatory
FTO	Freedom-to-operate
GSM	Global System for Mobile Communications
GPS	Global Positioning System
GPTO	German Patent and Trademark Office
GUI	Graphical User Interface
IBM	International Business Machines Corporation
INTIPSA	International IP Strategists Association
IP	Intellectual Property
IPO	Industrial Public Offering
ISO	International Organization for Standardization
LSI	LSI Corporation
LTE	Long-Term Evolution
MPEG-4	Moving Picture Experts Group-4
NAFTA	North American Free Trade Agreement
NASA	National Aeronautics and Space Administration
NDA	Non-disclosure Agreement
NPE	Non-practicing Entity
NTNU	Norwegian University of Science and Technology
OODA	Orient-Observe-Decide-Act loop
PCT	Patent Cooperation Treaty
R&D	Research and Development
RPX	RPX Corporation
SSO	Standards Setting Organization
TTO	Technology Transfer Office
TRIZ	Theory of inventive problem solving
US(A)	United States (of America)
USPTO	United States Patent and Trademark Office
VCR	Videocassette recorder
WIPO	World Intellectual Property Organization

## Preface

This thesis represents the final assignment of the 120 ECTS MSc. in Project Management, which is to be awarded by the Norwegian University of Science and Technology-Trondheim (NTNU), Norway. Its topic is “*Intellectual property strategy.*” The intent is to present the state-of-the-art IP strategies found across literature, together with important aspects that influence the course of actions in the IP world, along with my personal recommendations, conclusions and proposed framework. This is not only to fulfill the requirements for the MSc. programme, but also to gain further knowledge regarding this domain, push further the boundary of scholastic research and last but not least, serve as an introduction to the world of state-of-the-art intellectual property strategies to the interested reader.

Although the intellectual property includes concepts such as patents, copyrights, trade-marks, trade secrets and others, the main focus of the study shall be patents together with their licensing aspect. This is because of the sheer size of the scholar literature regarding the other mechanisms and IP elements, and also because the study has to be deep and specific to a certain part of literature.

Of all sectors that are in the economy, I find that the high-technology and the pharmaceutical sectors are the most sensitive to the influence of patents, as they are very dynamic sectors. However, the pharmaceutical sector will not be treated in detail in this report, if at all. The reason is that the scope of the report is to be narrow in nature, and not too broad (not suggesting IP strategies but patent strategies, and not for all industry sectors, but concentrating only on the high-tech).

I find the world of patents as intriguing, fascinating and dangerous, however (most probably), as necessary. Without patents, the rights of the inventors would not be respected, and the society would benefit on the whole. Inventors would lose the interest of innovating, knowing that the benefit is shared equally by everybody. As such, the impact of patents on the world is shown in the introduction, through their influence on leveraging and valuation, as well as their history, their final word in setting the de-facto standards, reasons why companies apply for patents, and what patents may not do. The framework of the thesis is presented in chapter 2, together with some views of scholars and patent attorneys, regarding IP strategies. In chapter 3, the characteristics of geographical areas with regards to IP systems, negotiations and licensing are offered. Chapter 4 is the chapter of conclusions and proposed IP strategy framework.

Almost two years passed since enrolling on this journey, and I have to admit it has not been easy, especially when attending Norwegian Level 2 classes, in parallel, in NTNU. I think I was pushed by curiosity and the desire to know and learn the most I could.

I would like to thank my guiding professor through the world of patents, Associate Professor Bjørn Otto Elvenes, who managed to raise even more curiosity concerning the world of IP and patents. I think that I probably offered him some sense of satisfaction when with every question I was trying to answer, I found myself discovering even more intriguing questions just waiting to be investigated, together with intriguing, unexpected relations and hidden consequences. Of course, I would very much like to mention my professors from the BSc study, Prof. Gheorghe Brezeanu and Prof. Dan Neculoiu, who remembered me well as their student three years after graduation, and who agreed to recommend me to study this programme. Moreover, they were both convinced I would do (very) well in the programme even if this meant I would be coping with a full-time job in parallel. My impression was divergent with theirs, regarding this aspect, throughout the different phases of the study. As a consequence, I tried not to mention my dedication to further studies to my colleagues in the company.



I am writing a thank you note to David, my boss, as he showed understanding when I had to meet the obligations for university at given times. Of course, I will also thank Trond, the company's IP director, which had suggested several study directions that might be in principle of interest for the firm.

My parents, brother and grandparents have been encouraging me to finish this study, but at the same time they asked me not to strive and do a perfect job all the time. I listened to them, but I did not obey their advice, as each time I tried to give the best I could and understand all hidden connections that I could discover in the scholar theory and history.

All in all, I had met and shared some interesting experiences with some extraordinary university colleagues, among which Gil, Hugo, Nasim, Alexandra, Nora-Martina, Veli-Heikki, Erlend, Christoffer, Stian, Giedra, Magnus, Håkon, Julie, Mia, Ásdís, Tryggvi, Karianne, Tamara, Ingvild, Marie and many others, of whom names I might have omitted, and for this I apologise. Although most of you are to leave Trondheim to pursue careers mainly in Oslo, though also Stavanger, Bergen or even abroad, (very) few of you have still remained in the city and we are to see each more often.

I am indebted to the Admission Committee of NTNU, which took a positive decision regarding my admission to the programme, considering that given my past study performance and despite my full-time work situation, I would be dedicated and willing to finish the study in time.

Last but not least, a special thank you note to my landlords, university music Professor and composer Ståle Kleiberg (nominated twice for a Grammy Award, the Best Opera Recording category: '*Treble and Bass*' album in 2009 and '*David & Bathsheba*' album in 2013) and Norwegian language university Professor Åsta Øvregaard (pioneer of the <http://www.ntnu.edu/now>, an on-line, web-based and free Norwegian language learning method), which encouraged me to speak more often Norwegian, whenever I could. The apartment proved to be strategically located in a relatively small triangle, considering the university and the office, which has been extremely helpful during these very busy years...

S.I. ENE,  
Trondheim, Norway  
29 August 2014

## Abstract

Paying the fees for patents is expensive. Therefore, a selection has to be made on which patent applications should be submitted and which not, and where. This is because each country has its own IP system and its own fees. Moreover, what kind of strategy is to be considered for licensing, if any. The study is concentrated or limited mainly to patents. Trademarks, copyrights, trade secrets, although they constitute IP elements too, they will not be treated in detail in this study. The reason is because there is that there is not only a sheer size of the scholar literature regarding these other systems, but in addition, I find that deeper details may be assured in discussing patents, for the given limit of the thesis length.

The study is mainly theoretical; it shall discuss in detail the issues and strategies that the companies might like to adapt when dealing with intellectual property. The research methodology is literature survey, for which the latest trends in intellectual property have been searched for and described using the web search tools of the library (<http://www.ntnu.no/ub> accessed August 2014), NTNU library's books and the Google Scholar search engine (<http://scholar.google.com> accessed August 2014).

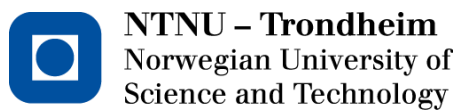
The departing point of the study is Chapter 1, with the history of patents, costs implied by patents, challenges of IP systems, reasons why companies apply for patents, presentation of the situation of the patent market, its contributors and influence, its development and its trends, some thoughts on the value of patents and what patents can not do. Then, the various options of the IP holders and IP non-holders are presented in Chapter 2. Also, various views of the IP strategy are presented, such as the analogy with the military strategy, and the high tempo patent strategy or IP strategies at the level of the organization. In chapter 3, various patent-related peculiarities of different geographical locations are presented together with methods of negotiation, issues of interest for patents for the respective markets and personal opinions, without considering the implied costs of the respective IP systems. The conclusions and the personal proposal of the processes IP framework are presented in Chapter 4. Chapter 5 mentions the references.

The major finding of the study is that there is no perfect IP strategy, but rather best is to consider an adaptable IP strategy, continuously tuned to the environment. Among the recommendations that I formulated, alternative dispute resolutions should be included in the licensing contract, to avoid costly litigation situations. Moreover, I observed that it is very important to spend the time to create and continuously update a database of patents and patents applications, to avoid unnecessary costs for ongoing patents or risking a lapse of patents. In addition, patenting in all 196<sup>1</sup> countries of the world is too expensive to be an option to consider in practice. An idea that I did not see mentioned in literature is having a patent of a solution that is not to be sold in practice. This ensures continuous revenues from the competition, as it would be more cost-effective for it to send payments to the patent owner compared to shifting upwards processes & equipment to the newer technology. A summary of the top 50 IP strategy mistakes presented by Duncan Bucknell, an experienced IP broker from Australia, is offered in Table 3 in the Appendix.

For non-IP holders, some observations that I make are that if they consider disseminating rapidly, they should probably consider an IP insurance. I consider that lapsed patents may present themselves with unthought opportunities, together with startups that are based on a specific technology. For various reasons (timing in market, marketing, finances, legislation, risks), startups might not be successful, even if their core patented technologies are extremely promising. Here I think comes the opportunity for the non-IP holder to acquire the patents of interest, or license them, or use the respective information freely, if the patents were lapsed because the maintenance fees were not covered.

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<sup>1</sup> <http://www.infoplease.com/ipa/A0932875.html> accessed August 2014



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## 1. Strategic views of intellectual property

*“We are moving toward a global economy where the true strategic asset is IP”*

Horatio Gutierrez,<sup>2</sup>

### 1.1 From the propensity of litigation of today to the early history of patents

It is maybe important to note first that even if this study is about intellectual property strategy, the focus is on patent strategy and the licensing aspect.

The attention of the media has been attracted by patent law suits, such as Yahoo vs Facebook on patent buying strategy [62], in 2012. It appears important that patents are part of a modern firm’s strategy and thus have to be managed with care. Another example from the same year is [63]. Here it is shown how Microsoft spent \$1 billion for 925 patents and patent applications from AOL, plus the right to license another 300. Only weeks later, Microsoft sold around 650 of these patents to Facebook for \$550 million, but it retained the right to license them. Moreover, it licensed to Facebook the remaining set recently bought from AOL. According to the lawyer Bruce Deming of Covington&Burling, who advised Microsoft on both transactions, this was a beneficial situation for Microsoft, as it could make a higher bid in the first place and then reduce costs. Facebook was competing with Google for revenue on the online advertising business, but with 56 patents in its portfolio before April 2012, it could not defend itself.

It is thus important to note that patents are not only used to assure a flow of revenues through licensing-out, but also to protect from actions of litigation set by competitors. In many industries, the defence aspect has become more and more important in the recent years, because of the propensity of the litigation court suits.

Therefore, Facebook followed a strategy of patent acquisition from big corporations: it acquired five patents from New York University professor Alexander Tuzhilin and San Jose entrepreneur Chris Cheah, 750 patents from IBM, and 650 patents from Microsoft and had obtained patents through the acquisition of Instagram, too. Therefore, Facebook built a complex portfolio to protect its IP. Cross-licensing may be used as a technique to avoid ever-lasting negotiations for specific licenses; spend years locked in court battles or to keep third parties out of the market. *It is almost impossible to build a product nowadays without infringing on someone’s intellectual property*<sup>3</sup>.

A more recent article [60] from 2013, shows the case of Apple versus Samsung. Apple is entitled to at least \$1.05 billion from Samsung, because of infringement. And the sum was likely to triple, as Samsung willingly copied Apple. It appears that until recently, most software companies did not pay much attention to patents, as often there are many ways in which a function or algorithm can be implemented. Nowadays however, there are many hardware and software companies that buy bulks of patents and then sue each other with increasing frequency. In the past, in 1988, there was the case of Apple suing Microsoft [63] for using the Macintosh graphical user interface, for copying the “look and feel.” Apple lost, in part because it had licensed and copied aspects of the GUI from Xerox, which was a pioneer through its research lab, Xerox PARC. Apple could not have a monopoly on the general design of the GUI, but Microsoft made the GUI available by licensing broadly the

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<sup>2</sup> PriceWaterhouseCoopers, “Exploiting Intellectual Property in a Complex World, Technology Executive Connections,” Vol. 4, June 2007 (statement of Horatio Gutierrez, Vice President and Deputy General Counsel, Intellectual Property & Licensing Group, Microsoft) [[http://www.pwc.com/en\\_GX/gx/technology/pdf/exploiting-intellectual-property.pdf](http://www.pwc.com/en_GX/gx/technology/pdf/exploiting-intellectual-property.pdf), accessed June 2014]

<sup>3</sup> Remark of Associate Professor Bjørn Otto Elvenes.

Windows operating system to PC manufacturers, and this made Windows more and more affordable, as prices were being pulled down. On the other side, Macintosh remained expensive and became a niche product.

IP systems are still mainly defined within geographical boundaries; different countries have different systems. One may apply for a software patent in USA and obtain grant, but the same application might be turned down in Norway or by the EPO. IP systems are also under continuous adjustment and development, and therefore *a decision made by a court twenty or even three years ago might not serve as a precedent nowadays*<sup>4</sup>.

There are different views on the problem, depending on the stakeholders. The inventors wish strong intellectual property protection, in order to protect and stimulate investments. From the viewpoint of competitors, however, there might be times when they would like to “borrow” or “build on” good ideas to follow the “dominant design” that is established on the market. From the viewpoint of the consumer, thus of the society, we all lose if companies do not feel safe investing in research and development. We also lose when patents make it expensive for the majority of consumers to adopt the most elegant, useful and usable design, or when patents block further advancements of a specific technology. Companies should not forget that a compromise is licensing the technology, which translates to paying royalties to the innovators. Thus, the innovators obtain the proper credit and the awaited return of investment. It is important to note that holding a patent *is not a self-defined right*. It is a right given by society (as a limited monopoly) in exchange of disclosing information about the invention to the society.

As such, there is a conflict of interest where the patent holder wants to have the strongest possible protection while disclosing as little as possible. The society on the other hand, wishes for a comprehensive disclosure with weaker protection, thus making it possible for others to build further on the original idea.

Even if Facebook and Yahoo settled the lawsuit without money exchanging hands [65], there are patent trolls companies that file law suits against companies. This applies especially in the case of USA, where patents have been awarded for innovations that would have been rejected in most other countries. Combined with a litigation culture, this has created a field for multiple legal disputes, long lasting court battles and huge compensations for even small infringements. So severe has the problem become, that both lawmakers and companies started to fight back.

An example is the case with Alcatel-Lucent [65], which sued eight retailers, for – commerce patent infringement. Among them, it was Overstock and Newegg, sued for \$6 million and \$12 million, respectively. Newegg had a policy of never settling with patent trolls, and their strategy proved its value when a court ruled in 2013 that the patent in question was invalid. The governments started to step in, as, for example, in May 2013, Vermont took action against patent trolls when it passed legislation that allows businesses to sue patent trolls that have had “bad faith” claims for infringement. The defendants who lost would be forced to pay costs with the court up to \$150,000. Moreover, Chuck Schumer has introduced some piece of legislation to the Senate that would allow USPTO to check the validity of patent claims before a lawsuit can be filed in court. All these facts show that steps have been made in the right direction with regards to innovation and the stakeholder who is entitled to benefit from it, once the hacks/drawbacks from legislation are eliminated.

Patents had been in place from about 1474 [20], when the Republic of Venice passed a decree which stated that a new invention could be protected from imitation as long as it was useful, novel, and it worked. It is maybe interesting to see that not all countries established their patent protection systems at the same time. Tom Nicholas, an

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<sup>4</sup> Remark of Associate Professor Bjørn Otto Elvenes.

Associate Professor of Business Administration, Harvard Business School, shows in [20] a striking graph referenced from [27], if one considers United Kingdom on one hand and China on the other, for example. This information is shown in Figure 1. While United Kingdom had established a patent system already in 1623, United States did it roughly 150 years later, while China only 30 years ago. This has implications on effective litigation, i.e. it would be harder to litigate in China compared to the United Kingdom because the Chinese law did not pass the centuries of amendments that the United Kingdom law has passed [27].

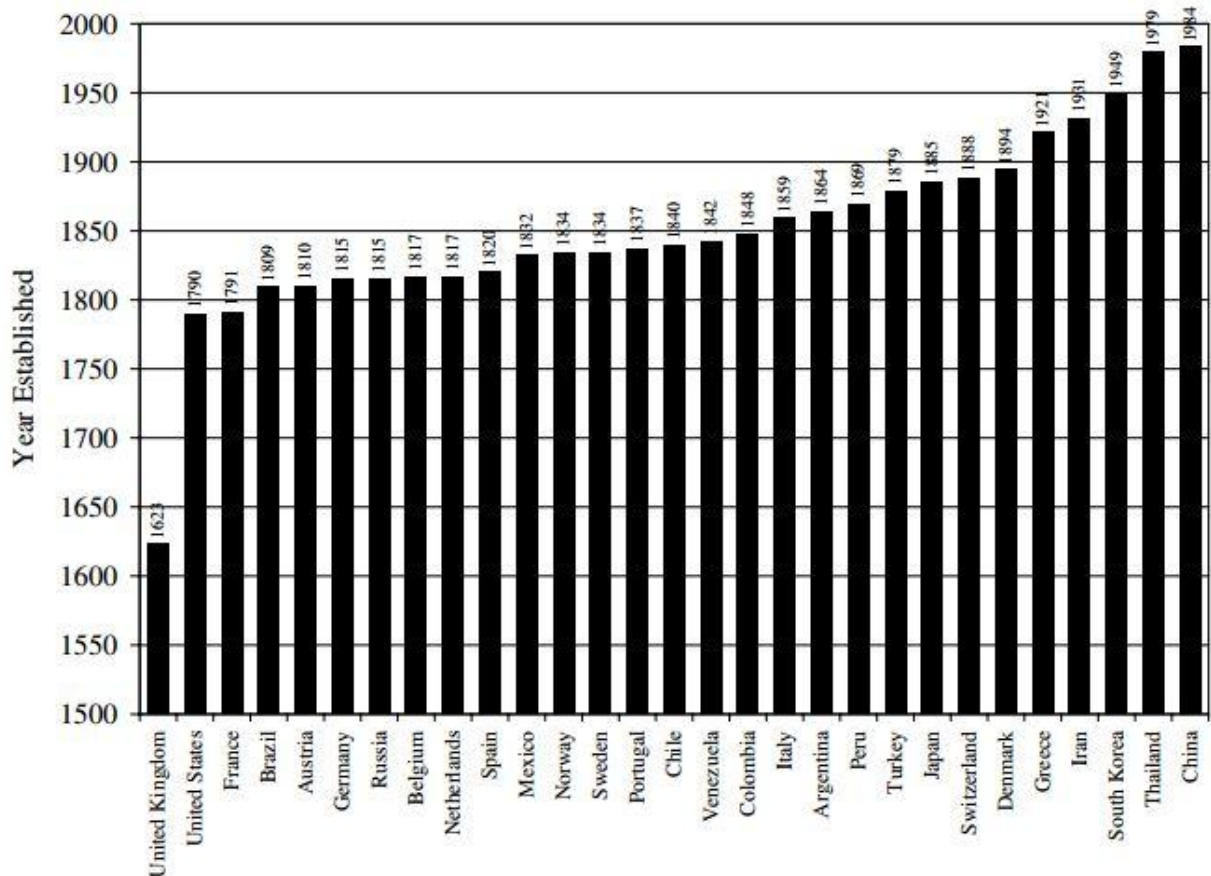


Figure 1 Years patent systems established [27]

## 1.2 Patent costs

Patents can be very expensive to maintain [46]. Moreover, one probably does not afford to fill patents in all the countries of the world, or better said maybe, afford to pay yearly maintenance fees for the respective patents in all countries of the world. This is because patent maintenance fees are expensive and different in each country, although sometimes the IP systems are similar (the case of the countries situated in Europe and members of the EPO). Therefore, a selection should be made, according to some criteria such as level of development of the IP system, culture of infringement, economic growth prospects, is the market appealing for selling or producing the respective products, is that a market that is promising on longer term, just as examples. Costs for maintaining patents can be high indeed, as, for example, for Europe, the cost can be as high as 319000€ over 20 years (Figure 2 from [46]). Therefore, along with a system that monitors when patents expire, there is a need for a strategy regarding filling them.

Preparing and filing the priority application	€ 10,000
Preparing and filing the PCT international application	€ 6000
Filing of national and regional stage applications <sup>a,b</sup>	€ 32,000
Prosecuting the applications before each of the Patent Offices <sup>c</sup>	€ 30,000
Validation fees and translations costs for Europe <sup>d</sup>	€ 41,000
Annuities for years 1 to 20 <sup>e</sup>	€
	200,000
Total costs over the 20 year patent term	€
	319,000

<sup>a</sup> US, EP, Japan, China, Hong Kong, Canada, Australia, India and Brazil.  
<sup>b</sup> Government filing fees, attorney/agent fees and translations.  
<sup>c</sup> Prosecution is the term used to describe the interaction between the applicants for a patent (via their legal representatives) and the various Patent Offices.  
<sup>d</sup> Validation in all EP member states.  
<sup>e</sup> Every country and region charges annuities during the 20 year patent term. The United States charges annuities only *after* the patent application issues as a patent and the total cost of the annuities is approximately € 4180 payable in 3 installments. In contrast the European Patent Office charges a yearly annuity while the patent application is pending and then yearly annuities are charged by each of the countries in which the European Patent is validated. The amount of the annuity varies by country. For example, assuming a patent application is pending before the European Patent Office for 10 years and then issues, the yearly annuity in Germany for year 11 is € 485. The yearly annuity in Germany increases each year with the yearly annuity due in Year 15 costing € 1070 and the yearly annuity in year 20 costing € 1950. Accordingly, the annuity fees due only in Germany for a 10 year period are currently € 11,850. Annuities over the lifetime of a Japanese patent are about € 8000.

Figure 2 Costs for a patent, over 20 years [46]

Some pieces of advice for dealing with patents is given by the author of [46] which has worked as a patent attorney for 18 years. Among them, to have an experienced patent practitioner as a board member, to have a legal framework (through employment/consultancy agreements and invention disclosure forms, as well as a publication policy), to conduct an IP landscape search, to determine if the technology can be protected by a patent, to consider the geographic scope of the patent application, and not forgetting about partnership agreements. The high long-term costs implied by a patent have been acknowledged by many authorities, and countries and entities such as EU try to drive down these costs. *Norwegian authorities stated that it would be cheaper nowadays for foreign companies to patent in Norway. The way this is implemented is by reducing the costs of translating the patent applications. If it will be approved, only the patent description needs to be translated into Norwegian while the rest may be written in English*<sup>5</sup>.

### 1.3 Problems and challenges of the IP systems

The IP systems have developed along many years, with numerous amendments improving them as time passed by. The IP systems present differences when compared one to another. This sub-chapter will discuss some of the issues and challenges of the various IP systems.

For example, there are different forms of IP-system logic and rewards. As such, sometimes governments are entitled to use compulsory licensing, when, for example, a new drug is discovered by a pharmaceutical firm. Although this might benefit the society as a whole (more patients receive treatment that becomes more and more affordable), the

<sup>5</sup> Remark of Associate Professor Bjørn Otto Elvenes.

inventors might lose the incentive to innovate. A *system of reward based on prizes* is discussed by the author of [20], in other words, the innovator should be awarded a significant prize for his invention by the society or state. This system has been implemented in Japan during the late 19<sup>th</sup> century to early 20<sup>th</sup> century. It was reported that prizes significantly boosted patents in prefectures where a prize competition took place and that they complemented patents by providing incentives for inventors to invest in novel technological discoveries.

Publicity also plays a role, as shown by the authors of a recent study [40]: making the inventor more dedicated to innovation if his/her success is made known publicly.

It should be noted that *a decrease of the patent fees* of 84% (the 1883 reform of the United Kingdom's patent system) did *not lead to a boost of innovation*, but to an increase of the number of patents as the author of [29] discovered. Therefore, if one considers shifting the overall level of innovation, reducing the patent fees does not seem to be the mechanism that allows this. This conclusion might apply especially in the case of Europe, which has high patent fees partly due to the translation costs in the official languages of the Convention on the Grant of European Patents (EPC) member states.

Moreover, there are studies on patent quality, such as [8]. The study shows that in 2009, the average time a patent spent in the queue was 34.6 months in the USA, 35.3 months in Japan and 41.7 months in the EPO. Moreover, between 1991 and 2009, the patent applications to USPTO surged 171% from 178,000 to 483,000.

Attention is drawn on *the need for a common view of quality and advocacy of increased collaboration* between patent offices is made by the authors of [8]. They consider that new laws should be backed by the management of these offices, continue sharing similar standards related to accuracy of the search of prior art; perform a calibration of the laws and practices to a common standard while accounting the errors in both directions, both from granting patents erroneously and failing to grant patents. Thus, lower fees might be charged in the future and patent examination would be performed faster. This translates to greater access to protection from the viewpoint of companies and better services offered by the patent offices from the view of the authorities.

Some authors wonder if the society would benefit altogether from *a world without intellectual property* [28], but they realize that this is not likely to be seen in the near future. It is more probable that the lawmakers will implement hybrid solutions, such as complementing patents with alternative mechanisms, such as prizes in sectors where social value is high, such as new medicine discovery or technologies that relate to the environment [20]. However, probably patents will dominate the domains where the private returns are the main focus of the industries.

It is worth to note that these insights stem out from very new studies, which are less than three years old, and that the report is based on literature that is on average less than five years old, not necessarily because I preferred the articles that are necessarily newer, but because the topic is so new that it did not raise such interest from the research community before the big lawsuits/patent acquisitions of the years 2000. Such headlines from 2011 are depicted in [24], for example: Google bought 1000 patents from IBM; Apple, Microsoft, RIM et al. bought Nortel's patents for \$4.5 billion; Oracle sued Google for \$6 billion over alleged Android infringement; Google acquired "*Motorola Mobility and its*



*17,000 patents for \$12.5 billion; Microsoft and Apple purchase 880 Novell patents for \$450 million.”<sup>6</sup>*

A more comprehensive study (considered 60 countries over 150 years)<sup>7</sup> referenced by [19] showed that strict rules regarding patents beyond an optimal level may damage innovation. Other authors<sup>8</sup> referenced in [19] showed that the increase in the number of patents does not increase innovation nor productivity, however another study mentioned in the paper showed that the patents do correlate with productivity. The authors<sup>8</sup> show that there were in history some inventions that were unpatented, such as the steam engine or the open source computer software. These inventions were outside the patent system, and it is difficult to make the assertion that one needs patents in order to secure innovation. The authors consider that another mechanism, such as first mover advantage, might be as appropriate, though less costly compared to patents.

In any instance, patents are granted as a device to reward creativity and inventiveness. It may be concluded, therefore that patenting, although important, is not a universal best way of encouraging innovative activities. The patent system may be regarded as one of the several tools that a society can use to encourage innovation and reward the inventors.

#### 1.4 Effects of IP systems and suggestions for improvements

One could ask oneself if patents create opportunities for innovation, or they hamper it. Such an author is Professor T. Nicholas of Harvard Business School, which recently published an article about patents, with the research question: “are patents creative or destructive?” [19]. The article is very interesting, as it shows in which area patents are to function, in which they can be damaging and where other mechanisms may join patents in order to increase the level of innovation. First of all, it is important to note that this question has arisen to society a long time before, when Netherlands decided to abandon patent laws in 1869, at a time when advocates claimed that patents provided damaging, monopolistic privileges. Years later, in 1912, due to political pressures, the Netherlands reintroduced patents. What happened was that certain sectors (such as food processing) saw an increase of innovation during the time period Netherlands abolished patents. This is mainly because this was an industry where trade secrecy dominated patenting traditionally. In other words, it seems the inventors kept their level of motivation for inventions; it is just that patent laws indicated the direction of the technological change. The author also cites his study<sup>9</sup> in which he showed that even if Britain reduced patent filing fees by 84% in 1883 through the Patents Act, the number of patents increased significantly, meaning that inventors patented more, but they did not innovate more. Another study<sup>10</sup> cited by the author showed that there is an elasticity of patent filings with regards to filings; each ten percents increase in fees translates to a 1 to 3 percents in patent filings.

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<sup>6</sup> [http://newsletters.articleonepartners.com/news\\_f1317eac-ee13-5a66-d0f5-38ea99a4c1eeLTE-Standard-Essential-Patents-Now-and-in-the-Future.pdf](http://newsletters.articleonepartners.com/news_f1317eac-ee13-5a66-d0f5-38ea99a4c1eeLTE-Standard-Essential-Patents-Now-and-in-the-Future.pdf) accessed August 2014

<sup>7</sup> Lerner J, 2002, 150 Years of Patent Protection, *American Economic Review*, vol.92, no.2, pp. 221-225

<sup>8</sup> Boldrin M & Levine D, 2013, The Case Against Patents, *Journal of Economic Perspectives*, vol. 27, no.1, pp. 3-22

<sup>9</sup> Nicholas T, 2011, Cheaper Patents, *Research Policy*, vol. 40, no.2, pp. 325-339

<sup>10</sup> de Rassenfosse G & van Pottelsberghe de la Potterie B, 2013, The Role of Fees in Patent Systems: Theory and Evidence, *Journal of Economic Surveys*, vol. 27, no. 4, p. 696

Moreover, the authors<sup>11</sup> of another study mentioned in the [19] paper concluded that the European aeronautics advanced at a faster pace compared to the USA, mainly because Europe was not constrained by patent disputes. Thus, societal costs are high, when intellectual property monopoly is protected, as with the Wright Brothers in USA. The same author of<sup>11</sup>, Mark Lemley<sup>12</sup> cited in the [19] paper considers in his study that although the jury in San Jose, California, obliged Samsung to pay Apple in excess of \$1 billion, the real costs of the patent war were in the region of \$15-20 billion. This was also because resources were redirected away from productive outcomes. The authors<sup>13</sup> of another study cited in [19] reached the conclusion that patent pools decreased the competition level and with it the incentive to innovate. The author of [19] discovers then that patent trolls are not the only ones to damage innovation. They force the defendant to allocate resources to defense, at the cost of R&D investments. It is interesting to see that also patent pools, the so-called “defensive” aggregators, damage innovation too, because the level of competitiveness between its members is reduced. Thus, both patent aggregators (aggressive, the trolls, and defensive, the patent pools) are a threat to the welfare of society.

Possible improvements of the IP systems are considered by the author of [19]. As a general fact, the IP system in the USA is not in a state as good as the one in Europe is now. The author considers that there are some interesting solutions to the issues posed by patents. Among them, he suggests one that is proposed by the book of authors<sup>14</sup>, cited in the [19] paper, that is to avoid weak patents as they are susceptible to litigation. This they stated has an effect on the resources companies allocate for research and development, for innovation, and therefore the economic development is slowed. They also stated that for improved objectivity, in USA, the jury should be replaced by judges and that the “first-to-invent” rule in the legislation should be replaced by the “first-to-file.” In the meanwhile, this has been already done in the USA<sup>15</sup>. In Norway, as well as in other countries, the legal system dictates that the IP litigation may be done only in specific courts, either courts especially created for these IP tasks or general courts that have developed specialized expertise within the field. In Norway, the IP case may be filed to *Patentstyret* for a decision or to a court in Oslo for litigation<sup>16</sup>.

The offer of prizes replacing or being at least complementary to patents is the other solution proposed by the author of [19]. Prizes must be not necessarily monetary, in the author’s view [19]. He shows that it has been proved along history that the prize competitions were mostly non-monetary (offered medals and public appreciation), however they served as the good means to diffuse new ideas and boosted innovation. Authors<sup>17</sup> cited in the [19] paper considered the problem of the number of participants: a high number of participants, the effort would be reduced on average, but at the same time, a solution at the tail of distribution would be found, they state. For less uncertain

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<sup>11</sup> Lemley M A & Shapiro C, 2005, Probabilistic Patents, *Journal of Economic Perspectives*, vol. 19, no. 2, p.75, p.80

<sup>12</sup> Lemley M, 2013, Software Patents and the Return of Functional Claiming 29, Stanford Working Paper available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2117302](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2117302)

<sup>13</sup> Lampe R & Moser P, 2012, Do Patent Pools Encourage Innovation? Evidence from 20 US Industries under the New Deal, Stanford Working Paper available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1967246](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1967246)

<sup>14</sup> Jaffe A B & Lerner J, 2008, *Innovation and its discontents: How our broken patent system is endangering innovation and progress, and what to do about it*, Princeton University Press, Princeton, New Jersey

<sup>15</sup> Remark of Assoc. Professor Bjørn Otto Elvenes

<sup>16</sup> Consideration of Assoc. Professor Bjørn Otto Elvenes

<sup>17</sup> Boudreau K J, Lacetera N & Lakhani K R, 2011, Incentives and Problem Uncertainty in Innovation Contests: An Empirical Analysis, *Journal of Management Science*, vol. 57, no.5, pp. 843-863

problems, a smaller pool of participants would be preferable as they would find a more efficient long-tail solution.

It seems that the IP systems are far from being perfect and that they are amended continuously. As they get better, it will also be harder to browse through the piles of existing patents (that accumulate year by year) and to consider all patents properly when analyzing a patent grant. Therefore, steps should be done in the direction of patent quality preparations/improvements, in my opinion.

### 1.5 Why companies apply for patents

Companies patent for a multitude of reasons. For a similar number of reasons, companies might choose not to file for a patent. The author of [19] offered some explanations to the question why companies still patent if they have the secrecy tool at hand. One explanation the author found is that startups tend to wish to avoid expropriation of their ideas and to establish legal rights for an invention to be sold on the marketplace. Moreover, other authors<sup>18</sup> cited in the [19] study claim that in the case of high-technology industries, there is a high possibility that several inventors make simultaneously a discovery. Therefore, a patent could be more useful compared to secrecy, in this case. This is because it helps assuring financing further development and commercialization. Many times, investors and financiers demand an invention to be patented before they would back it up with investments. A patent acts as both an indicator of the quality of the idea and as a safeguard for the investments. In these circumstances, stronger patent protection enables innovation, as society benefits from invention disclosure and diffusion of knowledge.

According to another author<sup>19</sup> cited in the [19] study, approximately 60% of patents were effectively terminated within four years at the level of 1984, because of the natural obsolescence of the technology. If I consider Moore's law<sup>20</sup> of doubling of transistors in a microprocessor every two years, a law that has proved its use until nowadays, I would tend to agree with the finding, even if it is 30 years old.

One should consider too<sup>19</sup>, that there is a lag between inventions (when the patent application occurs) to commercialization. This lag depends primarily on industry (take pharmaceutical versus all others, as an example). A longer gestation for patents translates to a shorter "effective" term. Shorter patent lives are socially optimal, according to some of the authors<sup>21</sup> cited in [19]. Moreover, for instance, another industry- the semiconductor industry is highly cumulative [19]; it is based on prior knowledge for improvement, compared to as an example, consumer products. This might explain why companies launching products with short life spans do not bother patenting their innovations.

To conclude, my opinion regarding patents is that they are nor destructive nor necessarily creative, but they are an imperfect system of reward for inventor's creativeness and innovation. This system can be improved over time-and probably should be

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<sup>18</sup> Kultti K, Takalo T & Toikka J, 2007, Secrecy versus Patenting, *Rand Journal of Economics*, vol. 38, no.1, pp.22-42

<sup>19</sup> Mansfield E, 1984, *R&D and Innovation: Some Empirical Findings in R&D, Patents and Productivity*, University of Chicago Press, Chicago, Illinois

<sup>20</sup> Moore G E, "Cramming more components onto integrated circuits, Reprinted from *Electronics*, volume 38, number 8, April 19, 1965, pp.114 ff.," *Solid-State Circuits Society Newsletter, IEEE*, vol.11, no.5, pp.33-35

<sup>21</sup> Budish E, Roin B & Williams H, 2013, Do Fixed Patent Terms Distort Innovation? Evidence from Cancer Clinical Trials, *MIT Working Paper* available at <http://www.nber.org/papers/w19430>

*continuously* improved, rather than *suddenly pause/stop* it. I hardly imagine it would be abolished in the near future, because there are industries where secrecy could not function effectively (for example, the high-tech industry, where innovation is led by the technological change and where the risk of competitors discovering the same inventions is high). Moreover, the patent system functions nowadays as an industry by itself, in my view: inventors who see elevation of status in companies, existence of patent offices & patent examiners, lawyers, courts and litigation, knowledge in the intellectual property world and the experience of all the past years. All these cannot be simply wiped out for a specific period of time, as with using a “switch” throughout the world, all at once.

## 1.6 Patent markets and their main players

Before going deeper into patent strategies, I consider it is important to understand the patent marketplace, with its opportunities, threats and main players. Where can a patent owner look for ensuring a constant flow of revenue for its IP, or where could have a look an IP buyer, interested in a specific technology? Applying for, owning patents and winning litigation suits, all these help building and maintaining reputation, thus avoiding future litigation, as the authors of [75] have revealed.

The company value is sometimes (for the listed companies) determined on the stock exchange, by the value of its constituent shares. There is a question I asked myself, and I found an answer in the literature. If a company is successful in owning a significant number of patents, will its share price tend to increase, for example, due to improved reputation? I found the article [14] of the same author as [19] which took data from 1920 to 1930 and analyzed it. On October 29, 1929 the stock market crashed, and a deep crisis followed. It is relevant for the study as quite recently, in 2009, to a comparably lesser degree, a global financial crisis appeared, and it impacted the share price of various companies on the stock markets. A question that may arise: is there a correlation between the run-up of share prices due to patenting activities and the reset due to the stock market crash?

It seems that the ‘20s were a period dominated by high technological innovations. Investors valued patent capital, and as a consequence, it was an important component of the 1920 stock market run up. The crash however was not determined by an over-valuation of the patents that the companies owned or filed for, but rather by other influences. It is interesting to wonder then why during 1930s, the stock rose as before, even if companies secured influential patents, that had a real effect on their productivity or efficiency (with the newer technologies; they were able probably to produce more compared to competitors, or at a lower costs). One author<sup>22</sup> cited in the [14] paper stated that the collapse itself destroyed the mood for speculations of positive expectations. These expectations were to be built on future free cash flow. Therefore, what in the past contributed greatly to the rise of the share prices among industries, had a lesser importance in the 1930s.

I would add my personal following comment regarding patents and stock markets: I consider that a larger patent portfolio is even more important for the share increase of the companies (compared to the 1920s), as it denotes not only creativeness, inventiveness and expertise of the inventors, but also financial resources to deal with, file and keep a patent portfolio, power of negotiation within patent pools through cross-licensing-thus minimizing the risk of costly litigation by competitors, the possibility of licensing out some

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<sup>22</sup> Galbraith, J K. 1989. The Great Crash. London: Hamish Hamilton, p. 171

of the patents (thus securing additional revenue), and of course, obviously, protecting the company's share on the market.

There is a problem with this, that a large patents portfolio might mean large potential value. This holds true if one assumes that all patents in the portfolio are valuable. The substantial value however is determined by the company's ability to create a future positive cash flow or its capacity of commercializing these patents. It could be however that a company might plan to develop an extensive portfolio containing a few "gold nuggets" patents and the rest marginally valuable patents. This could be done as negotiation cards in cross-licensing agreements. In such negotiations, not only their value, but also the number of patents matter<sup>23</sup>.

To conclude, I think that investors are even more receptive to the value of the patents nowadays, compared to how they were back in the history. However, patents are of course not the only weapon that can secure a competitive advantage on the market, therefore, it can also be the secrecy, or the lead time, or using complementary systems. But I will come back to these later in the study.

A firm may obtain patents through patent applications of its employees, or acquire them from the market, if not licensing them, or joining a patent pool. There are patent aggregating parties on the market. There is a book [64] that gives some names of recent patent aggregating companies both in USA and Europe. A company seeking to buy, license or sell patents, would probably consider contacting one or several patent aggregating companies such as the ones shown in Figure 3.

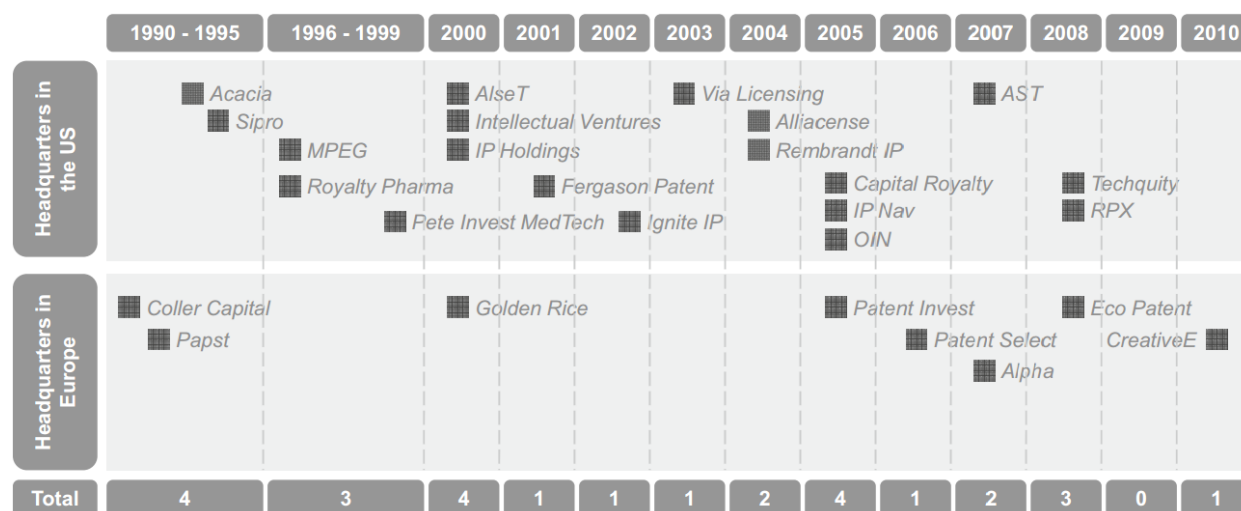


Figure 3 Example of patent aggregating companies from book published in 2013 [64]

The main activity of the companies is different, as each has a different strategic goal, as shown in Figure 4. It is maybe important to explain that "carrot" licensing is also known as opportunity licensing while "stick" licensing is also known as enforcement licensing. Their strategies can be aligned with the IP strategy of the company, which should follow in my view the business strategy; there should be a correlation between the business strategy and the IP strategy, especially because when in litigation, the resources a company invests are drawn up from sectors that are more productive, such as R&D just as an example. The authors of [64] refer to defensive patent aggregators in a similar way the authors of [31] mention them-as the fifth category of patent intermediaries. Their findings shall be described in the next paragraphs.

<sup>23</sup> Comment of Associate Professor Bjørn Otto Elvenes.

Patent aggregating companies acquire large amounts of patents to....

...generate revenues (basic strategy I)	...serve an objective (basic strategy II)
<ul style="list-style-type: none"> <li>• <b>Patent acquisition company: Selling, stick- and carrot licensing – applying arbitrage strategies</b> (Coller Capital, Intellectual Ventures, Techquity)</li> <li>• <b>Patent enforcement company: Stick-licensing infringed patents</b> (Acacia, Alliacense, CreativE, Fergason Patent, IP Navigation, Papst, Rembrandt)</li> <li>• <b>Patent incubating fund: Carrot licensing refined technologies</b> (IgnitelIP, IP Holdings, Patent Select)</li> <li>• <b>Patent trading fund: Mainly selling patents</b> (Alpha Patentfonds, Patent Invest)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Defensive patent aggregator: Offering insurance against infringement lawsuits to members</b> (Allied Security Trust, OIN, RPX)</li> <li>• <b>Non-commercial patent aggregator: Offering technology access to a broad range of users to foster innovation and society</b> (Golden Rice, Eco-Patent Commons)</li> <li>• <b>Patent pooling company: Offering access to standards</b> (MPEG, Sipro Lab, Via Licensing)</li> <li>• <b>Royalty moentization company: Offering alternative source of capital</b> (AlseT, Capital Royalty, Pete Invest MedTech, Royalty Pharma)</li> </ul>

Figure 4 Business models of patent aggregating companies and their strategies [64]

There is a very recent and interesting article in the Journal of Economic Perspectives [31] (related to [64]), of Business Administration Associate Professor Andrei Hagiu and Competitive and Corporate Strategy Professor David B. Yoffie, both associated with Harvard Business School. The authors [31] divide the patent intermediaries into **traditional aggregators, platforms, defensive aggregators** and **super-aggregators**. They begin by stating that even if big corporations sue each other-they offer same examples as in [62, 63], patent buyers and sellers do not find one another with ease. This is because there is no platform such as eBay, Amazon for exchanging patents. When patent owners meet each other, the uncertainty under which they carry negotiations is high: the prices vary widely from transaction to transaction, while the terms of transactions are well-kept secrets and are most often confidential. There are of course patent brokers, patent pools and even standard-setting organizations that address this problem. There were several online platforms, but they did not gain meaningful importance. The last decade has seen the rise of new intermediaries, which the authors call defensive patent aggregators and super-aggregators. The latter tend to become quite influential and controversial.

The first category [31] is that of **traditional patent aggregators**. These are the patent brokers. They help patent owners license or sell their technologies in exchange of a fee. On average, such patent brokers tend to be small companies with fewer than 10 employees. Some examples are Thinkfire (<http://www.thinkfire.com>), IPValue (<http://www.ipvalue.com>), Pluritas (<http://www.pluritas.com>) and Competitive Technologies (<http://www.competitivetech.net>). Such patent brokers existed since at least 1870, and they had a positive effect on the US market for patent technology, according to a study<sup>24</sup> mentioned by the authors [31] which investigated 50 years of patent brokerage. As

<sup>24</sup> Engerman, S L, Hoffman P T, Rosenthal J-L, & Sokoloff K L. 2003. Finance, Intermediaries, and Economic Development. Cambridge University Press, New York

years ago, the patents did not describe hundreds of technologies as today, and because it was not often that patent brokers dealt with patent portfolios, the overlap of patent boundaries were rare. Therefore, the job of today's patent brokers is much harder compared to those of over one century ago. According to a study<sup>25</sup> cited by the [31] authors, patent brokers charge fees which are more than 10 percents of the value of the transaction, while sometimes they might reach 20-30 percents. This high level signaled that there are inefficiencies in the patent market [31].

There are also **patent pools** (the second category) [31], which are made of formal or informal organizations in which firms come together to license patents to other parties. Such examples are the MPEG-4 or the Bluetooth standard. Patent pools were created in order to solve the problem of "royalty stacking" [31]. This means that unless the firms join in order to have stronger negotiation power, each of them is forced to pay higher license fees as single buyers. The authors [31] cite literature<sup>14,26</sup>, where it is shown that there are several drawbacks of the patent pools: first, it enables secret price trading at the expense of price competition. Second, they may create barriers to entry and innovation, favoring the large corporations with big patent portfolios, discriminating against small companies or individual inventors, for which entry into the pools is harder. Third, patent pools might apply to a small number of markets, as the intellectual property is evenly distributed among several large or well established players.

There are de-facto standard setting organizations, which are mainly enabling different players obtaining good inter-operability of their products on the market. These organizations experience conflicts due to the influence of the large producers in the market, each advocating its standard over the others. Moreover, these standard players do not represent all industries or technologies, relative to the size of the entire market. Therefore, it is important to conclude that professional brokers tend not to pay attention to individual inventors, and as such, small inventors are not helped to be paid for their innovative ideas. The authors<sup>14,26</sup> had in focus the IP market of USA, mainly.

The third type of platform the authors refer to [31] is the **non-practicing entities, (NPE) also called "patent trolls."** They are the most controversial patent intermediaries. These entities do not innovate themselves; they acquire patents from the individual inventors for sums close to \$100,000 as median and \$400,000 as mean, per patent<sup>27</sup>. However, afterwards then they seek licensing revenues by threatening companies with litigation or even litigating. The phenomenon of litigation got traction in the last decade, and especially since 2011, the time of the known lawsuits [31, 62, and 63], see Figure 5.

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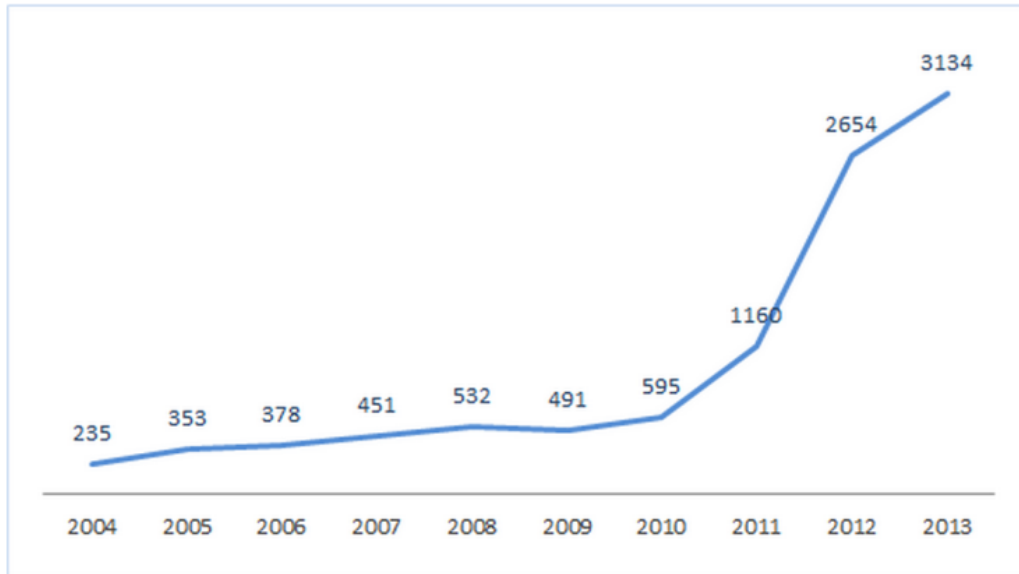
<sup>25</sup> Young, E. 2008. "Patent Marketeers." San Francisco Business Times

<http://www.bizjournals.com/sanfrancisco/stories/2008/03/24/focus1.html?page=all> accessed August 2014

<sup>26</sup> Lemley, M.A. & Shapiro, C. 2005, "Probabilistic Patents," *The Journal of Economic Perspectives*, vol. 19, no. 2, pp. 75-98

<sup>27</sup> According to [www.PatentFreedom.com](http://www.PatentFreedom.com), accessed by the authors of [31] on December 2010

**Patent Lawsuits Involving NPEs Over Time**

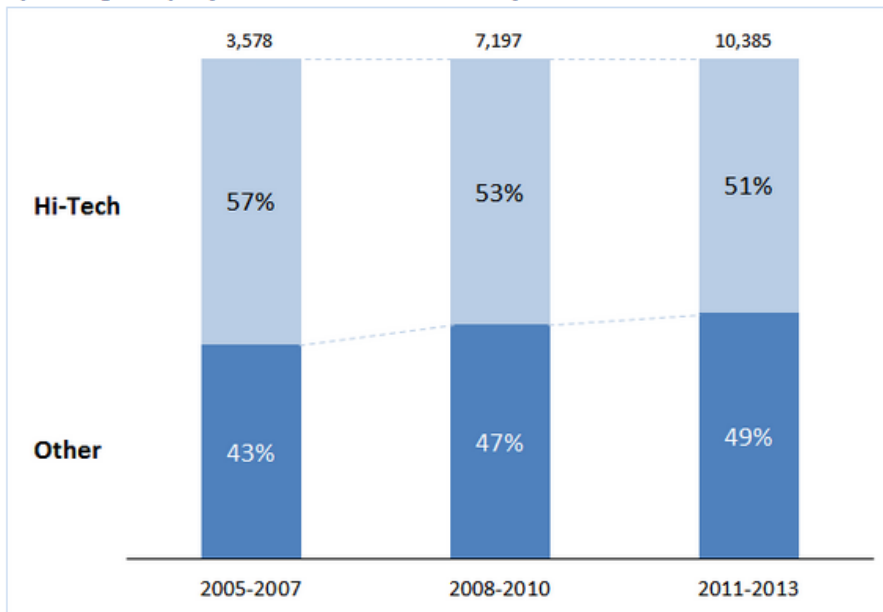


**Figure 5 Patent lawsuits involving nonpracticing entities over time**  
<https://www.patentfreedom.com/about-npes/litigations/> data captured as of 21 June 2014)

In the Appendix, Table 2 it is shown the list of non practicing entities ranked using the number of patents they own in United States. The largest NPEs (Intellectual Ventures and Interdigital) control several thousands patents.

In Figure 6 it is shown that the most exposed sector to litigation has traditionally been the hi-tech (hardware, software, semiconductors, communications and consumer electronics). This observation is in line with the one of [91]. Over recent years, the producers of this industry suffer less, as nowadays NPEs litigate not only them, but also the sellers/distributors and even users (<https://www.patentfreedom.com/about-npes/industry/> accessed June 2014).

**Operating Company Parties in NPE Lawsuits by Sector**



**Figure 6 Industry sectors where NPE lawsuits occur over time**  
<https://www.patentfreedom.com/about-npes/industry/> accessed June 2014)



The authors of [31] state literature<sup>28,29,30</sup> which shows that in itself, the non practicing entities are buying and selling patents, and this increases market liquidity and a way for small patent owners to be paid, similar to dealers in financial markets. However, NPEs can create harm through two practices: first, they typically sue many companies at once for moderate amounts, in order to increase the odds of the target to settle instead of risking a costly and uncertain trial. Second, they attempt to hold up companies by litigating at the most vulnerable time, such as just before the release of a new product, when it is hard for the target to afford a risky trial. They show that the literature exposes the case of Rambus<sup>29</sup>, which has been accused by memory chip companies that it ambushed the industry with litigation shortly after a new industry standard had been set.

However, IP trolls might encounter higher obstacles in several countries that implemented measures against actions taken by them. As an example, the IP owner may be obliged to inform the infringer without delay about possible infringements. Discovering a potential infringement and then waiting for a year before taking action, while being sure that the value of the infringement has increased, might be illegal in these countries. This has implications on the internal IP strategy of the company, which should actively monitor product launches and patent filings of competitors in these markets.

The fourth type of platform the authors of [31] refer to is the **online marketplaces** or **live auctions**, which are a two sided patent platform, ideally impartial with the buyer or seller. Online marketplaces have existed since 1998 [31]. Most of such platforms did not have success and have been shut down. There are several which survived, among them Yet2 ([www.yet2.com](http://www.yet2.com) accessed June 2014) and Tynax ([www.tynax.com/topicdirectory](http://www.tynax.com/topicdirectory) accessed June 2014). They both work with Fortune 500 companies, and they both stress the importance of the confidentiality of their customers (the buyer or seller can search the platform for patents for new technologies, without their identities). Transactions are not completed online, but rather Tynax or Yet2 manage the process after a buyer or seller shows the real interest in closing a deal with a possible partner. The revenues of these two online marketplaces come from commissions: \$100,000 to \$10 million for Tynax and 15 percent of licensing fees for Yet2 [31].

On the other side, the **patent auctions** [31] such as Ocean Tomo auctions between 2006 and 2009 did not have much success (the authors cite a paper that shows revenue of \$114.6 million; this is not a high amount if one will consider the value of the entire IP that exists in the world, or the average sum that one pays for a patent). Part of the reason is that the auctions experienced low participation and little bidding [79]. Ocean Tomo's auctions never had enough scale to convince buyers and sellers that they would become an important platform for trading patents. The most active bidders were a handful of nonprofit entities [80]. Patent owners preferred direct licensing, selling to non-profit entities, or even raising funding from venture capitalists and pursuing patents in own products. This happened because they did not expect these platforms to offer attractive capital from their assets. Other part of the reason is that there is general distrust of the confidentiality information in the on-line domain and the need to have the "close-touch" and personal relationships for the transactions of the sensitive intellectual property

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<sup>28</sup> McDonough, J F, 2006, "The Myth of the Patent Troll: An Alternative View of the Function of Patent Dealers in an Idea Economy," *Emory Law Journal*, Vol. 56, p. 189 available at SSRN: <http://ssrn.com/abstract=959945>

<sup>29</sup> Schmalensee R, 2009, "Standard-Setting, Innovation Specialists, and Competition Policy," *The Journal of Industrial Economics*, vol. 57, no. 3, pp. 526-552. Available at SSRN: <http://ssrn.com/abstract=1219784>

<sup>30</sup> Spulber D F, 2011, "Should Business Method Inventions be Patentable?," *Journal of Legal Analysis*, vol. 3, no. 1, pp. 265-340 available at <http://jla.oxfordjournals.org/citmgr?gca=jla%3B3%2F1%2F265>

information [31]. To add more, the final transaction prices and valuations were confidential information, and they could not be shared with the general public, and thus the transparency and the liquidity in the patent market would not be improved.

Related to patent auctions, the author of [45] depicts some conclusions with regards to a patent auction which took place in San Francisco in 2006. It seems that the smallest price paid for a patent was a very small one indeed (a few hundred dollars), while the average price was several tens of thousands of dollars. The public feared that the trolls would afford the most valuable patents and that the social welfare would be affected. Even if that could be a hostile process, that approach would maximize the value of the patents in the market, through established royalty fees. It seems that even if IP auctions model the average auctions (reserve price of the seller, 25% fees to the auction firm, highest bid wins, etc.), these kinds of auctions are at their infancy. The reasons are related to the trust in the market, to the limited time that the buyer has to do necessary checks, to the suspicions of the buyers that the advertised patents are probably not valuable at all, among many others. Only time will prove if this market tool will see an expansion and further development.

The author [45] identified some weaknesses of the patent auction system: the more patents are listed in the auction flyer, the more time is necessary to spend in order to conduct the investigation of the patents. This is because usually the auction firms release the patent lists only weeks before the auction. This puts pressure on participating firms, which translates to more money spent to trustworthy sources, such as attorneys and patent brokers. Legal diligence is the most crucial part of any IP transaction, the author [45] claims.

Patent professionals also wondered if there were any 'valuable' patents in the auction, in other words, why the owner would try to sell them. They probably were chosen after a pre-selection process by patent professionals, for reasons related to the relation of protecting a non-core part of the business [45]. Moreover, the author assumes that they would not put into the market 'gold nuggets'. These risk being acquired by patent trolls. This would affect the image of the company on the marketplace, as it would be associated with a patent troll following the sale.

The author [45] finds more viable if a court would organize such an auction in cases of bankruptcy. Not only the company in difficulty would not be able to make the pre-selection, but also it would allow more time for interested parties to check the patents being put on auction. Commercial auctions are not a consequence of the bankruptcy of the patent parent company, however they enable inventors monetize their dormant intellectual property. The author [45] concludes that it is safer and better for a patent owner to entrust his patent portfolio to a patent broker, rather than to a patent auction. This is because these professionals would conduct due diligence and make efforts to ensure appropriate returns to patent owners, thus avoiding patent value dilution.

I could conclude myself on patent auctions that are interesting ideas, I would add some critique that both [31, 45] articles are considering only the US patent market and that the situation could be different in other parts of the world, for example Asia, in countries in which the state might have if not a higher influence on the markets (compared to corporations), but at least for sure not negligible (China for example). If these countries shall develop their legislation, they could advertise patents owned by research institutes or even universities.

I consider owning patents an expensive business, and I reckon that if universities (in US and Europe, too) would form an entity similar to a syndicate in order to organize patent auctions, then they would be able to offer a high enough number of patents in order to attract attention and also probably offer patents of convenient value at affordable

starting prices. Moreover, to avoid aiding patent trolls, they might include terms regarding applicability of the patents in a scheduled real product, in other words a sale would not be completed if the buying entity had a patent troll litigation behavior or has been created just before the auction.

There seems to be indeed a need for an intermediary on the IP market, one that has good knowledge of the relevant technologies and the potential uses, a contact between the interests of the buyer and of the seller. The average buyer and average seller could not be expected to have these contacts and the necessary overview. This might be an indication that either the market is not mature enough for such intermediaries, or that the right tool for facilitating such a contact has not been determined yet, or that the actors do not fully trust these mechanisms because they are fairly new and have not created the necessary trustworthiness in the market<sup>31</sup>.

The fifth and last category of [31] is that of **defensive** and **super-aggregators**. From the first sub-category, there are two main firms: RPX (for-profit, founded in 2008 and publicly traded on NASDAQ from 2011, [www.rpxcorp.com](http://www.rpxcorp.com) accessed June 2014) and Allied Security Trust (not-for-profit, known as AST [www.alliedsecuritytrust.com](http://www.alliedsecuritytrust.com) accessed June 2014). These offer an insurance policy against patent troll risk to large businesses. Such firms pay annual subscription fees ranging from \$65,000 to \$6.9 million, depending on operating income (this is the information the authors of [31] obtained in May 2012, as of June 2014 the link they refer to does not work). For these yearly fees, RPX identifies patents that might threaten subscribers, buys the patents (or the rights to sublicense them) and provides all its subscribers with licenses to those patents. They are also made available for members that plan to use them in counter lawsuits against nonmembers. It is important to note that RPX bears no liability if a subscriber is sued or if it loses a patent case.

The way in which Allied Security Trust works is similar, but different to RPX, in the sense that it identifies patents, and then solicits bids from its subscribers, the bids and identity of subscribers being kept secret from one another. Only the members who were successful with the bidding process receive a license for the patent, by comparison with RPX where all members receive this right to license. While RPX licenses have vesting periods, Allied Security Trusts are perpetual and members who did not bid can still purchase a license with the price of the highest bid. Moreover, AST always tries to sell the patents, while RPX only if they are not of interest for its subscribers. RPX made an intriguing public remark, never to try to obtain profits through litigation. This assures companies that RPX will not act as a patent troll. However, corporations that do not pay the membership fee might benefit as much as the members, as once the patent reaches the hands of RPX, they are safe. For this reason, RPX tries to sell the patent shortly after it had granted sublicenses, partly to obtain profits and keep low membership fees and partly to add a feeling of insecurity to non-members. Although this approach complicates the decision for members, their homepage claims that 90% of members renewed their subscription (<http://www.rpxcorp.com/why-join-rpx/> accessed June 2014).

However, I am cautious about this last information, as the company is founded in 2008, the average length of the subscriber's contract is 3 years. Therefore it might be too early to draw clear conclusions about its efficiency. There is a drawback, that in the market, RPX for example will find it hard to establish stronger patent purchasing power compared to patent trolls, because of its business model. Moreover, as RPX represents the interest of its members, mostly large corporations such as Cisco, HTC, IBM, Intel, Microsoft, NEC, Nokia, Panasonic, Research in Motion, Samsung, Sony and others, patent owners might try

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<sup>31</sup> Thoughts of Associate Professor Bjørn Otto Elvenes

to suddenly increase the price of the patent they hold because they perceive it as a sign of interest from its subscribers, which are as acknowledged, high revenues companies. This behavior is referred in literature as “awareness-inducing information” [81]. RPX tries to reduce the impact of this problem by using shell companies to buy patents in the interest of the syndicates that it formed among its subscribers [31].

There is a multitude of companies that sell IP insurances, though their coverage is not unlimited, but reaches the \$1 million limit generally in the case of patent infringement, according to Chapter 9 of book [32]. Among the companies that offer patent litigation insurance are *Intellectual Property Insurance Services Corporation* (<http://www.patentinsurance.com> accessed June 2014), *Samian Underwriting Agency* (<http://www.samian-underwriting.com> accessed June 2014) and *Swiss Re Group* (<http://www.swissre.com> accessed June 2014, provides solutions to companies with global revenues in excess of \$250 million). *Ambridge Partners* (<http://www.ambridgepartners.com/> accessed June 2014) offers insurance also if the company has been sued for infringement, it lost and the appealed the verdict. The decision regarding insurance should be taken after being advised by both an insurance consultant and a legal counsel. Other companies mentioned in the book chapter offer insurance for protection in case of copyright and trademark infringement, media liability, privacy liability, invasion of privacy, internet exposure defamation, etc.

In any case, the insurers never share data with the applicant, however it checks if: applicant is able to supply a full inventory of its IP, if it has patents of its own, if the applicant has received several offers to license or warning letters, if it had already been involved in patent litigation, if it is in a high risk industry such as medical devices, technology, telecommunications, consumer or pharmaceutical, if the applicant represents a threat to the leader of the market, if it cannot identify its competitors, if it does not monitor patent activity in its domain. This process rarely takes less than two weeks and usually it takes four to six weeks. For \$1 million coverage, the applicant will pay around \$20,000. This will be adjusted accordingly after the criteria exposed above would be applied.

I would make an analogy of this type of insurance with the automotive and house insurance policies, it has been proved that the more the subscribers, the more affordable it becomes, and then it becomes easier for companies to take the decision of buying such a premium and thus be at shelter in case of litigation. Thus the cost of managing the risk of litigation would become smaller and smaller, in case such type of insurances would get traction.

There are however less costly methods of solving out litigation. They are named “*alternative dispute resolution*,” on short ADR, according to chapter 10 of [32]. They might be faster, too. ADR tools are used in negotiations, contracts and deals. The most used types worldwide are negotiation, mediation and arbitration. In some countries, courts require parties to go through mediation before they start a civil court proceeding. For negotiation to succeed there has to be a desire of both parties to settle, without proceeding to the court. In the case of mediation, parties select a neutral person, to assist them in solving the dispute. The mediator has no power to reach a solution, and must remain neutral. Regarding arbitration, parties are to submit their conflict to a neutral individual, for them to reach a decision which is binding. The arbitrator is an expert in the field, not a judge. The parties pick the arbitrator. An example is the World Intellectual Property Organization (WIPO) Arbitration Center [32]. Other ADR are combinations of negotiation and arbitration, mainly, mini-trials or summary jury trials. ADR offer some advantages that lawsuits fail to give, such as: confidentiality, lower expenses (more so for mediation

compared to arbitration), usually better outcome because of settled conflict, they are much faster, they preserve the relationship with the patent attorney, solve international conflicts (national courts may not do this, they have a specific jurisdiction) and better control in the case of negotiation or mediation compared to the case of arbitration or litigation. A company interested in finding a mediator should consult the list of certified mediators of the International Mediation Institute (<http://www.imimmediation.org> accessed June 2014).

There are however disadvantages of ADR, such as: no guaranteed resolution, decisions are generally definite, therefore space for appeals, attention needed by management, perceived as weakness. However this is not true, as even if mediators are not as knowledgeable with regards to IP, so are judges, the authors stated. They know the legal system, but not the technical details of the patents. Mediation is an elegant try of solving a conflict, and maybe necessary in the case of trademarks, as it preserves a company's reputation and image and keeps conflicts with competitors confidential and private. One contract between an airline company and a software company had a mediation clause, and only thanks to this the companies continued to do business even after they settled the conflict. It is of course important to have agreed on a good mediator.

To conclude, in face of the risk of litigation, insurances are not the only option, as they are costly, while lawyers and proceedings in legal courts are very expensive and time consuming. Mediation and the other ADR techniques might offer a more rapid, elegant and cost-effective solution, though this might not help that much in the case of patent trolls, I think.

Returning to the sub-categories of patent aggregators [31], there is the second subcategory, that of **super-aggregators**. They are the largest and most controversial IP intermediary. The example authors [31] give is Intellectual Ventures, which is a hybrid between a defensive aggregator, a patent troll, a "weapons dealer" which can supply IP to both litigants in the patents battle. Founded in 2000 by former CTO of Microsoft, Nathan Myhrvold, it raised \$5 billion from investors and as of 2012, it spent \$2 billion building the worlds third largest patent portfolio made of 25-30k patents, covering software (it is important that I mention that software is much more easy to patent in the USA, compared to Europe), semiconductors, communications and e-commerce. Although for the first 10 years it did not litigate its patents, starting with 2011, it sued a group of companies including HP, Dell, Wal-Mart and Best Buy.

Although Intellectual Ventures is so big and powerful, it has some weak points. For example, as with company's own estimates, 19 in 20 or 49 in 50 patents are of low value and are very costly to maintain. Sorting through and maintaining tens of thousands of patents creates diseconomies of scale. It is though attractive to small universities that wish to monetize their patents but lack the legal, technical expertise or resources. As the patent life is at most 20 years, it remains to be seen if the firm will generate the returns investors expect for comparable investment opportunities such as venture capital or capital equity. Therefore, there is a growing concern that it should engage in more lawsuits. This comes with the risk of escalating costs in addition to the serious risk of patent invalidation by courts. Only time will tell if this is a lucrative business model on the long run.

I would add that there is a first alternative to these patent intermediaries on the online market, such as the official search engines of the Patent Offices. As an example, one may check "Espacenet" of EPO ([http://worldwide.espacenet.com/?locale=en\\_EP](http://worldwide.espacenet.com/?locale=en_EP)), or one of USPTO's search engines, for example "USPTO Patent Full-Text and Image Database (PatFT)" (<http://patft.uspto.gov/netathtml/PTO/search-bool.html>), or PatentScope of WIPO (<http://patentscope.wipo.int/search/en/search.jsf>- it includes 2 million PCT patent applications), or a search with the Google's Patents search engine ([https://www.google.com/?tbs=pts&gws\\_rd=ssl](https://www.google.com/?tbs=pts&gws_rd=ssl)). This search would reveal not only the

inventor of the technology which is of interest, but also the agent, and this gives the possibility of contacting it. From here on, the envisaged strategy is that of either cross-licensing with the entity or agreeing on licensing terms if not patent buying (it is not only expensive, but also very expensive to own as shown in the introduction part of the thesis). It is true that patent terms may be as broad as possible, and thus not easy to find a valuable patent for a specific technology. In this context, firms such as Yet2 might serve this purpose better, as they create their own abstracts written in clear language to help potential buyers understand the potential benefits of the patented technology they are looking at.

However, it is important to note that even if an overview is obtained by searching for information with such engines, good understanding of its relevance and its value is hard to be assessed by an unexperienced Engineer. Discussing the findings with a patent Engineer/IP director or a patent lawyer might prevent the actor from pursuing dead-ends, or from doing costly mistakes, both related to relevance, quality or to the approach used for negotiating the purchase or license.

To draw up some conclusions regarding the patent market, the situation now is very different compared to the situation a decade ago, when the incidence of litigation was not as high as nowadays, when barriers between domains covered by patents were not as fragile as now. Therefore, the IP world of today is complex and hard to measure.

As the authors [31] pointed out, it is close to impossible to measure empirically the net effect (positive or negative) that today's patent intermediaries have on the IP market. One can assume that there will be a fight among super aggregators in the future as they start to have both purchasing and negotiation power, compared to the rest. They make their profits from both processes (not only from litigation, not only from defending). This might be seen, therefore, as a trend for the coming years, the increasing importance of super-aggregators. On the positive side, they offer monetizing options to the small patent owners in the market, therefore creating incentives and pushing the barrier of innovation even further. They could also serve as a stop for a group of partners that plan to license technologies for a short time frame (this is valid for industries where the innovation cycles are short). However, if they use their bargaining and information power much to their advantage, then price collusion is expected to be seen on the patent market. Moreover, when a super aggregator buys patents or licenses only to assert them against companies that free ride on intellectual property in a conscious way, then they preserve the incentives for future innovation.

However, their incentives might be directed by their financial investors which might seek higher and higher profits (pension funds and university endowments). In this case, the incentives for innovation are diminished, and the effect on the society is more to the negative scale, although on the very positive for a niche, the IP lawyers' incomes and patent brokers. Therefore, if the balance between these is kept, the companies and society might benefit as a whole because of incentives for innovation, easiness of monetization and insurance-like policies. I would advise however a patent seeking entity not to grab the chance of contacting the entities in Table 2 of Appendix, for acquiring new technology as they might be exposed to the threat of litigation if they do not reach an agreement. I would suggest a workaround to this, which is contacting them through an intermediary- a separate entity similar to the mentioned syndicate that the RPX uses when it acquires new patents.

It is maybe worth mentioning that I have observed Acacia Technologies topping the NPEs list that RPX offered on its website as proof of efficacy of defense for its subscribers.

Moreover, the author of [91] claimed-at the time of the study (that is 30 April 2010), that venture capitalists will be attracted in the patent shark business more and more while the patent trolls would increase the professionalism. Checking the share price of Acacia Technologies (currently named Acacia Research Corporation) (see Figure 7) and I found indeed strong interest for its shares until 2012, with a 300% surge of price in 2009 alone.

In 2012, there was a substantial drop, which might indicate a market correction correlated to unsupported optimism about future earnings took place. As plausible is the statement that this is a volatile market where prices are set by opinions of investors, rather than by facts and substance<sup>32</sup>. Following the share price until recent times, since January 2014 to date (July 2014) the share price increased by around 30%. Therefore, the author's opinion is well founded. Probably the investors look at profits more than to social welfare.



**Figure 7 Acacia Research Corporation share price evolution in NASDAQ (Copyright Google Finance)**

Patent trolls are a manageable risk, and therefore management has to take an informed decision with regards to taking action or waiting. One action one could pursue (except licensing or subscribing for an insurance, which imply significant costs) would be to file a reexamination request before USPTO in US [chapter 8 of reference 32] or probably before EPO in the case of Europe.

### 1.7 On the value and pricing of patents

It seems an interesting thing to look on the market for patents for acquisition, sales or licenses. However, how valuable can a patent be? Are all patents valuable, or some are much more valuable compared to the others?

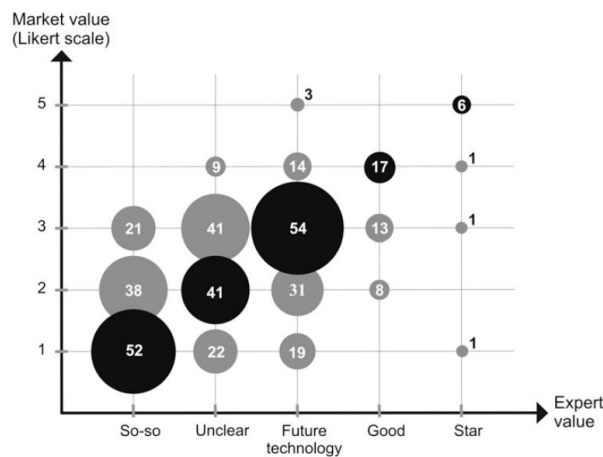
There is a study [59] that showed that the majority of patents in the portfolio analyzed (one could extrapolate to the market, to a limited degree) were of moderate value (as ranked by experts) and of average market value [59], however the very next group was represented by low market value patents and so-so value as ranked by experts. On the other hand, the study of [91] revealed that the patents owned by the patent trolls are being highly cited, a fact that suggests that patent trolls will have stronger and stronger ammunition. One could distinguish between two factors that influence the value of a patent. One is the potential value of the patent in a normal market situation. The other is the “infringement”/”black mail” value of the patent in a particular situation. This one may

<sup>32</sup> Comment of Associate Professor Bjørn Otto Elvenes.

be several times higher than the value that would be determined on the normal market, or even lower, if the patent troll strategy backfires<sup>33</sup>.

Returning to the patent portfolio in discussion, only 1.5 percent of the patents were memorable as ranked by experts and of maximum value as valued by markets. This is shown in Figure 8. The value has been evaluated using a patent portfolio acquired by an investment fund in 2007 at an average price of \$35,000 from a global consumer electronics firm that invented and patented these technologies between 1989 and 2006.

The investigation presented only the portfolio of a singular company, for which indications of the spread in value are given. However, there are some other limitations, an issue, for example, might be the company’s representatives compared to the ones of other companies. Also, the portfolio does not present the value spread of patents made by independent inventors<sup>34</sup>.



**Figure 8 Association and correlation between market and expert values (N= 392 patents) [59]**

For some patents, considering the option of litigation, the patent values increased to a maximum of 30 times, as it may be seen in Figure 9. The minimum age of patents in the set was four years, the maximum twenty years, while the mean was ten years. The patent portfolio was ranked as average by experts when considering parameters such as the importance of protected technology, breadth, easiness to invent around, difficulty of proving infringement, patent market value. However, there were patents that showed maximum scores, but also very low scores when ranked by experts considering the variables mentioned previously.

Value Rating	Description	No. of patents (n=392)
5	<ul style="list-style-type: none"> <li>Very high price (30+ times original purchase price—\$1 million+)</li> <li>Several bidders</li> </ul>	9
4	<ul style="list-style-type: none"> <li>High price (15 to 30 times original purchase price—\$500,000–\$1 million each)</li> </ul>	41
3	<ul style="list-style-type: none"> <li>Moderate price (5 to 15 times original purchase price—\$150,000–\$500,000)</li> </ul>	130
2	<ul style="list-style-type: none"> <li>Low price</li> <li>Sold as complement to other patents</li> </ul>	118
1	<ul style="list-style-type: none"> <li>No interest from buyers</li> </ul>	94

**Figure 9 Classification of patents by market value [59]**

A study similar to [59], which ranks patents in a portfolio is [51]. It considered market value on the vertical axis and company value on the horizontal axis. Patents were then assigned to a quadrant as shown in Figure 10.

<sup>33</sup> Comment of Associate Professor Bjørn Otto Elvenes.

<sup>34</sup> Remark of Associate Professor Bjørn Otto Elvenes.



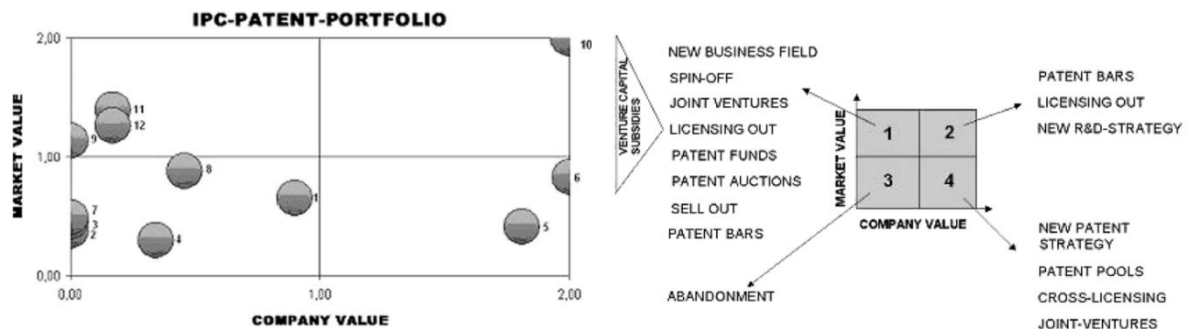


Figure 10 Patent assessment to quadrants in patent portfolio and suggested strategies [51]

Depending on the quadrant, the authors suggested an IP strategy that suited the respective patent in the portfolio. For example, the low market value and low company value patents should be abandoned, in the authors' view. They added that the very high value patents should be licensed out, in the geographical areas or markets which the company may not cover itself. Patent bars may improve the monopolistic influence on the market. Moreover, these patents were susceptible for shaping a new R&D strategy in new research fields. For quadrant four, a new patent strategy might mean investigating if the patent contributed to the product or not, or if such analysis might reveal that important parts of the technology had not been patented yet. The quadrant one patents were the ones that may often be forgotten in the normal routine business. Such patents might lead the way for new business units or even spin-offs of patent activities.

Selling these patents to a patent fund might also be an option, though I think it should not be an entity with the behavior of the patent trolls, as it would harm the social welfare. As the least recommended options, selling it out (complete loss of control) and using it to block competitors to enter the market might be the options recommended. However, considering the strategic perspective, a joint venture or a spin-off to a new department might be the way of ensuring higher rewards in time, as such new development opportunities materialize.

Threat of patent litigation is the main driver of patent exchange in the market, the authors of [59] concluded. They have observed, considering the respective patent portfolio, that particularly valuable patents are older, they cover part of current established technologies (this makes it easier to relate to the products that are already on the market), are broadly drafted, thus leaving vague proof of infringement. They recommend monitoring competitors' technology, to taking part in de-facto standard setting bodies, purchasing patents from bankrupt companies (the same as [45]) and focus on hard evidences of infringement. I find it hard to understand that the valuation committee of the company that sold the patents portfolio in the first place did not evaluate them properly, considering litigation, the main driver of patent exchange and value on the market.

One plausible explanation I find is that the patents were re-evaluated (considering litigation) in 2013, two years after the known lawsuits between the main players in the electronics and consumer electronics industries. In 2007, at the moment of the deal, litigation incidence was 7-8 times lower, according to Figure 5. It is, therefore, important to understand that patents can be a formidable asset and investment along the years. This is as they change their value depending on the propensity of products and technologies available for purchase on the consumer market (when facing the competitors in the marketplace) but also because several patents may nowadays be very valuable in case of a costly threat of litigation (when facing the competitors in the court). Probably a more complete set of factors that influence the future value of patents is given by the author of the very recent article [53] from 2013. It considers 20 factors, shown in Figure 11.

- V1. Increased revenue
- V2. Increased licensing opportunities
- V3. Increased spin-off opportunities
- V4. Increased goodwill
- V5. Increased social welfare (i.e., curing disease)
- V6. Increased industrial clustering and/or networking completeness (closing the gap in the value chain)
- V7. Increased market share
- V8. Increased citation of patents
- V9. Increased income due to litigation
- V10. Increased cost (i.e., operational cost, budget limitations)
  
- V11. Increase in further research and development effort and staff
- V12. Increase in necessary patent application and maintenance costs (for domestic and foreign patent right)
- V13. Increased expenses (i.e., factory, certification)
- V14. Increased managerial risk
- V15. Increased expenses due to litigation
- V16. Increased technological risk (i.e., certification, meeting standards)
- V17. Increased technological risk development or production (product failure)
- V18. Increased market risk acceptance (customer failure)
- V19. Increased market risk (i.e., leading firm blockage, competition)
- V20. Increased dilution of business focus

Figure 11 Factors to consider when assessing the value of a patent [53]

Depending on the value assessed, the author of [53] recommends splitting the portfolio into groups according to Figure 12. This recommendation is primarily intended to universities, though I would add that it could be considered for large patent portfolio owners, too.

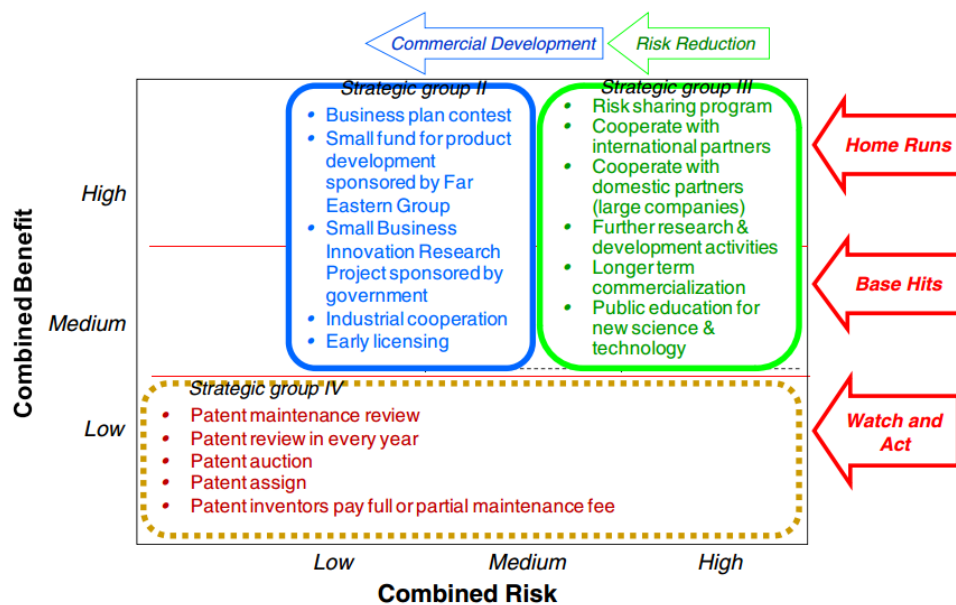


Figure 12 Strategies for patent portfolios, determining the value by assessing risk and benefit [53]

The authors [58] of a study found evidence that there were various filing strategies correlated to the value of patents. The empirical study of [58] investigated a portfolio of 250,000 patents of EPO filed between 1980 and 1995. As such, the number of claims filed, several priority filings prepared for the draft, the decision to follow the PCT path, and patents that served as parents for following applications are the particular cases of such

strategies. These strategies might also introduce delays in the patenting process; a theory that has been proven to be plausible by [97] and exposed in detail in Chapter 2.2.6. The author concluded that the patents that are more frequently cited are kept active for long times and constitute large families and are more frequently opposed will tend to be considered to be more important by both their proprietors and the patent system.

In principle, the company may choose to patent or to keep it as a trade secret. It is often very difficult to evaluate if a trade secret can ensure enough protection, because of its nature. This uncertainty, which concerns which mechanism is to be chosen by the company, might influence the patenting strategy of the firm.

The author of [33] suggests that even before a patent strategy is to be developed, first the value of the patents should be assessed. However, this, in itself, is a huge and difficult area in its right, as the value is not about expected positive cash flow from the patent over its life cycle, including licensing. Instead, it also comprises value from preventing competitors from entering the market. The uncertainties are even higher, if one considers that the different stakeholders assess the value in a different way (contextual part).

The author of [33] however recommends (as an initial solution, I would add), that a person who is not skilled in the technology area should use the World Patents Index provided by Derwent (<http://thomsonreuters.com/derwent-world-patents-index/> accessed June 2014). This search engine helps finding the answer to the question “which geographical areas did the competitor fill for a patent?” The more geographical areas are covered by the competitor, the higher importance it means the competitor assigns to the patents. This indicator fails in the case in which a company only fills applications in its home country, or if it fills all the applications in the same countries. The peculiarities of patent environments across the Globe will be detailed in Chapter 3.

## 1.8 What patents can not do

Although patents are a powerful weapon in the market, they cannot do everything; they are not the ultimate weapon. In my view, on the market, the most power is held by the consumer/customer, as it is the only one to decide to whom they will direct its finances, in order benefit from the perceived value of the product or service. In my opinion, the players on the market will employ strategies to direct the attention of the consumer to their products, by associating some values to their brand, ensuring good levels of reputation, reliability, user-experience, interaction, luxury even, thus addressing themselves to the values that the customer appreciates or identifies with. Some people might consider that patents are the most effective weapon or asset, but it is not true, as they are a weapon, as they are a shield, and after-all, it is humans that draw them and use them to describe the inventions. Therefore, I find it safer to assume that the true asset is their inventors, with their creativity.

With the propensity of litigation of the last few years (since 2011), it may very well be that patents are to have more and more defensive role. There might be several other misconceptions regarding patents, some of which have been presented in the literature [33]. It is best if these are acknowledged before forming the patent strategy.

The first one is the “*value*” trap [33]. It might be that sometimes, secrecy is more appropriate compared to disclosing important information through a patent application. In fact, the patent itself might not have value by itself. It is the patent owners or licensees that possess the ability to exercise the patent through the value chain, thus creating value. If this value chain is broken, as in the case in which another patent prevents the

deployment of the innovation to market, then everything prepared beforehand might (in the worst case) have no value whatsoever<sup>35</sup>.

The second one is the “*protection*” trap. It is important to keep in mind that the patent does not give the right to practice the invention, but only gives the inventor the right to exclude others. As the author of [33] pointed out, IP is intangible property. Tangible property, if stolen, the police prosecute. If intellectual property is stolen, the owner must prosecute<sup>36</sup>. If the society would like to view IP as tangible property, it should prosecute alleged offenders on the expenses paid by the public, in the view of the Advisory Council for Applied Research and Development (ACARD) of UK. It is worth noting that this was an opinion shared over 30 years ago. “In consequence, only rich owners have protection, but also in consequence, society absolves itself of much responsibility for intellectual property rights,” as cited from [48]. The author adds “the real pirates are not those who steal innovation from patent owners, but those who steal the system of encouraging innovation from the public.”

Moreover, there might appear the case in which two patent owners have similar patents must negotiate cross-licenses because they cannot practice their inventions. Not every idea has to be protected, as there are costs implied in the process, and they might outweigh the benefits.

The third one is the “patent at all costs” trap [33]. It might be the case that the claims are greatly restricted during the prosecution. In Figure 13, it is illustrated this idea. It might be that after this stage, the patent is not worth paying for or maintaining.

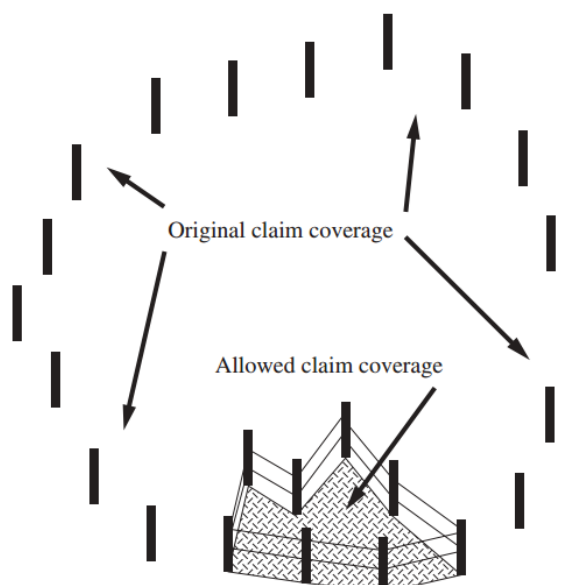


Figure 13 The result of severe restrictions of the claims [33]

The fourth idea is a “uniform treatment” misconception [33]. This means that one should not assume that the patent application shall be treated the same way in all countries where it has been filed. Treatment along the judicial systems varies from country to country, as does the prosecution of patent applications in patent offices. Each country has exceptions, such as in the case of the pharmaceutical industry, involving the cases where public health and wealth are taken into account. Moreover, the interpretation of laws differs from country to country, and therefore the best help might come from an agent that is specialized for the respective areas taken into consideration.

<sup>35</sup> Comment of Associate Professor Bjørn Otto Elvenes.

<sup>36</sup> ACARD, 1980. Exploiting invention. Report to the Prime Minister, London, December

The last misconception is the “having the idea” only [33]. The patent is tied to an embodiment in tangible form. Therefore, a patent might not just protect an idea as such, but one which is to be implemented in a product. Patents can not give anybody a monopoly over the basic idea mentioned in the patent.

There are two secondary/ related aspects worth mentioning [33]. The first is that it should not be the case that a customer should feel that the supplier’s patent protect both the supplier and themselves. The supplier is free to find other customers in the respective country. The second is that in some countries, the governments may order the patent owner not only to provide with a patent license in cases of necessity, but also trade secrets and know how to assist third parties in the production of the invention. Compulsory licensing could be a threat in a few countries; therefore, a patent attorney should possibly work with agents in countries to determine if this could constitute an issue in the respective countries.

## 2. Intellectual property strategies

### 2.1 Overview

When it comes to IP strategies, I find it best if some definitions are given, first.

The author of [33] made an analogy between the definition of strategy and patent strategy. For the “strategy” term, he used the definition given by Webster’s Ninth New Collegiate dictionary. As itself the term strategy refers to three levels, the analogy with patent strategy would be at three levels, too.

The first definition proposed by the author [33] is “*Patent strategy for a product line is the science and art of employing the business, technical, and legal resources of a company to afford the maximum support to adopted policies with and without competition.*” This takes the view of the beneficiary of the patent strategy and is to some extent the same as planning and controlling.

The second definition of the author [33] relates to a specific technology or size of the market: “*Patent strategy for a technology area is the science and art of managing research to meet competitors in the marketplace under advantageous conditions.*”

The third view, that of “a clever stratagem” gives the following definition [33]: “*Patent strategy for an invention is a careful plan for gaining an end, including clever schemes for outwitting a competitor.*” In addition, comes the formal definition of IP strategy from [4]: “*IP strategy is the development of a course of actions that utilizes intellectual property to enable a company to sustainably realize higher prices, increase market share, and/or maintain lower costs than the competition.*”

Brand is another way in which intellectual property helps by driving prices upwards. Market share may be increased by leveraging the patents to infringers, as Apple did with its competitors, a similar example being Gillette, which had more than 70% of the cartridge razor blade market. Lower costs compared to competition may be achieved through (cross-)licensing at more favourable royalty fees compared to competitors. Managing licensing from non-practicing entities in the best way may help securing higher margins and profits, too.

In my view, the definition of IP strategy would be ‘*the conglomerate of continuous external, internal financial, technical and legal activities/actions related to the planning and use of IP systems’ leverages (long and short termed) that both the IP and non-IP holders have at hand for the deterrence of competitors employing/developing (on) them*

or to gain (better) access/coverage on/of the market, or even to mislead competitors, when aiming for an innovative product/service development/launch, with the exception of the cases in which the organization joined a related standard-setting organization'. For the high-tech industries, the strategy might prove a bit more tactical in nature, because of the shorter duration of the respective patents. In any case, I agree that the market is to be expanded, controlled and improved to its maximum potential, often at the cost of the competitors' share of it.

As a consequence, the term patent/IP strategy may have different meanings in different situations. Therefore, it is important to make decisions on the conceptual level on which the IP/patent strategy would be generated. However, on short, the strategy may be commenced by asking four questions: "patent, keep secret or publish?"; "what to patent?"; "when to patent?" and "where to patent?" as starting point [44]. After all, patent value may be unleashed by taking one of these big-lines actions: practice, license, litigate or sale [54]. The end states of the IP strategy, as illustrated by the authors of [17] are: being disturbed by a patent troll, being in an IP war, being in a licensing agreement or having a very good IP portfolio that allows broad access to the marketplace.

In the very recent article [3], the two Harvard University professors offer a very good overview of the current alternatives a firm has to act on the intellectual property market, taking into account both the legal and business look of the market. This is because the first author, IP Law Professor William W. Fisher III is associated with Harvard Law School while the second author, Strategy Professor Felix Oberholzer-Gee is associated with Harvard Business School, also serving as the Chair of the MBA programme. Following the link<sup>37</sup> provided in the document [3], one discovers a graph of the general summary of these options, as shown in Figure 14.

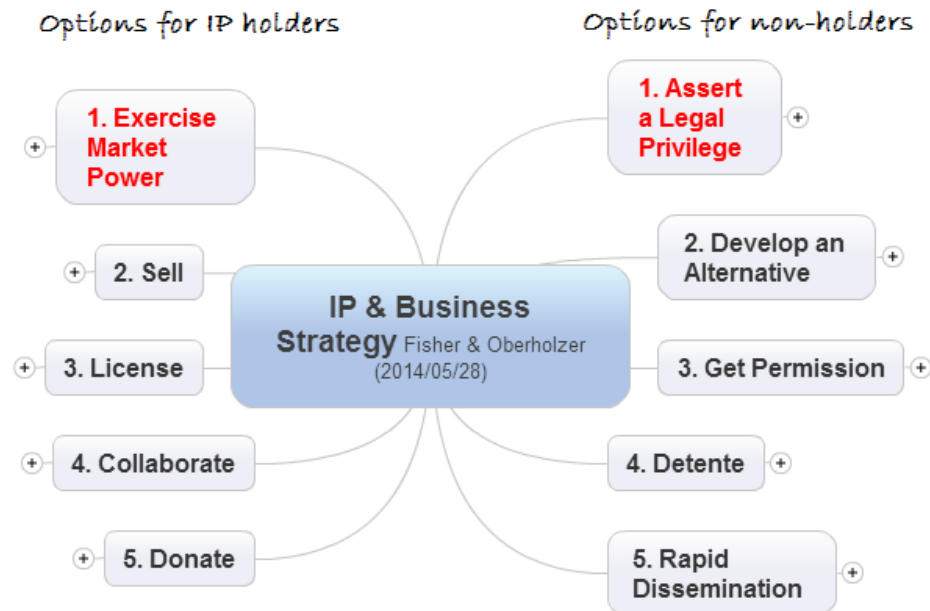


Figure 14 Alternatives for IP holders and non-holders [82]

Both IP holders and non-holders have approximately the same number of options. They will be analyzed in detail in the following subchapters.

<sup>37</sup> [http://cyber.law.harvard.edu/people/tfisher/IP/Strategic\\_Management.htm](http://cyber.law.harvard.edu/people/tfisher/IP/Strategic_Management.htm) [accessed August 2014]

It is very important to note that unless I state in chapter 2 (together with its subchapters) something which implies my opinion, denoted by the use of the first person singular pronoun, then the ideas exposed, case studies, and cost/benefits/guidelines discussions belong to the authors that created the graph referenced in footnote<sup>38</sup>, the same who authored [33].

## 2.2. Options for IP holders

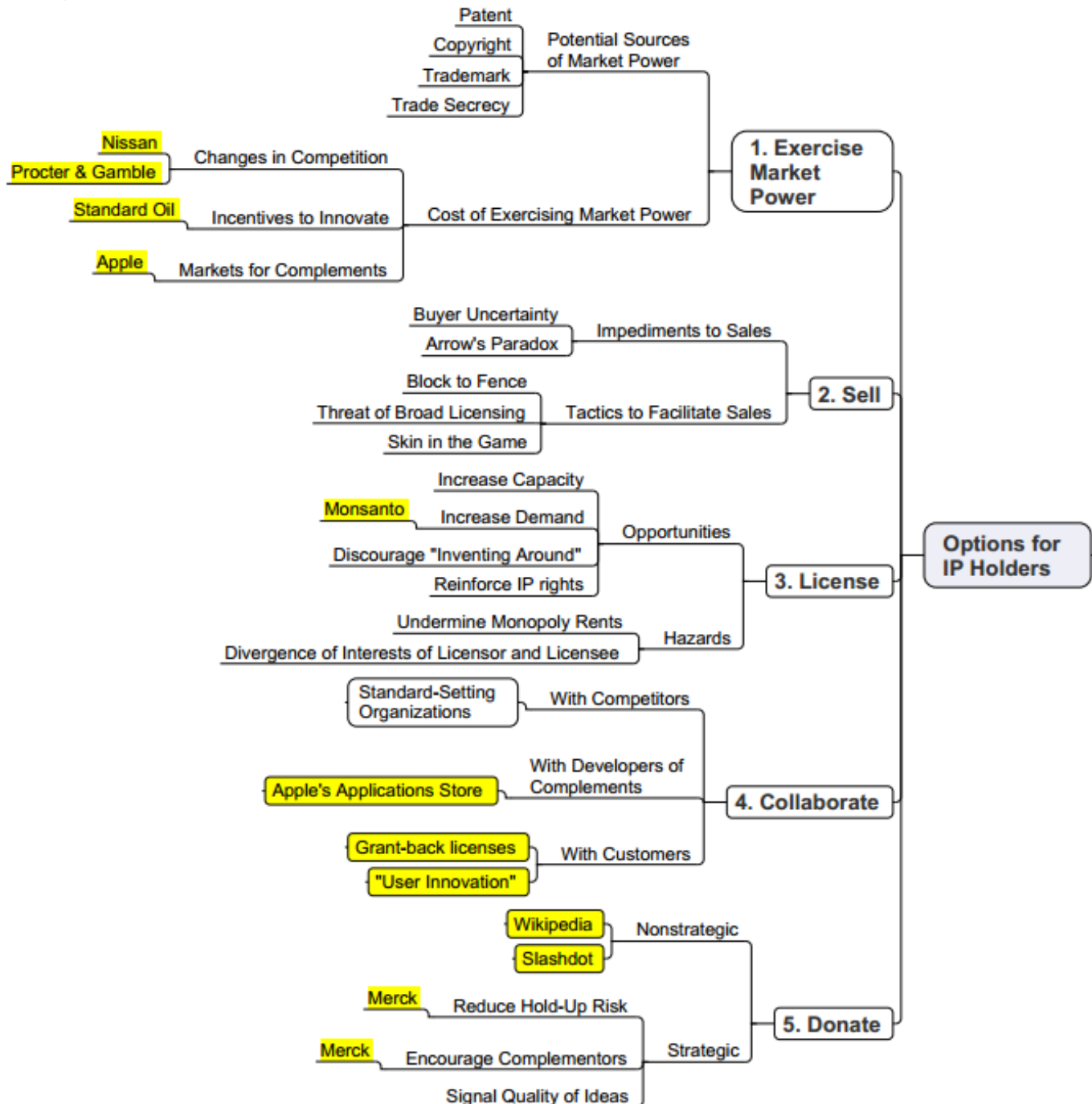


Figure 15 Alternatives for IP holders, in detail [3]

The authors of [3] have described in detail the options that the IP holders have at hand. They also offered details on opportunities, costs, case studies and general guidelines

on each option of the five in the link provided<sup>38</sup> after a click distance from footnote<sup>37</sup>. It might be that the installation of MindManager software (written by Mindjet) could be required in order to read the link mentioned in footnote<sup>38</sup>. It may be downloaded (even as a cost-free, trial version) from <http://www.mindjet.com/mindmanager/> [accessed August 2014].

### 2.2.1. Exercise market power

Exercising market power is the very first option an IP holder has. In essence, I consider that having IP translates to being powerful. Such power might influence the market. This subchapter is divided into a) potential sources of market power; b) ways of exercising market power and c) costs of exercising market power.

a) Potential sources of market power<sup>38</sup>: **absence of substitutes** (obviously, a company would wish to have no competitors and “own” the market); **effective enforcement** (see recent responses to filesharing: revocation of the Hodapi law that had imposed hard penalties on copyright infringers, replaced with tax on internet service providers, equipment manufacturers, ultimately internet users. The revenues shall be distributed to the copyright owners. Norway has instituted comparable laws<sup>39</sup> regulating the use of music -TONO, [www.tono.no/english/](http://www.tono.no/english/) [accessed August 2014], and copying from books -KOPINOR, <http://www.kopinor.no/en/home?hidden=true>, [accessed August 2014]. These apply primarily to non-internet use, and the revenues are distributed to copyright owners according to percentages). The other sub-category is related to trying to exercise some influence on the distribution channels of the product and the law, ultimately the consumer, in order to obtain the market act in accordance to the good-practice promoted by the market influencer. This is made by pursuing facilitators (the distribution channels or the law) that could take better control of the issue, or by ensuring that the border controls are effective (inspections that various goods are not to be present in countries where there is a dispute for the respective product between two producers, for example). Another source of market power is the **legal exclusivity**<sup>38</sup>. It includes *patents* (“rights to prevent others from making, using, selling, or importing novel products or processes”<sup>38</sup>), *copyrights* (“exclusive rights to reproduce, modify, distribute, and perform works of authorship”<sup>38</sup> with applications in software, databases and product labels), *trademarks* (“exclusive rights to make commercial use of words and symbols that identify the goods and services provided by particular companies”<sup>38</sup>, enables rights of exclusivity) and *trade secrets* (“rights to prevent others from acquiring and then using processes or device used in the operation of a business”<sup>38</sup> with applications on customer lists, computer programs, information related to business operations, information related to the manufacture of a product). Inventions that are on the borderline of patentability would be better kept as a trade secret rather than being filed as a patent, according to the authors’ viewpoints [33].

b) the ways of exercising market power are two<sup>38</sup>: **standard pricing** and **differential pricing**.

The **standard pricing**<sup>38</sup> gives the advantage of easiness of predicting profits; however it has some drawbacks, too. For example, profits attract competitors, and as such the market power diminishes. Patent litigation might be needed; it is expensive (usually \$3-5 million per side in the case of USA)<sup>38</sup>, and the IP holder often loses more than it costs.

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<sup>38</sup> <http://cyber.law.harvard.edu/people/tfisher/IP/IPStrategy.swf> [accessed August 2014]

<sup>39</sup> Assoc. Professor Bjørn Otto Elvenes is acknowledged for this contribution he made after reviewing the draft of the MSc thesis



Moreover, the litigation success might be not enough to stop copying (the case of software and recording industries). Then, potential benefits of joint promotion on the market or benefiting from clients spread across the network are diminished. Therefore, before pursuing this strategy of uniqueness on the market, it might be a good idea to consider increasing the market size through collaborations with customers, developers of complements, suppliers and even competitors<sup>38</sup>. One should keep in mind that the rivals might try to develop strategies such as “inventing around.” Therefore they have to be discouraged. Companies that use this standard pricing strategy are Ferrari, US pharmaceutical industry, diagnostic testing industry<sup>38</sup>. It appears that they do not cooperate with each other that much<sup>38</sup>.

The **differential pricing**<sup>38</sup> on short is charging consumers different prices to access the same good or service, even if the difference of versions cannot be explained by differences of the costs of the versions<sup>38</sup>. It requires *four elements*<sup>38</sup>: market power, restrictions on arbitrage, heterogeneous buyer market and last, but not least, the ability to differentiate those buyers. On a *first degree*<sup>38</sup>, it is about charging each buyer the sum that is able and willing to spend for a service or good. A good example is the high tuition asked by US private colleges. On a *second degree*<sup>38</sup>, the seller does not know how much different buyers may afford and be willing to pay, but induces them to divulge their desires or capabilities. Examples<sup>38</sup> may be volume discounts (when the dynamics of the order changes as a consequence of a reduced price), versioning (printers that have programmable chips that cost the same to manufacture, but control the printing at different speeds), offering of discount tickets, or maybe more interesting, bundling of products. On a *third degree*<sup>38</sup>, the seller divides customers into divisions corresponding roughly to their ability and readiness to pay. Examples<sup>38</sup> are discounts for new or traditional customers, customer classes in pricing (variations across private, public or commercial customers). Though this strategy might ensure higher revenues on some segments, it implies increased administrative costs<sup>38</sup>, and it should be kept in mind that it might offend customers<sup>38</sup>, as they tend to prefer transparency, they dislike hidden pricing strategies, and they like to have options (do not appreciate ‘versioning’). As a guideline, all four conditions of differential pricing should be attainable or present<sup>38</sup>. A survey of the possible price differentiation schemes for possible models should be made<sup>38</sup>. Then the worthiness of different price differentiation schemes should be evaluated<sup>38</sup>: one should check the potential gains obtained through market segmentation<sup>38</sup> (information technology sector is appropriate for 1<sup>st</sup> degree differential pricing), should assess the costs of creating and administering the database and product for differentiation<sup>38</sup>, the potential losses due to arbitrage<sup>38</sup>, the losses caused by the customer’s anger or resistance<sup>38</sup> (therefore, the strategy has to be appropriately framed, for example in the software industry, AutoCad and Adobe use different pricing strategies for universities, as they do not obtain profits<sup>38</sup>).

I consider that there is a good chance that the market can be created through the cooperation with universities if products are offered at discount prices as the Engineers universities provide the following years will be accustomed to the tools and brand name even since academic years.

c) costs of exercising market power<sup>38</sup>: the more market power one exercises into the market, the more competition it will attract and the rivals will see increasing incentives to innovate. Also, some, such as Apple, neglect markets for product complements (such complements are often not compatible).

Newer Apple accessories have to be approved by Apple. A cable not approved by Apple might not work (due to the embedded microelectronics inside the cable) and even affect the granted warranty for the Apple product (in some countries). This is the “walled-

garden” market strategy where Apple tries controlling complementary products<sup>40</sup>. It licenses, for example, the AirPlay technology to almost anyone, but only the audio transmitting part. The video part it does not license out; it keeps for itself. Therefore, having a stronger market power comes with some risks.

### 2.2.2. Sell

The second option an IP holder has is to sell the IP. This subchapter is divided into a) the market for IP; b) tactics to facilitate the sales of IP and c) general guidelines for selling IP.

a) The market for IP: divided between **impediments to sales** and **aid to sales**<sup>38</sup>.

The **impediments to sales of IP** are illustrated by such attributes as having IP that protects unique assets<sup>38</sup>; or the value of the assets depends highly on the context<sup>38</sup>; or there is a probabilistic issue<sup>38</sup> (uncertain validity of IP, the scope of the right might be unclear); or the IP sale would affect the existing portfolio of patents as it might be paired with it<sup>38</sup>; or the evaluation of its commercial value is difficult and expensive<sup>38</sup>; or the ranking method for such as sale is flawed<sup>38</sup> (arrow’s paradox<sup>38</sup>: as it cannot take into account all existing cases as well as the future implications regarding the evolution of the industry that the respective patent covers).

The **help to sales of IP**<sup>38</sup> comes in the form of specialized platforms, some of which were mentioned before in the thesis, see [31]. Live auctions such as Ocean Tomo; online platforms such as Yet2.com or Tynax (<http://www.tynax.com/topicdirectory> accessed June 2014); brokers such as the ones mentioned in the previous chapters, in addition, Epicenter(<http://www.epicenterip.com> accessed June 2014) or Thinkfire (<http://www.thinkfire.com> accessed June 2014) together with the NPEs mentioned in Table 2 of the Appendix (the list is not exhaustive, there are also patent attorneys that represent smaller clients with the same characteristics of NPEs). Patent law is progressively inclined against NPEs, if one considers the example of USA (the 2011 Leahy–Smith America Invents Act (AIA) which passed the US Congress diminished the rate of imprecise patent lawsuits; the Obama executive orders as of 2013, that urged USPTO to ratify various reforms in order to dismay patent trolls, increased investigation of broad or ambiguous claims, also to software patents, to which Microsoft expressed concerns)<sup>38</sup>. In addition, I share the view of Assoc. Prof. Elvenes, that traditional marketing efforts could be established, in the sense that there could be done a transition from creating market awareness to offering post-sale services to buyers. This strategy could identify the blind spots, along with areas where help already exists.

b) There are tactics to facilitate the sale of IP<sup>38</sup>: the first being **”block to fence”**<sup>38</sup>, it denotes the acquisition of a large number of patents not only for the innovation they provide but also for covering the related processes and substitute products, in the hope that this will drive up the costs of inventing around. In fact, as Assoc. Prof. Elvenes observed, the inventor himself could pursue this strategy, of acquiring related patents, in order to create such a fence and lack of freedom of movement for competitors if not at least to increase the value of the respective patent.

In the case of **threat of broad licensing**<sup>38</sup>, a company can fully disclose the idea or product to the buyer, and if the buyer does not appreciate the innovation, the seller may threaten to sell the idea to others. The threat to diminish monopoly profits helps increasing the value of the advertised patents.

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<sup>40</sup> Assoc. Professor Bjørn Otto Elvenes is acknowledged for this observation he made after reviewing the draft of the MSc thesis

The tactic of “**skin in the game**”<sup>38</sup> may be used by sellers that partially disclose IP and offer not to sell it to others if the buyer offers for example stock options as a form of compensation. This way, the risk of success is shared between the two parties, buyer and seller, to a certain measure.

c) General guidelines for selling IP<sup>38</sup>: as a general rule of thumb, the sale of IP is worth doing if the difference between the value in sellers’ hands and the value of the IP in buyers’ hands exceeds the transaction costs. One should not forget the opportunity costs related to owning IP and licensing (thus securing additional profit) and the lost control over the sold IP that might come to the hands of NPEs (litigation as a process is still rising, despite the modification of the law as action taken against trolls) when deciding for a sale. As transaction costs are slowly declining, patent brokers might still be more promising than open markets.

### 2.2.3. The licensing option for the IP holder

Instead of selling the IP, the IP holder could license it to third parties, keeping the IP, but selling the rights of using it to a certain measure. This subchapter is divided into a) opportunities for licensing IP; b) hazards for licensing IP and c) general guidelines for licensing IP.

a) There are opportunities of licensing<sup>38</sup>: Licensing of IP may **increase capacity**<sup>38</sup>, this becomes of interest for university technology transfer offices (University of Texas at Austin obtains \$10.15 million in royalties according to the appendix of [39]) and independent inventors (such as Jerome Lemelson, world-renowned inventor)<sup>38</sup>, who lack the resources, experience and ability to establish a product on the market. The incentives of the licensor and licensee seem not to be in conflict in this case.

Moreover, it may **increase demand**<sup>38</sup>, as the company Monsanto<sup>38</sup> did by initially licensing to 200-300 seed types to companies and then, when its patents were close to expiration, it threaten it would not license anymore if the licensors had not signed a contract that locked them in for a modified version of the patent, with a later expiry date (thus the licensors would have lost 2 years of revenues and the market, they were “locked-in” the process). A more ethical success story is Qualcomm<sup>38</sup>, a large “fables” (the company does not own manufacturing facilities of its own) that supplies technology to a range of licensees through its patent portfolio of 11,600 US patents and 54,100 international patent applications [39]. As it collects about \$1 billion in royalties’ revenue per quarter, one-third of its income is represented by collected license fees.

Licensing cheaply the core technology, the market may be established through a de-facto standard. Then, by owning patents that cover accessories, and selling licenses for these, one might earn more solid finances in this case compared to the one in which the owner put efforts in pushing the initial patented technology by itself<sup>41</sup>.

Licensing also **discourages “inventing around”**<sup>38</sup>. A company that licenses technology would probably avoid engaging in developing on the technology it licenses to avoid lawsuits or unnecessary spending of resources, although some licensors might suggest joint efforts.

Licensing also **reinforces IP rights**<sup>38</sup>. I think that here, as through licensing a market is established, the market creates even more value for the patents. Therefore, in the case in which there is an infringer, it will have to pay significant higher penalties in the case of a lawsuit as the technology had been well deployed on the market.

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<sup>41</sup> This remark belongs to Assoc. Prof. Bjørn Otto Elvenes, and as an example I would give the VCR players, which helped create a larger market for the audio-video content of the movie-industry corporations.

Last but not least, **licensing can be a pure profits center**<sup>38</sup>. For example, the film industry benefits greatly from license income from well-known fictional characters displayed on products sold on the markets. Texas instruments, in the mid-1980s, escaped bankruptcy by non-exclusive licensing of its neglected patent portfolio<sup>38</sup>. As such, it doubled the rate of patent applications for the following decade and had revenues of more than \$4 billion. An option is to obtain fees from an evaluator, a potential licensee that obtains the short-term exclusive right to assess the technology and negotiate a license if the results are satisfactory. The licensor has to strike a balance between either licensing for a modest fee or reserve the right to ask for the test results of the licensee. In either case, personal relations have their influence in this case, and they should be considered carefully.

b) There are however some hazards of licensing<sup>38</sup>: A consequence is that licensing **undermines monopoly rents**<sup>38</sup>. As such, most of the income generated by the licensed technology comes to the pocket of the licensee, and therefore, it is lost by the licensor, though it has a share. Licensing transactions are often taxed, and therefore the state obtains part of licensing revenues. The solution to this would be to create an entity of the company, such as Qualcomm owns *Qualcomm Technology Licensing Division*. The authors<sup>38</sup> show in the Flash diagram that it is crucial that the holding company actually operates in the respective country with lower taxes on licensing fees.

Most often, **interests of licensor and licensee are divergent**<sup>38</sup>. An example<sup>38</sup> comes from the luxury goods industry; Calvin Klein benefited from a large network of licensees. However, some licensees did not respect the initial contract with regards to price and quality, and therefore the brand reputation suffered (<http://www.brandingstrategyinsider.com/2008/09/the-poisoning-.html#.U6b40PmSyPw> accessed June 2014). This drawback is especially true in the case of trademark licenses. Therefore, care should be shown to the other party's incentives to license (in or out).

It is important to keep in mind that **there is the risk of antitrust liability**<sup>38</sup>. I think that turning to a successful licensor in the market, translates to the fact that the technology which is licensed is top-notch and that it becomes more and more cost-effective to license it, as revenues grow. This might not be on the likes of competitors, which might ask for details of the technology, and the state might come to their advantage, due to the antitrust practices valid across the world (they favour the market, not the dominant player). Therefore, the license terms have to be considered carefully, not to find oneself in such a situation, in case one already has a dominant position on the market.

c) As general guidelines on licensing<sup>38</sup>: there are **circumstances in which licensing might be an opportunity and others where it may not**<sup>38</sup>, as exposed below.

Circumstances for the first category are the ones where *the pioneer of the market lacks*<sup>38</sup> the resources to meet potential demand. In this case, licensing would start generating profits for the pioneer. Moreover, *licensing might enhance demand for a new product*<sup>38</sup>. This happens because a larger share of the consumers is faced with the product faster. A good example is the Windsurfer<sup>38</sup>; its inventor, Hoyle Schweitzer licensed broadly the pioneering technology. It has been observed that on the semiconductor market, licensing increases the commitment to quality, because of the multitude of licensees that compete on the market, they will need high-quality technology from the licensor [83].

I think that otherwise, invaded by non-functioning devices, the market would be at risk. Licensees might be discouraged to invest in developing a new product, and therefore, the licensor insures its pioneering position. This position might be at risk if two pioneers agree to cross-license patents and then license them on the market, because of antitrust policies. Licensing on reasonable terms and fees might discourage licensees from

challenging IP rights. However, for the licensees, they are usually in a better position compared to the pioneer. For example, in the case of Windsurfer, although Hoyle Schweitzer initially licensed the idea broadly and cheaply, after he challenged the licensees in court in England, USA and Canada, he lost the challenges to the patent<sup>38</sup>.

Circumstances of the second category are the situations in which the interests of the licensor and licensee are not manageable. It might be that the licensee asks for an exclusive license for a “drastic technology,” for example<sup>38</sup>.

The authors of [9] offer guidelines on the best practice regarding the development of a licensing program. According to their study, not all companies maximize their efficiency related to licensing; it is only the fewest of organizations that take advantage of licensing strategies, as seen in Figure 16. In other words, one needs efforts and dedicated people for it to happen in a successful way.

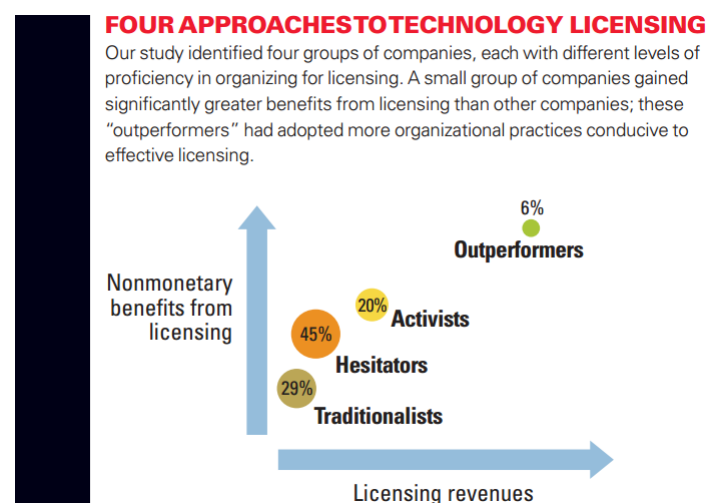


Figure 16 A study showing the performance of licensors in Europe, as from a survey [9]

The study [9] identified six organizational success factors among licensors. *Assigning dedicated employees* to licensing is the first one. This translates to having full-time employees identifying licensing opportunities and implementing licensing deals. *Leveraging external networks* is the second because the company’s knowledge of new applications is extended to other industries. Sometimes, it might be a good idea to *set up temporary cross-functional teams* in order to analyze new licensing opportunities; this constitutes the third success factor. Often, *a transfer project team could be assigned to the licensee to assist it with the effective technology transfer to the licensee*, and this is the fourth success factor. The fifth success factor is *the role that the CTO and director of IP may have in overcoming the company’s traditional reluctance to adopting active licensing strategies*. The sixth success factor is *empowering other employees with regards to licensing participation*, in order to help the organization identify and implement licensing deals.

For semiconductor licensing agreements, of importance is assessing the patent value. A study which concentrated on assessing the value of a semiconductor company portfolio is [90]. The main outcomes from the study of the empirical data are that the novelty and the inventive activity are the most important factors for determining the value of the patent while the difficulty of inventing around and disclosure were not of high importance. Moreover, it seems that the present value of the patents may be approximated by “*knowledge of technical importance, the position of the patent in a portfolio, its learning value for competitors through disclosure, and the difficulty in inventing around*”

[90]. I am rather skeptical about this affirmation as the study has been performed in 2001 and at that time, these indicators alone could have indicated the future value of the patent.

However, since the propensity of litigation suits and surge of lawsuit costs starting with 2011 (according to Figure 5), I would rather consider that the value of the patent correlates to a high degree with its capability of allowing access to a technology through cross-licensing or serve as a shield from a lawsuit. This is a supposition especially for the high technology sectors, such as the semiconductors industry. I did not find yet empirical data to confirm my hypothesis, probably because the researchers did not yet take out surveys in the recent years (with data after 2011) in which to observe a stronger correlation between the value of the patents and their protection to litigation lawsuits for the recent years compared to the last decade, as an hypothetical example.

Concerning the chemical industry (which I consider analogous to the high tech industry due to specificity of high investments in R&D, also a high technology sector and obvious need of patenting to protect the R&D investments), the author of [73] presents several findings. Among them: that firms license more in markets where they have smaller market shares, that technology licensing is less likely to occur in a differentiated product market and that aggressive licensing leads to increased competition in the market and lower overall industry profits.

To conclude, licensing requires having control on the divergences of interests between the licensee and the licensor. This can be obtained through three levers<sup>38</sup>: 1. People- select carefully the licensees and cultivate a relationship of reciprocal trust. 2. Align incentives- the relationship should be as such as when the licensee gains, the licensor gains, and when the licensor loses, the licensee loses. 3. License terms- as the relationship becomes more complex, this last lever becomes more complicated and unreliable. As it will be seen later in Chapter 3.2 China and Hong Kong, very strict license terms would not be of much help when considering licensing in China and Hong Kong, for example.

#### 2.2.4. Collaborate

The fourth option an IP holder has is to strengthen collaboration. This might be a) with competitors, b) with developers of complements and c) with customers.

##### a) Collaboration with competitors<sup>38</sup>

Collaboration at business level in general may be a good thing, which gives track to new opportunities, as shown in the case studies described by [61]. In 2005, 65% of European GDP came from small firms, compared to 45% for the USA. The authors claim that “business partnering, similar in many ways to patent pooling, is the only model for European SMEs to grow internally and provide the wealth creation demanded by the Lisbon and Barcelona accords.” If this partnership gives benefits at business level, it might seem a good analogy to presume that it would have the same effect in the case of IP level collaborations.

One type of collaboration is **tacit collaboration**<sup>38</sup>. It is done by doing research with universities (with whom competitors might arrange research activities too). A recent article that shows insights into this matter is [7]. In Figure 17 it is shown the different types of university collaborations, depending on what is to be achieved, how the collaboration should be structured together with examples.

	IDEA LAB	GRAND CHALLENGE	EXTENDED WORKBENCH	DEEP EXPLORATION
<b>What do you want to achieve?</b>	<ul style="list-style-type: none"> <li>• Attract new partners</li> <li>• Build relationships</li> <li>• Generate options</li> </ul>	<ul style="list-style-type: none"> <li>• Shape innovation ecosystem</li> <li>• Develop research agenda</li> <li>• Meet societal challenges</li> <li>• Hire talented graduates</li> </ul>	<ul style="list-style-type: none"> <li>• Solve near-term problems</li> <li>• Gain advice and support</li> </ul>	<ul style="list-style-type: none"> <li>• Tackle fundamental challenges</li> <li>• Access new areas of expertise</li> <li>• Access pipeline of discoveries</li> <li>• Hire talented graduates</li> </ul>
<b>How can you structure the collaboration?</b>	<ul style="list-style-type: none"> <li>• Simple and standardized contracts</li> <li>• Open calls</li> <li>• Outline research priority areas</li> <li>• Internal selection</li> </ul>	<ul style="list-style-type: none"> <li>• Special-purpose vehicles</li> <li>• High-leverage industry consortia</li> <li>• University endowments or centers</li> </ul>	<ul style="list-style-type: none"> <li>• Consulting agreements with individual academics</li> <li>• Contract research agreements with university</li> <li>• Student projects</li> </ul>	<ul style="list-style-type: none"> <li>• University center sponsorship</li> <li>• Framework agreements allocating decision rights to downstream intellectual property</li> </ul>
<b>Examples</b>	<ul style="list-style-type: none"> <li>• HP Labs Innovation Research Program</li> <li>• IBM Faculty Awards</li> </ul>	<ul style="list-style-type: none"> <li>• Structural Genomics Consortium</li> <li>• Shell Grand Challenge</li> </ul>	<ul style="list-style-type: none"> <li>• Nokia applied research contracts</li> <li>• Often practiced within larger collaborations</li> </ul>	<ul style="list-style-type: none"> <li>• Pfizer-Scripps partnership</li> <li>• Rolls-Royce University Technology Centers</li> </ul>

Figure 17 Types of university collaborations [7]

The collaborations are expanded from left to right, from simple to complex. In any case, it is important to ask oneself if the universities in focus have experience from industry collaborations and to decide upon the ownership of the ideas. For example, most universities own the ideas, with the exception of Sweden and Italy, where the “professor privilege” applies, and as such the researchers and the academics own the ideas [7]. Moreover, it is probable that universities, in their large majority, do not have a coherent policy in this area, or they might have, but not be enforced strongly. Or it may be enforced differently, depending on the IP in focus. As an example, most authors will have full copyright on their works (if done independently of others), but patenting might be handled under other regulations<sup>42</sup>.

Regarding the collaboration with universities, I find especially important the agreement, which should restrict which research outcome is to be published, which is to be patented, who will own the patent, who will have access to the research facilities, who will be allowed to carry on improvements, just as immediate and important examples for applied research with external customers / participants. This is in order to avoid situations where patent applications may have lost their formal patentability because of an interesting presentation held on an after-noon.

The **express collaboration**<sup>38</sup> is determined by *patent pools*, which are especially useful for surmounting patent “thickets.” These pools could be formed of complementary patents. The second lever of express collaborations is *standard setting organizations* (SSO). These offer several advantages<sup>38</sup> such as:

- i) Increased overall value of the products made by all firms on the market. This is because the network of clients benefits better by having implemented a standard across the industry as the sales volume is potentially larger. This is in line with the findings shown in [72]: first, the larger market pie enlarges the patent value in situations where demand is *very* high. Second, such a strong patent advantage may determine rival exit (considered as third party) under *very* low demand. At *moderate* levels of demand, the collaboration benefits may be lost when opposing reciprocating competitors via an aggressive stance that may erode total market value [72]. The functionality is thus increased too as there would

<sup>42</sup> Observation of Assoc. Prof. Bjørn Otto Elvenes added after reviewing the first draft of the MSc thesis

be a pool of knowledge concerning the attractive features. To add more, there may be economies from a larger mass of components required during the fabrication process. The benefits are even higher if the product is launched when the standard has been anticipated. There is evidence that the value of the market increases too, as the EU Commission staff estimated that an increase of 1% of the number of standards used in a country corresponds to an increase of 1% of the GDP<sup>43</sup>.

- ii) The potential licensing IP revenue: if the firms IP aligns closer to the standard, the revenues are higher. For example, Qualcomm owns 12.5% of the standard setting patents for 4G (LTE), and thus receives in revenue ~3.2% of the price of every 4G phone sold in the world<sup>38,44</sup>. By comparison, Nokia owns an even larger share. The welfare seen by the society is unchanged, as it is only about transferring of rights, not increasing social value.
- iii) They increase barriers to entry. This blocks access of competition to a new technology. For example, manufacturers of steel conduits combine the plastic with metal in the form of noodles, thus discouraging the use of plastic only conduits.
- iv) There are new opportunities for seeking of rents. Each participating firm desires a (disproportionate) share of the social benefit of the standard. This may be problematic viewed from the point of social welfare as there might be a waste of resources (financial, human, material) due to the struggle over shares while at the same time, the safety of the standard might be at risk, as with its efficiency.

It is important to know that SSOs are permitted as an exception to antitrust exclusions. However, they must<sup>38</sup>: i) have a justifiable objective, that is it is not for the only reason of suppressing competition that the standard has been create; ii) they must tolerate the procedural requirements directed at reducing misconduct (see ANSI policies of openness, lack of dominance, public notice, consideration of views, voting system based on consensus, appeals process, written procedures). These policies are considered as contracts by EU and USA, they are binding on SSO members (an example is Broadcom versus Qualcomm (see <http://www2.ca3.uscourts.gov/opinarch/064292p.pdf> accessed June 2014); however iii) the ability of companies to enforce their IP is reduced (*through the legal source of obligation*: implied license, patent misuse, abuse of dominant position (EU only), duty of good faith (EU only) or issues related to antitrust and unfair competition (Treaty of Rome); *duty to disclose*: each firm must disclose patents or pending patents that are necessary to form the standard, the failure in doing so may provide patents unenforceable against SSO members plus *duty to license*: two options, either announce in advance the rejection of enduring the constraints *or* comply with **FRAND** licensing [**Fair**→terms should not be anticompetitive, for example, the licensee should not be forced to license an unattractive product in order to reach the desired technology; the license should not be free for the licensee, the licensee should not be obstructed from buying licenses from licensor's competitors, or include agreements that forbid the challenging of patents in courts; **Reasonable**→the license fees should be near to the amounts the licensor could have collected in the absence of the standard, should

<sup>43</sup> <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SEC:2011:0671:FIN:EN:PDF> [accessed August 2014]

<sup>44</sup> [http://newsletters.articleonepartners.com/news\\_f1317eac-ee13-5a66-d0f5-38ea99a4c1eeLTE-Standard-Essential-Patents-Now-and-in-the-Future.pdf](http://newsletters.articleonepartners.com/news_f1317eac-ee13-5a66-d0f5-38ea99a4c1eeLTE-Standard-Essential-Patents-Now-and-in-the-Future.pdf) [accessed August 2014]



not be so expensive as to affect competitiveness of the industry-these terms are modified by the need to avoid royalty staking, the value of the technology should be correlated with the value it contributes to the standard and to the product, and the sensitivity to the benefits of society through competition and increased production; **Nondiscriminatory**→ same terms offered to all potential entrants and firms in the industry, possible to modify this depending on credit guarantees and volume; plus limits on injunctions (corporations that will not seek injunctions in certain areas for a definite amount of time against licensees that commit to a certain licensing framework)]<sup>38</sup>.

Of the same type of express collaborations with competitors, it is worth mentioning *reverse payment settlements*<sup>38</sup>. These are a so called "pay-for-delay" agreements, in which a patent holder company offers the potential patent challenger competitor a sum to delay its entrance on the market. It is a reversed situation because usually it is the infringer who pays the patent holder for the right to enter the market.

I found on the internet a list of top 60 semiconductor start-ups. It is made by Analog EE Times and it is published once in 18 months. I think that some of these startups will have sound finances with time while others may even go bankrupt. I tend to assume that they have some patents that protect their technologies that they advertise. They might lack the market, the skill to create one and might need a partner to join efforts or to license the technology from. Therefore, I recommend having a look on this list<sup>45</sup>. The options are multiple, either make use of a recently lapsed patent of an existing technology, or license-in the technology, or buy the company, or establish a partnership, or buy the patents. In either way, I find this list of companies to be interesting from both an IP level perspective and from a business level perspective, from the view of a semiconductor company, which in my opinion, should keep an eye on such lists at regular intervals.

There are three **opportunities of express collaborations**<sup>38</sup>: i) price competition is reduced. Thus profits are increased; ii) the technology is shared and thus the costs are reduced; iii) the revenues come not only from a single party, but from its networks too.

The **hazards of express collaborations**<sup>38</sup> are two: i) exposure to the antitrust laws and ii) if a misuse is found, the patent will be concluded as unenforceable.

**General guidelines on express collaboration**<sup>38</sup>: it is often better to engage in a collaborative standard than not to, because a competitor might enter the market with its IP and reduce the IP value/influence the current company has. Moreover, a large exit premium might be obtained, such as Motorola Mobility obtained when it had been sold to Google. The risks in collaborative standard settings are most often manageable. There has to be paid attention to antitrust laws, such as disclosure obligations, licensing obligations. As a business strategy, one should expect that the scrutiny will be higher in Europe compared to USA<sup>38</sup>. In the process, it is important that management and lawyers are involved from the start, and work together at all moments of the de-facto standard setting process. Participating into a patent pool (before and during the process of setting the de-facto standard) not only creates the premises of licensing revenues, but the antitrust investigations are less probable to be enacted, as in the case of USA<sup>38</sup>.

It might be important to specify that there are standards determined by industries, for specific products, known as 'de-facto'<sup>46</sup>. They are standards because of their perceived

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<sup>45</sup> [http://www.analog-eetimes.com/en/ee-times-silicon-60-hot-startups-to-watch.html?cmp\\_id=7&news\\_id=222906532&page=3](http://www.analog-eetimes.com/en/ee-times-silicon-60-hot-startups-to-watch.html?cmp_id=7&news_id=222906532&page=3) (accessed July 2014)

<sup>46</sup> Comment of Associate Professor Bjørn Otto Elvenes.

dominance or market share, examples being GSM, LTE (developed by 3GPP), USB, Wi-Fi, etc. There is the other type of standards, formal, and confusion between the two types should be avoided. An example of formal standards is the ISO set of standards or safety related standards (a minimum percentage of produced airbags, for example, should pass the specific qualification tests for production and mount in vehicles)<sup>47</sup>.

According to the author of [21], there may also be collaboration in the form of a *strategic alliance* or *partnering* in order to leverage the IP rights. This would give several benefits, such as: sharing and developing the technology, combine technology which is complementary, execute a governmental contract, develop a distribution network, and develop a new product or a new market. In Figure 18 are shown the main differences between a joint venture and a strategic alliance, in the author's view. I find some inconsistency as the author refers to *strategic alliances*, but uses a 'short-term' as a characteristic of them. Strategy refers in general to long term time scales, while tactics to shorter terms. I preferred to reference Figure 18 below, without modifying it, but mentioning this observation in addition.

	Joint Ventures	Strategic Alliances
<b>Term</b>	Usually Medium to Long-Term	Short-Term
<b>Strategic Objective</b>	Often serves as to Precursor to a Merger	More Flexible and Non-Committal
<b>Legal Agreements and Structure</b>	Actual legal entity formed	Contractual-Driven
<b>Extent of Commitment</b>	Shared Equity	Shared Objectives
<b>Capital Resources</b>	Each party makes a capital contribution of cash or intangible assets	No specific capital contributions (may be shared budgeting or even cross-investment)
<b>Tax Ramifications</b>	Be on the lookout for double taxation unless pass-through entities utilized	No direct tax ramifications

Figure 18 Differences between joint ventures and strategic alliances [21]

b) Collaborations with developers of complements<sup>38</sup>: technology and contracts may be designed in such a way in which to enable as quickly as possible multiple, inexpensive and future products and services from complements. See, for example, the "sandboxing" demand that Apple instituted since 2012, from care to its users. It encouraged developers to come up with new applications, but they were to be developed in a designated box, the Apple software kit.

c) Collaborations with customers<sup>37</sup>: here there are mainly two sources to explore, **grant-back licenses** and **"user innovation."** The first category is represented by the condition that the licensee grants to the licensor the right to license any improvement on its patents. This might be exclusive or nonexclusive, and it benefits the licensor because it increases influence in the field of the technology. Antitrust laws pose a risk to this strategy, however, non-exclusive grant back licenses- limited to the duration of the patent, are backed by the US and EU laws.

The second category is represented by selling customers "toolkits" as to enable them to modify easier the product that they buy [84]; organize "idea competitions" [85]; use

<sup>47</sup> Remark of Assoc. Prof. Bjørn Otto Elvenes regarding the difference between de-facto standards and formal standards.

a “Collective Consumer Commitment Method”[86] or even engage in “Collaborative Customer Co-Design”[87, 25, 26].

Although the authors of [72] advocate a dynamic strategy in which actions such as fight, wait or cooperate are adopted in time over an observe and act basis, I personally find this to be unrealistic even for dynamic industries, because of the network effects and the reputation of the company. I do not think it is feasible to alternate states of rivalry, cooperation and expectation with competitors, depending on how the market dictates. This might be possible in politics, where any alliance is possible, but in the market, networks effects (customers, suppliers, distributors) are at stake and may not be as dynamic as desired. Strategy, existing contracts, preferred market image, the availability of alternative approaches<sup>48</sup> are more considerations that influence such adaptations that need time to take effect.

### 2.2.5. Donate

Some IP holders may consider an opportunity to donate their IP. Although this option might seem strange at first, it may prove its value for society or the further developing of the respective technology. This will be shown in this subchapter, which is split up in a) non-strategic donations and b) strategic donations.

a) Non-strategic donations<sup>38</sup>: donations of IP to commons-based peers production, such as Wikipedia or NASA Mars Clickworkers; to universities through open-access rights or non-enforcement of patents in order to enable advances in research; philanthropic responses from pharmaceutical companies when confronting global health crisis or humanitarian technology transfer (I would consider for example special prices for technologies that are able to diminish famine through increased food security or improved global health).

b) Strategic donations<sup>38</sup>: donations that reduce hold-up risks, that encourage complementors, that would stimulate demand for other products or services (the Sun Microsystems, with its open-access software policy); that accelerate obsolescence of a product (the case of fashion industry, with registered copyright, trademark or designs patent protection) or that maintain presence in a rapid changing environment, such as SouthPark TV series copyrights on Youtube ("Google and Viacom today jointly announced the resolution of the Viacom vs YouTube copyright litigation. This settlement reflects the growing collaborative dialogue between our two companies on important opportunities, and we look forward to working more closely together," Source <http://mashable.com/2014/03/18/google-viacom-youtube-settlement> accessed June 2014).

In chapter 5 of the recent Ph.D. thesis of the St. Gallen University associated author [67], it is shown reasons why firms giveaway their patents, for free. The typology of different patent donations and motives is shown in Figure 19.

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<sup>48</sup> Additional considerations of Assoc. Prof. Elvenes regarding this matter.

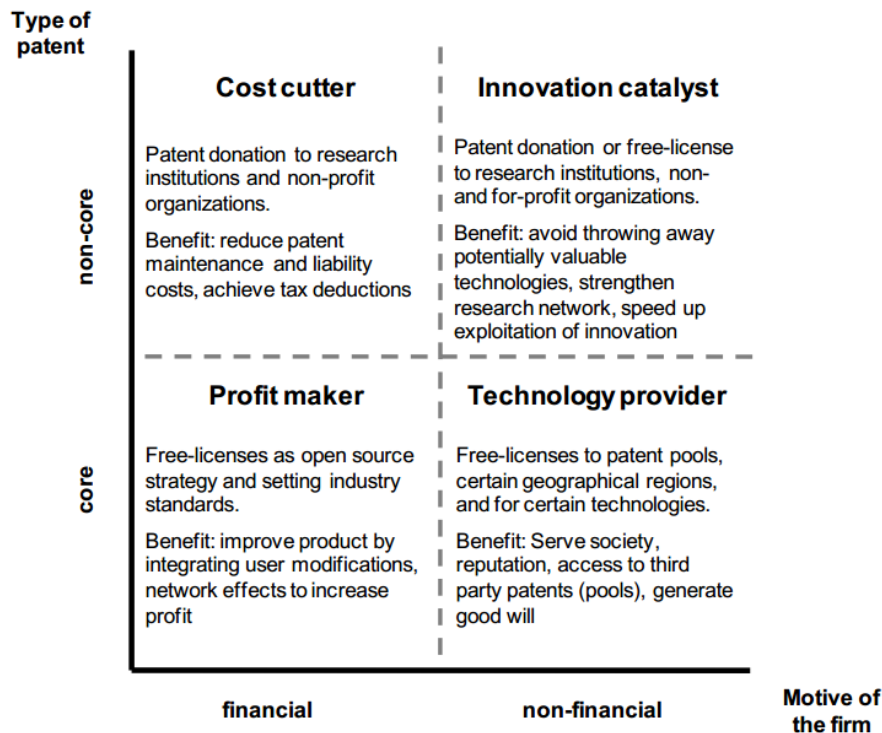


Figure 19 A framework with regards to different reasons for patent donations [67]

The type 1 category, the *profit maker* [67] releases patents in order to benefit from network effects. The main industry that benefits from this approach is the software industry, which benefits from the ideas that come from the open source community. The potential know-how and ideas of the users to improve products help the companies secure dominant market position and expand profits. Companies such as IBM, ARM and Sun Microsystems implemented this constitute the first category of donors.

Regarding the type 2 category so-called **the cost cutter** [67], companies donate their patents to universities, non-profit organizations or research institutes in order to reduce the costs. They save the patent yearly fees, but also the costs for settlement in case of infringement. In the USA, companies may also benefit from tax returns. In this category, companies such as Shell, DuPont, Shell Technology Ventures, Kellogg, Lubrizol, Caterpillar, Eaton and Hercules donated patents that were not anymore representing their business core, and thus became obsolete. One of the patents donated in 2007 by Hercules for example, covered a technology that was a promising alternative with regards to the ozone layer. In order to ensure further development and use, Hercules, donated the patent to Delaware Economic Development Office (DEDO), which licenses the technology to entrepreneurs that plan to create new ventures via business ideas. The state of Delaware covers the costs of the patent, in this case.

The **innovation catalyst** [67] category is formed by firms that plan to trigger innovation activities and discover new fields of business opportunities. In 2001, Boeing donated to the University of Pennsylvania patents covering a material they used in antennas which showed potential to the medical area, as a replacement of human bones. Celera made available patents covering a drug against the Chagas disease, in order to ensure its further development by the receiving party, the non-profit organization Institute for OneWorld Health. Procter & Gamble donated 196 patents to Vanderbilt University in 2000. They covered a technology with potential to develop a 'super aspirin,' which did not show the gastric side effects of the aspirin drug. They also provided funds to maintain the patents and assistance for further development.

The last category of **technology provider** [67] covers firms that donate core patents to third parties. The reasons are combinations of fostering generosity; provide the society and entry patent pools. An example is Hewlett-Packard, which promised three patents on a battery recycling technology to the Eco-Patent Commons patent pool. The company has chosen to support the green technology initiative of the non-profit organization, instead of using the technology for generating income. Most of the companies of this category are represented by the pharmaceutical industry.

Therefore, firms that decide not to enforce their patent portfolios, nor to sell them, but to open them to the public, might profit from rewards on the long term by establishing a viable ecosystem. A successful example is Apple compared to Blackberry, see [95]. I think that society would benefit as a whole from such share of know-how and free of charge IP, even in the case of high technology companies as it fosters innovation. However, I consider it is more the case for large corporations, with huge patent portfolios (and which patent more than they can develop), which may donate some patents to society. I do not think that a small to medium enterprise would benefit on the long run if it would let go of the patents, in face of the competitors. Patents are the consequence of the innovation efforts, creativity, R&D investments and of the strive to achieve a competitive advantage.

### 2.2.6 The role of pendency as a “submarine” IP strategy technique

There is a technique that the framework presented in [3] does not refer to, in my opinion because [3] concentrates on the US patent system, where the examination starts automatically with the patent filling. In [50], the author shows that companies might have been using certain debatable points of some of the patent systems (such as pending applications or withdrawing a patent application before filling for examination) to either give a sense of insecurity to competitors, to gain time to evaluate a potential exclusion right, or to disclose prior art in the case of withdrawn filings. Even if it is likely that a patent applicant might wish to have granted the rights as soon as possible, it seems that in a few cases, applicants prefer to delay the examination by the office by as much as possible in order to take a bet on what the rights are going to be, and discuss upon the pending applications with potential commercial partners. Research has shown<sup>49</sup> that competitors might look at pending applications in order to estimate which areas of technology a firm might pursue. Therefore, it is likely that the patenting process in itself has to be viewed upon with care and included into a strategy.

For example, when a patent application is filled, it creates value for the applicant in several ways. *Firstly*, it secures freedom to operate (FTO). This, research showed<sup>50</sup>, was the second most important reason for patenting, after hampering imitation. All patent applications are published no later than 18 months after their filling date, in the considered case of the German patent system. After its publication, the invention becomes part of the prior art, and it destroys the novelty of all further applications that would cover the same creative idea. *Secondly*, there are 12 months (under the Paris convention) within which the applicant has the right to file consecutive applications covering the same invention at other patent offices. Therefore, the size of the patent family may be extended. *Thirdly*, filling an application does not automatically imply its examination. The application is pending until the applicant or another party formally requests examination. In the German patent system, the request may be filled within seven years after the application date. The analysis showed that the largest share of the requests for

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<sup>49</sup> Palangkaraya A, Jensen PH, Webster E 2008. Applicant Behavior in Patent Examination Request Lags, *Economics Letters*, vol. 101, no.3, pp. 243-245.

<sup>50</sup> Chapter 3.6.2.15 “Summary statistics of independent and control variables” of [50]

examination at the German Patent and Trademark Office (GPTO) were expressed after seven years, as in Figure 20 .

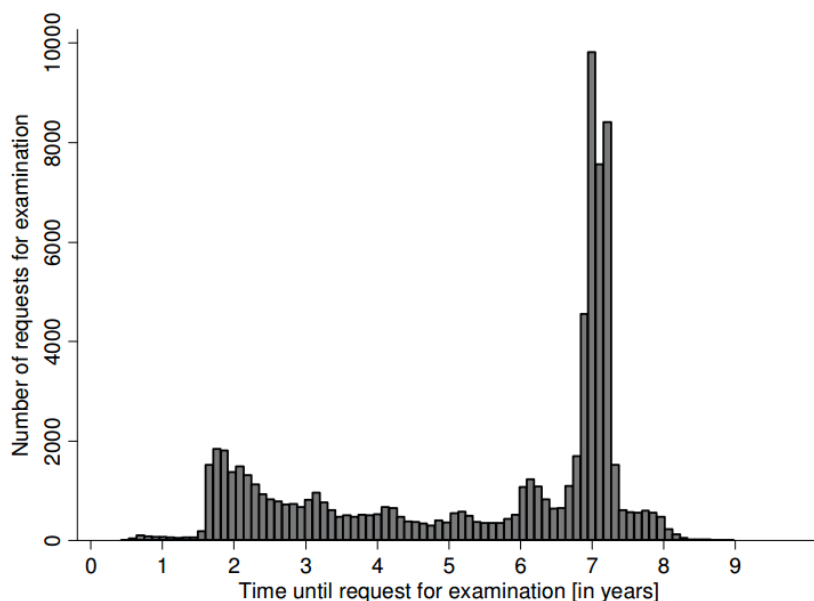


Figure 20 Timing of delayed requests for examination [Chapter 3 of reference 50]

The author of [50] disclosed that one of the interviewees of his study stated that “[pendency] is less expensive than a patent but still effective enough to negotiate [with potential licensees].” Moreover, another interviewee stated that “Developing the wheel suspension for the [product X], we were afraid for a very long time that our R&D efforts could infringe upon patent claims of a similar design alternative of [competitor Y]. It took a long time for [competitor Y] to file a request for examination. Thus, we were not sure which of its claims the office would grant or reject. [...] For a long time, we thought that our invention infringed upon [competitor Y’s] claims and tried to develop invent-around solutions [...]”

As the author of [50] completed the analysis of the empirical data he collected, it becomes clear that is possible to assume that pendency is used in several cases to reduce costs while maintaining the freedom to operate, gain time, provoke insecurity in competitor’s strategies regarding R&D investments and reduce transparency in the patent systems. Though, this approach would not be applicable in US, as the system of USPTO starts examining the application automatically with the patent filing, it does not ask for a formal request as other systems in the world do, such as the GPTO or EPO. The author recommends treating patent applications as what they are not a measure of innovativeness, but rather measures of intellectual property strategy.

The authors of [66] published a similar study, regarding the impact of corporate scientific disclosures on the pending patents of rivals, using EPO patent examination procedures. Their empirical findings are two: first, “semiconductor technologies are strongly linked to scientific knowledge,” and second that “company publications are effective in blocking related patent applications, and, accordingly, have the power to serve as a device for securing the freedom to operate a technology.” As a parenthesis, guideline on how to decide on when to pursue the defensive strategy is offered by [56], see Figure 21.

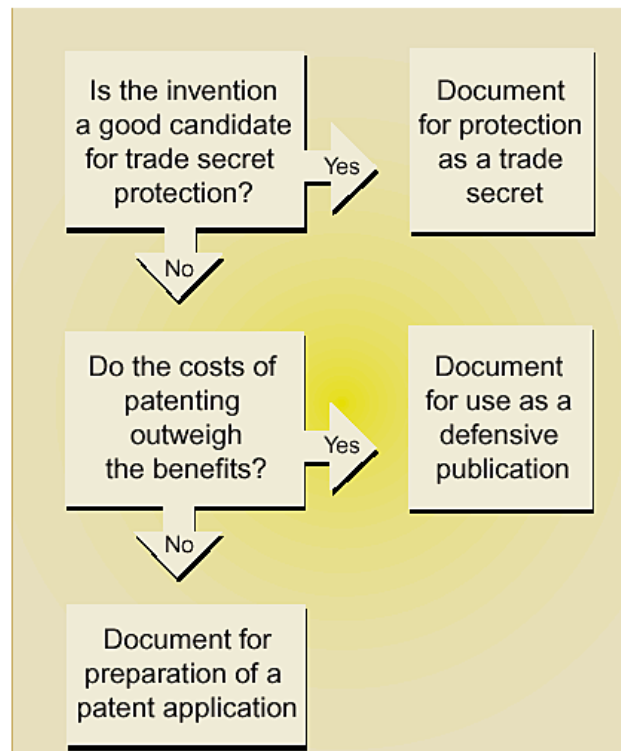


Figure 21 Decision processes regarding keeping an invention as trade secret, patent it or publish it in a publication [56]

A potential candidate for trade secret protection is the technology used in the fabrication of the technology. Detecting the improvement in the production techniques of the rival company is not easy. To add more, the trade secret has to be guarded by stringent security measures to ensure its secrecy. On the other hand, defensive publication might be preferred over patent protection in the scenarios in which (i) “the incremental inventions are covered by existing patent claims” and (ii) “not embodied in a product with potentially long-term marketability”[56]. Own filed patent applications (an early publication of own patent application issued in a non-US country, considering the 18 months usual time frame for US) are considered prior art. Catalogs, web sites, are not searchable by patent examiners in databases. The authors recommend publicizing the information on a forum to which patent examiners have access, in order to assess them and use them against a competitor’s patents.

The authors of [66] draw to attention however, that their findings should not be generalized to USPTO, as it uses other procedures for patent examination, among others (the granting procedure is more rigorous at the EPO, the costs for filling and maintaining a European patent is two to three times higher compared to a US patent). Reading [49] however, one can observe that pendency may be extrapolated at least to European level, at EPO, not only at national level, as in the case of GPTO. The authors discovered that *essential* patents (building stones of SSOs) contain significantly more claims; they are amended 25% more often than patents not relevant for standardization; the time necessary for a decision to be made regarding an application is longer for essential patents; and the pendency time was around 70 months (approximately 6 years, similar to the case of 7 years for GPTO). The explanation is that if the patent application is filed early in the standardization process, the applicant will aim for ensuring space of manoeuvre until the specifications of the standard are set.

A related strategy used by companies is “patent ambushing” [66], when they do not reveal relevant patents until very late in the standardization process. Although these techniques might be beneficial for the companies that employ them, they reduce social welfare, introduce uncertainty in the patent system and encourage cloudiness. EPO has identified such abuses of the patent systems and has limited recently the space for divisional applications filling. This is expected to reduce the “overly long pendency times.”

The implications I see for a firm are to consider not only the process of patenting, but of disclosing business strategy through the unavoidable disclosure that comes with the publication of the patent application. In other words, this is something that has to be considered, and the lever of pendency may be used at a firm’s advantage in some cases. I think the patent offices do not take measure for this lever in the system as pendency incurred lower costs, and therefore instead of losing the money spent by an applicant, the patent offices secure income not only for one year, but as it has been shown, for the maximum duration of the pendency time, which is seven years in the case of the German patent system. Therefore, a firm has to pay attention to the value assessment of the patent, account for patenting costs in various countries (where higher returns are expected, due to the predicted volume of the market) while considering seriously the timing factor [55].

### 2.3. Options for non-holders

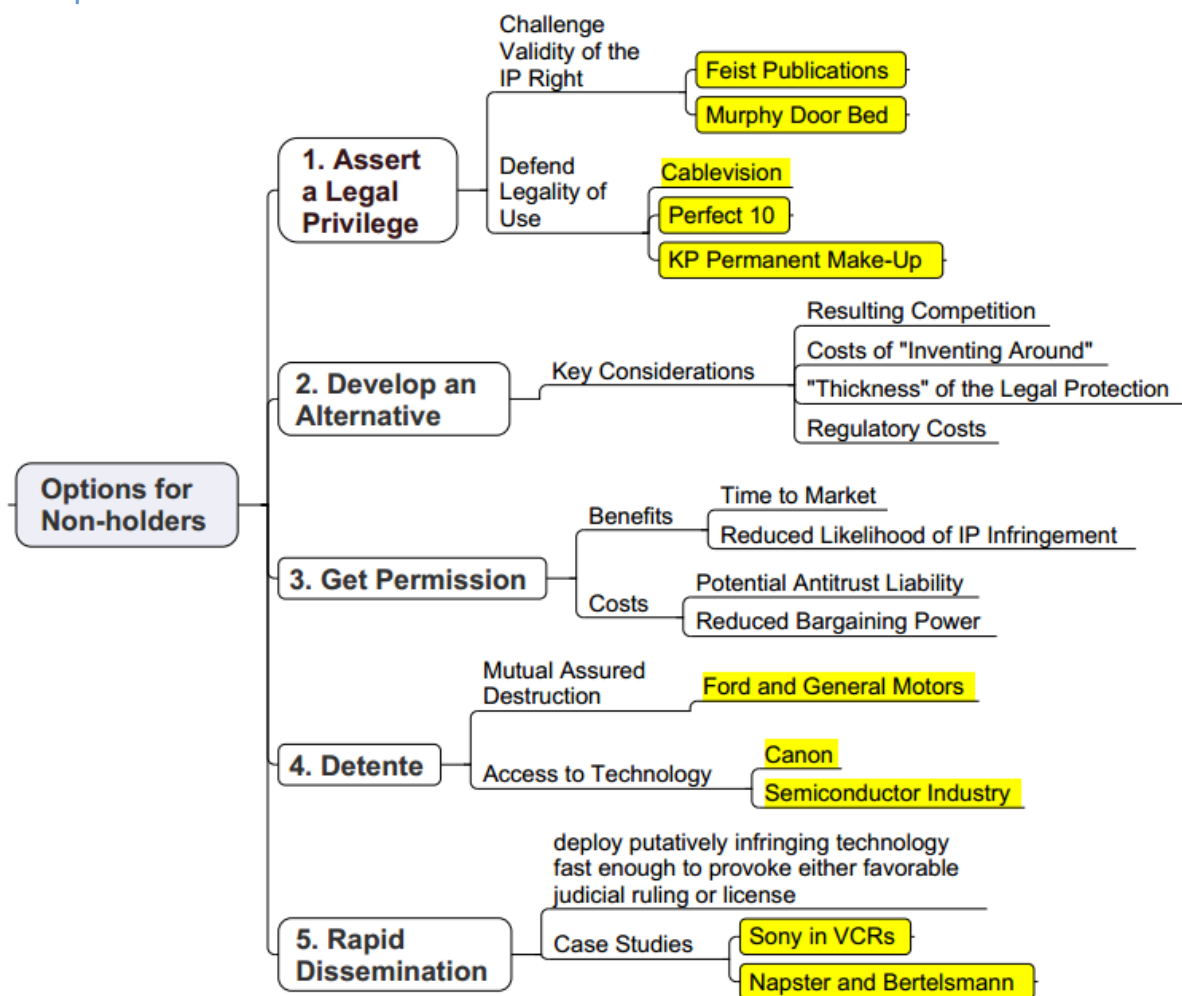


Figure 22 Options for non-holders [3]

Non-holders of IP also have several options at hand, the first being the assessment of a legal privilege. They may also seek an alternative to the technology, ask for permission,



build up large piles of patents (detente) or even quickly deploying the product on market, without having such a legal right (rapid dissemination).

### 2.3.1. Affirm a legal privilege

The first option a non-IP holder has is to “*challenge the validity of the IP rights*” the owner claims it has. This subchapter is divided into a) weapons for resisting lawsuits, b) hazards of assessing the legal privilege, and c) general guidelines.

a) Weapons for resisting suits<sup>38</sup>: **challenge validity of the IP right**<sup>37</sup>, or **defend the legality of the use**<sup>38</sup>. An example offered by the authors, for the first sub-category is the “one-click” patent that Amazon obtained and later has been challenged by Peter Carveley, some claims of it were mentioned in a previous patent. Also, a **misuse**<sup>38</sup> might be a valid challenge, as with the case of Napster, that patented a system of file sharing, another case offered by the authors. They were sued by Metallica for copyright infringement, and they lost the case. Another example is Cablevision, which realized that it could record at the viewer’s request the show that is to be watched, and then later re-broadcast it for the client. It planned to offer the service of remote-storage. This was not well received by the media companies, and, therefore, they had gone to trial, and they had won. After four years of suits, they could supply this service to consumers. However, so could the competition, and therefore litigation to defend a right may prove to be pricey, as the benefits are shared within the industry.

b) Among hazards<sup>38</sup>: Of course, the **high cost of litigation**<sup>38</sup> is one of the drawbacks. It comes in addition to emotional stress. Moreover, **if one wins, competitors will benefit from the success**<sup>38</sup>. **If one loses, consequences might be ruinous**<sup>38</sup>. The authors offer the example of Kodak suing Apple on patent infringement for technologies related to digital imaging technology, in 2002. Years later, Kodak was on the verge on bankruptcy, and Apple claimed in court that when Apple partnered with Kodak, it had divulged technologies through non-disclosure agreements and that in fact, Kodak’s patent rights belonged to Apple. This had made the situation of Kodak even worse.

In [69], the authors show that patent wars at court levels had an impact on the firm strategy. They used the global smartphone market war between Apple and Samsung as an analysis basis. They found evidence that as patent wars intensify, companies shift their business focus to the markets that are controlled by weaker IP protection. Companies whose home market systems have weaker IP systems adhere to a larger degree to this, compared to the companies with stronger technological capabilities. Moreover, the patent war that was intended to limit the growth of the Android market may have just shifted the sales to countries with weak IP systems. Therefore, it might not be in the firm’s best interest to limit imitation through the use of litigation. Managers should keep in mind the much broader implications that litigation implies when dealing on a global market. Apple found itself at disadvantage when litigating against Samsung, as the latter concentrated on weaker IP markets and Android started to get a higher share of the global market. The study has at least one limitation, which is being based on a patent where the main weapon was determined by patent thickets. This might not always be the case for companies in other industries.

c) Several guidelines for non-IP holders that assert a legal privilege<sup>38</sup>: It is seldom that defensive litigation may be a preferred option, mainly because the **dominant firm can use litigation to establish a broad precedent**<sup>38</sup>, and moreover, it may prove to be **an obstacle for the reputation**<sup>38</sup>.

### 2.3.2. Develop an alternative

The second option non-IP holders have is developing an alternative to the patent protected technology. This strategy may be pursued in the case in which the company possesses high levels of creativity and time is not critical, or when the other alternatives did not work (seeking for a license or buying the respective IP). This subchapter is divided into a) benefits, b) hazards and c) general guidelines for developing an alternative.

a) Benefits for developing an alternative<sup>38</sup>: this gives the advantage of avoiding **both litigation and doing without license fees**. It also improves the negotiation power in license negotiations or acquisition. In my opinion, this happens also because when an alternative is developed, the value of the initial technology decreases, and may even become a threat. On short terms, it improves the best alternative to a negotiated agreement. On long term, it adds value at strategic level to the reputation.

b) The hazards of this alternative are associated with the costs<sup>38</sup>: Of course, there are **costs of “inventing around”**<sup>38</sup>. There is i) the cost developing the technology. The authors offer as an example, the probability of developing an alternative which is higher in the industry of software compared to the industry of medicines. Moreover, the costs in the software industry are medium, compared to high costs in the pharmaceutical industry. I assume this is because of the higher level of insurances that pharmaceutical have to provide, higher research costs, longer duration of the projects, higher failure rate taken as percentage of projects started and higher risks due to exposure to lawsuits. I could also add the diminished revenue in the case in which a state forces a pharmaceutical company to license to competitors the medicine it discovered after long years of research (compulsory licensing), in cases of national health emergencies.

And there is ii) “*the costs associated with ‘the thickness’ of the legal protection for the pioneer*”: thinnest is the copyright standard for sound recordings, medium is the trademark law (of concern is the “consumer confusion”) and copyright standards for software: major players in the software industry shift from copyright to patent protection, although the situation is different in Europe compared to USA. In Europe, software patents cannot be filed in all countries in EU, while in USA there is an established history of software patents since 1960s, when the United States Court of Customs and Patent Appeals (CCPA) forced USPTO to increase the availability of patent protection for software. Along with the copyright standards for software, there are the general copyright standards that are thick, too. These are based on various methods, tests and audience. Last but not least, the patent equivalents are thick, too. They can be examined by an element-by-element approach (each element described and compared with the element in the other patents). For example, in the semiconductor business, there is the case of (Johnson United States Court of Appeals for the Federal Circuit (CAFC) 2002) (<http://law.justia.com/cases/federal/appellate-courts/F3/285/1046/570109/> accessed June 2014) in which the patent that was challenged specified aluminium as one of the materials used on the printed circuit board, and by doing such it did exclude all other possible materials. In other words, the material was disclosed (a metal), but not claimed.

Another hazard is the regulatory costs<sup>38</sup>, that are specific mostly to the pharmaceutical industry. Then, the resulting competition: in pharmaceuticals, during the patent protection, the pioneer is not faced with serious price competition from companies using substitutes. They compete on brand and therapeutic nuances. I think this is because it is in their interest to develop a market for their product, to create a need. The newcomers with lower quality offer lower prices, while the ones with acknowledged superior quality demand higher prices. After the patent expires, there will be competition between

generics, and the price will go down. However, the pioneer is modestly affected by this, as in some cases, it was reported that the prices rose. For the software industry, it depends on the new entrant's strategy that introduces the alternative technology<sup>38</sup>.

c) As general guidelines<sup>38</sup>: The technology, law and marketing should be combined to estimate the total costs and advantages of each likely way of inventing around the protected technology of the pioneer. If this alternative of developing an alternative is selected early, it may prove to be much less expensive compared to the others. To add more, a credible threat to follow this strategy may lead to drastically reduced license fees from the pioneer<sup>38</sup>.

### 2.3.3. Get permission

The third alternative of a non-holder of IP is asking for permission. For this, a) benefits, b) costs and c) general guidelines will be presented briefly.

a) the benefits, namely two<sup>38</sup>: If the IP holder asks for permission, this gives the advantage of **short lead time to market**<sup>38</sup> (the case of Windsurf boards) and would **eliminate the risk of IP infringement**<sup>38</sup> (as Youtube does by asking for permission for videos it offers for viewing, before they are shown to the public).

b) the costs, mainly three<sup>38</sup>: Licensing comes with the financial **risk of royalty stacking**<sup>38</sup>, although its frequency is debated in academia, **reduced bargaining power** or **potential liability from antitrust laws**<sup>38</sup>. The transaction costs could be diminished if one considers patent pools and collective licensing. I consider this happens as if the market of the royalties is larger, then the collectively negotiated price is more favourable for the licensees.

c) general guidelines<sup>38</sup>: the rule of thumb is that if licensing is an opportunity for the licensor, it might prove to be for the licensees, too. If the IP holders succeed in advancing with the technology, then this will affect positively the licensees. However, to be able to maximize from these advantages, the terms of the contract have to be carefully negotiated.

### 2.3.4. Detente

The fourth option a non-IP holder is to accumulate large portfolios of related patents. This could be used to gain access to some technologies. In this subchapter, the a) benefits, b) hazards and c) guidelines are offered.

a) Benefits<sup>38</sup>: Accumulating large portfolios of patents, without asserting them, can prove beneficial because **the mutual possible destruction discourages costly litigation**<sup>38</sup>. Ford started this process of accumulating patents, and then General Motors, but they did not assert them against each other. For this option, it is more relevant the number of patents, compared to their quality or content. I agree to this statement, as I wonder who would have the time, resources and energy to browse through tens of thousands of patents in order to assess their quality or relationship to the ones of the other party. The second advantage is that **cross-licensing ensures access to new technology**<sup>38</sup>. This seems to be the case mainly for the semiconductor industry, where [88] state that "Instead of being driven by a desire to win strong legal rights to a standalone technological prize, these firms appear to be engaged in 'patent portfolio races' aimed at reducing concerns about being held up by external patent owners and at negotiating access to external technologies on more favorable terms." This is in line with the view of the authors of [38] and [2] for the

semiconductor industry, as a particular case and with [36] as a general case, through the likelihood that a company may threaten back with a reciprocal suit.

b) Hazards<sup>38</sup>: From the perspective of the company, this is a rather wasteful process, as it implies the same costs and effects as advertising on the market in order to stabilize the market share. From the social welfare point of view, this is pure waste. I agree to this second term, as patents that do not denote true inventiveness are giving more power to the non-innovators on the market, to the ones that have the most (financial) power.

c) Guidelines<sup>38</sup>: Overall, this approach is as bad as litigation. The reason is that it implies huge costs to maintain the patent portfolios and it may feed the patent trolls, which through their behaviour described in the previous sections, they harm the society. However, in a highly litigious industry, it might be the only way of winning some way of operating. I consider this is the case in the mobile phone industry, where large corporations buy and sell massive amounts of patents (ex. Samsung, Apple, Motorola, RIM, Nokia, Microsoft are some names that have been involved in recent news titles regarding acquisitions and sellings of patent portfolios).

### 2.3.5. Rapid dissemination

The fifth option a non-IP holder may pursue is to disseminate rapidly. This is also very risky, and unethical, too. In a) the strategy is briefly described, b) offers some case-studies, while c) deals with the general guidelines.

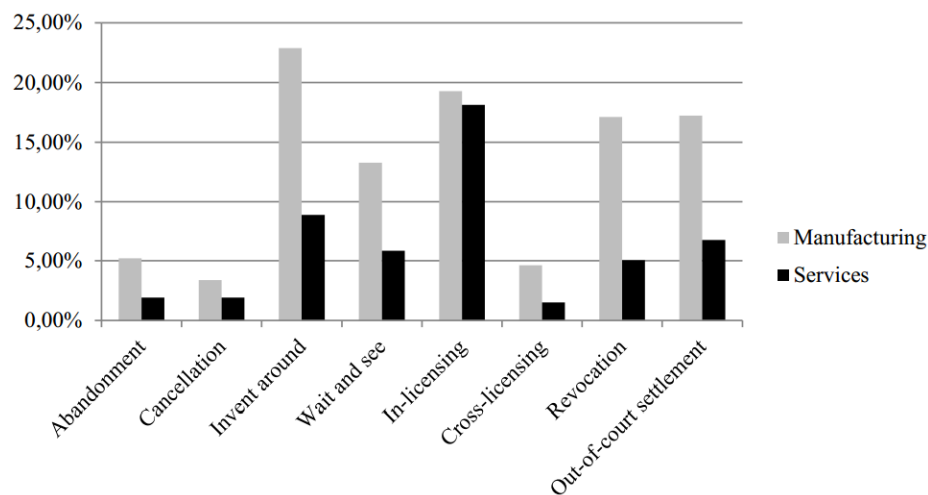
a) Strategy<sup>38</sup>: The strategy would be to release on the market infringing technology fast enough as to provoke favourable terms regarding the justice system or license. The main hope would be that once deployed, the system would develop at such a rate that when a dispute takes place, the market would be too developed for the IP holders to diminish. Or, as in the case of Sony below, that the justice system would be amended in order to permit the technology.

b) Case studies<sup>38</sup>: The successful case is of Sony, which released (Video Cassette Recording) VCR technology. The major entertainment companies did not vow the idea. It meant that people could create copies of the movies that they broadcasted. It took six years for the United States Supreme Court to decide on their legality, and by that time, approximately 11% of the American households benefited from this technology ([3] and footnote 38). As they were so spread, the judges were more permissive regarding the law of copyrights, and they stretched the doctrines in order to legitimate the machines. Sony won the gamble, but it forfeited its leading position as it underestimated the vast availability of recorded movies. There is an unsuccessful case, Napster, which first it put content on the website, and only then it sought to obtain licenses from publishers. Not only they refused, but they litigated. Napster lost, and so did its main investor, Bertelsmann AG. This is because the copyright owners brought the company to a suit, claiming that it was responsible for the injuries that they had experienced. As the potential damage to be awarded by the company was large, the company settled the cases for several million dollars instead of running the risk of provoking it.

c) Guidelines<sup>38</sup>: It is important to note that this option is suited for very large corporations, which have negotiation power and resources to tackle the problem which would arise when the conflict would erupt. It might also be suited for corporations that have the realistic prospects of becoming very large before the conflict arises. It poses very high risk, and therefore, if the copyright holders refuse to license, the result may be catastrophic. I would say that this is the case for the patents world too, not only the copyright as the

authors of [3] show on the link in the paper. The gains are possibly very large, if not huge, as success may create high barriers of entry. This might happen if the network externalities come as a helping hand. In my opinion, this is not a moral option for a respectable company to pursue.

To conclude, the framework proposed by the Harvard University associated authors of [3] is a state-of-the art framework, also because they have included a link in the paper which is continuously updated. The last update is from 28 May 2014, <http://cyber.law.harvard.edu/people/tfisher/IP/IPStrategy.swf>, accessed June 2014), and therefore it accounts for the recent cases in courts and is aware of the latest trends and outcomes. However, I find it concentrates only on private entities and views the options from their own perspective, together with the benefits for the society. It does not include the peculiarities of the markets, or the viewpoints of the public sector entities, or of the governments. Nor does it mention or develop an “internal strategy” tailored to the organizational needs of the firm. The options presented for IP are rather external options, within the market, and the list is not complete. For example, the author of [71] proposes additional (defensive) strategies, such as *abandonment* (before investing in the R&D activities, if the analysis showed that the project is associated with great risks and considerable costs), *cancellation* (too expensive for the firm to obtain IP rights or to lay a false trail for competitors), *wait-and-see* (to wait for the IP holder to observe the infringement, a risky strategy) and *out-of-court settlement* (evidence shows [77] that 80-95% of all patent cases settle through licenses, cross-licensing arrangements, pools, agreements not to license third parties, market division or field-of-use agreements; antitrust concerns are likely as agreements are between competitors on the market). The author of [71] shows the propensity of such strategies on a pool of manufacturing and services companies, referred for convenience in Figure 23. A similar graph is shown in [18].



**Figure 23 Distribution of IP defensive strategies over industry types [71]**

In the empirical study [70], the authors consider that there is a correlation between the trademarks use and the company’s set of patenting motives. This is also because trademarks are an important part of a company’s reputation and may support the perception that a technology is covered by a patent, even if it may have well expired. Moreover, also the search intensity is correlated with the company’s set of patenting motives: the more it monitors the technological environment, the more it is interested in acquiring patented technologies. The same may be said about the research activities, which positively correlate with the patenting activities, too.

## 2.4 On several patent strategies and their implications

Although the main options one has have been presented in the previous chapters, various authors come with additional thoughts, most often advocating the same principles exposed before.

For example, in the recent book [39], Law Professor John Palfrey, Harvard University offers four advice regarding IP strategy. **The first one** is to “*consider the IP as an asset, rather as a weapon,*” such as a sword, or as a shield. This is mainly because the opportunities might come later in the future, either as increased profitability or notoriety. **The second one** is “*to be open to other entities that come from the outside of the firm,*” such as customers and competitors. These views are shared by the authors of [6]. The main idea here is that if the ecosystem thrives, then the participants shall thrive too. **The third one** is to consider the “*intellectual property the most valuable asset, as it offers freedom for action for the organization.*” This benefit is larger as compared to the defensive role, the author states. **The fourth** recommendation is “*to agree on an internal strategy that enables creativity and flexibility*” within the IP world. These two should be based on openness and interoperability, in the author’s view. It is important to note that the author considers that neglecting the intellectual property, or ignoring it, or failing to manage it, then unnecessary risks are run throughout the organization, in addition to missed opportunities.

The author of [39] also states that having a solid intellectual property portfolio reduces risk by establishing greater clarity around what one can do as an organization without breaking the rights of others, even unintentionally. Having the rights registered, the organization may decide later what it will do with these rights. A good example is the documents that contain the inventor’s rights agreements, which each new employee should sign in order for the company to avoid he’s or she’s departure and joining a start-up. Also, the uncertainty with the lawyers is reduced when the IP portfolio is well recognized, as compared with the one of the competitor. It is often that one has to pay \$3 to \$5 million bill for legal fees for a side in a lawsuit [39], at least in the case of USA (the authors does not specify this, but I assume it is USA only due to his affiliation and the geographical area where the book is published). The possibility of extremely high damages may justify the expense on the complainant side, but also on the defendant’s side, as it may provide a strong incentive to negotiate settlement to avoid a very costly court battle. Having such certainty in intellectual property rights can lead to earlier and cheaper settlements. The strategy has to be adjustable over time, but tailored to assets, as one-size-fits everything formula would not work.

Returning to the first (of four) recommendation(s), one should acknowledge that intellectual property is in fact information, and it is not drained if more people use it. On the contrary, the more people use it, of higher value it becomes. But the statement has limited validity<sup>51</sup>, which is in the IP system that functions well. In the other case, when illegal use is widespread, it may not only undermine revenues from the protectable IP, but also in worst case, undermine the claim of protected ownership.

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<sup>51</sup> Assoc. Professor Elvenes’s comment on the limitation of the statement

For the well-functioning IP system, examples are Facebook and Twitter, platforms that are so popular nowadays in large part because companies integrated their systems with these networks without asking for a cent, but in ways in which both companies could have charged them. The Nobel Prize winning economist Robert Solow has shown that the introduction of new technologies is accountable for as much as 80% of the GDP growth [39]. Moreover, innovative companies are prone to obtaining higher profit margin growths compared to the average economy.

Innovating internally is a good way of establishing intellectual property rights. But as shown before, licensing or developing it with others in joint ventures may be as good, if not better, as the time to market is shorter. Another possibility is acquiring a company or part of its assets. The idea concerns the second recommendation, of being open to the others that are not part of the organization, as they might be helpful, too. This is especially useful when a license can not be obtained. For example, history has shown that customers are willing to participate in the design process of products that they appreciate. “Beta testing” is a term that has originally appeared in the IT business, however nowadays has been extended to other industries, such as those that fabricate mountain bikes, cameras, shirts or design web-sites. For example, IBM asked its employees’ family members to fiddle with its new technologies online in order to discover new ideas. Also LEGO, outsources the innovation ideas generation responsibilities to a panel of knowledgeable customers and even “citizen developers” [39].

However, in the case in which the case of licensing in open collaboration is considered, the guidelines presented in detail in [96] are summarized in Figure 24.

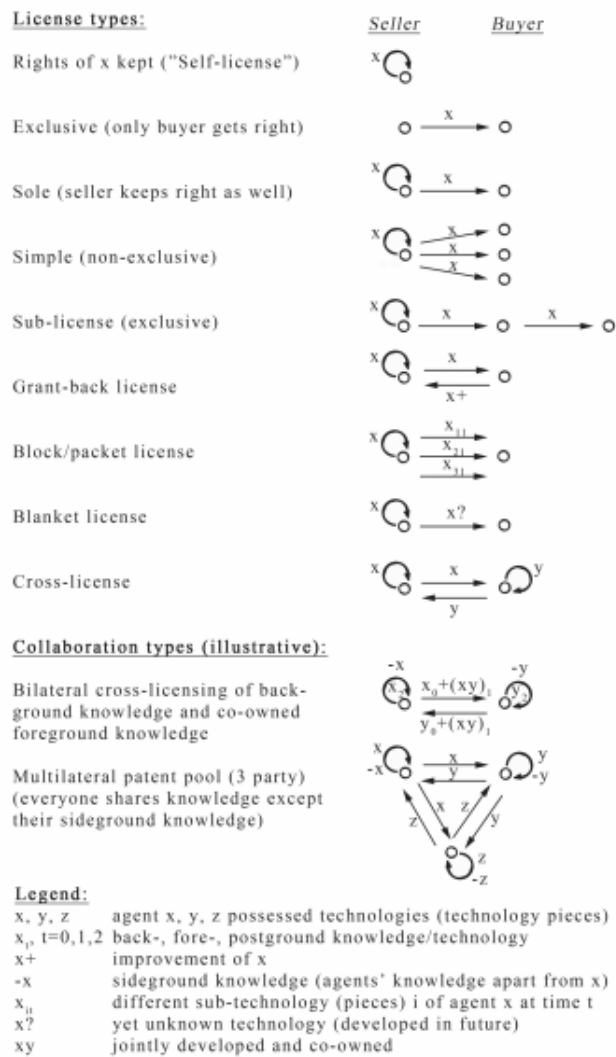


Figure 24 Types of licenses in open collaborative innovation [96]

As such [96], the owner may keep the rights (**self-license**), may demand compensation (**exclusive, sole, non-exclusive license**), allow the licensor to find sublicensors (**sub-license**), reserve the right to use any improvements that the licensee does to the technology (**grant-back license**), package the rights of several technologies as a block (**block/package license**), license all rights related to future improvements of the current technology (**blanket license**) or gain access to other's IP (**cross-license**), alliance in a collaboration where background and co-owned foreground knowledge is shared, except for side ground and postground knowledge (**bilateral cross-licensing**) or joint license with other holders of complementary assets that are needed to further development, including everything except sideground knowledge (**multilateral patent pools**).

It is not that everything is IP protected. It is often the case that intellectual property might be freely available. The author [39] considered some examples, which are described along this paragraph. As examples, the system on which Google is based, Linux, or the World Wide Web that everybody uses although Tim Berners Lee, its inventor, did not seek for payment from our usage. The web space seems to be very open and attractive to new ideas. The Harvard Law professor Jonathan Zittrain introduced the theoretical concept of generativity. The main idea is that a company may be offering a certain layer of its intellectual property to others in order to keep building on top of it or alongside it. The generative tools enable others to develop the later set of innovations. For example, Zillow, an online real estate database appraises property values using data which available



publicly (per square foot cost data, historic sales data, etc). But it also uses Microsoft's Virtual Earth mapping technology and photography taken from bird's eye to enable potential house buyers discover architectural design, neighbourhood properties and others. The better example is Apple with the enthusiasm of the iPhone users and software developers. It created the iPhone Development Center to enhance the development of iPhone, iPod and iPad applications. The applications are then to be depleted on the Apple iTunes Store. This generated revenues for both Apple and independent developers. Moreover, it ensured the need for newer hardware, as users are looking for the best devices to access the applications. A similar approach has been undertaken by Google for the Android products. The network effects are "enormous" as the author states, and Facebook (user developed applications such as FarmVille), Apple, Google and Microsoft (the beta version of Internet Explorer 7 has been tested with users, the stronger proved to be stronger afterwards) are the proof of it. The rest, that did not implement this strategy, such as RIM in the smartphone market, are trying to catch up with the leaders. There are of course risks, as organizations may experience future unforeseen consequences. This is mainly because of the quality of the service, which might be downgraded by certain programmers, in the open world.

The idea behind open innovation is to combine internal and external ideas together with internal and external paths to market in order to forward the development of new technologies. The authors of [6] show a figure with the innovation approach one company has at hand, referenced for convenience in Figure 25 together with the following examples. Innovation tournaments are innovation contests. Such contests had been held by the Harvard Medical School, General Electric, MathWorks, Netflix, Harley-Davidson and many others [6]. Ideas generated on the market, but selected internally happen for example with Innocentive. Sometimes, the costs of further developing the ideas may be high for the consumers. Therefore, for example, LSI, a semiconductor company of San Jose, has long provided customers with electronic "tool kits" that help developing innovative chips. Approval contests are events organized by companies where customers are asked to vote the preferred idea. They are mostly directed to clothing brands, as the study shows. The communities and markets group denominate the high tech industry in general and the software industry in special, through the well known term of "open-source." In this case, software is shaped by both customers and designers. The high tech companies IBM, Samsung and Toshiba joined together to create a laboratory that includes both idea generation and selection. They agreed to share the intellectual property regarding production processes. They could not compete at the production level, but at the design level, having ensured lowered production costs, as they shared the facilities.



Figure 25 Selecting the right innovation approach [6]

A big corporation that developed products in total secrecy and now is asking the opinion of users before market launches is Procter& Gamble. Of all, Eli Lilly, a pharmaceutical producer, started InnoCentive (also mentioned in [39]), a platform that is

based on the wisdom of the crowds. Nowadays it became an independent organization. It allows companies post a problem to which it needs a solution, on the website. The 300,000 solvers compete for the cash prize offered by the company that posted the challenge. 1650 challenges have been posted by 150 organizations until 15 August 2013 (<https://www.innocentive.com/about-innocentive/facts-stats> accessed June 2014) and 85% have been solved through 40,000 solutions. Big multinationals such as Procter & Gamble and Dow Chemicals benefited from this service, together with NASA, Air Force Research Labs, The Economist and several agencies of governments throughout the world. Spreadshirt is another example, as it let customers design the shirts they would like to buy. Windows 7 has been the most attractive Windows launched to that date, as it involved the customers and they were accountable for the changes. This has been showed throughout the adverts, by a customer saying “I’m a PC, and Windows 7 was my idea.” Therefore, involving ideas from the outside world should in principle increase sales, notoriety, and if not these, at least improve the user experience.

The fair use (of copyrighted materials, which benefit from exceptions and limitations) and material from the public domain permits companies to use aspects of other’s IP without an explicit license. For example, rights tend to run out over time. Patents might have especially short terms, the author of [39]. He did not mention anything else regarding these statements, except for special cases of generic drug companies. Therefore I would come up with a recommendation to companies to actively keep an eye on patents of the IP market that have recently expired or which will soon expire. These might give novel insight into technologies or invention ideas/ principles.

The third recommendation of the author of [39] concerns the freedom of action through intellectual property. The author describes three degrees of action. *The first one* is that if one owns intellectual property, one may choose at a later stage what to do with it, be it exploiting it on the market or doing something else with it. Large patent portfolios have created détente situations in which big corporations did not sue one another because too many of their own products violated the IP rights of the company that they planned to bring in court. As the author states, before the launch of the product on the market, the IP strategist should sit together with Engineers and Managers and check if the technologies that are to be deployed infringe or not the IP of other players on the market. This gives better preparation for a potential lawsuit, and I would add, as shown previously, lower costs for insurance against such threats. *The second degree of freedom* [39] is knowledge management. It is being created with each innovation, and the organization should still be able to work effectively with piles of knowledge developed. It is suggested therefore to collect data from actions of customers and competitors, in order to improve the efficiency of the processes. *The third degree of freedom* [39] is the brand relationship to the IP. The connection between the two is through trademarks. The reputation on the market, the brand, may prove to be as important as patent rights. On Twitter for example, there is an open, unstructured game called “What Disney show are you?.” Twitter users use a code to associate their username with a name of a fashionable Disney character. This gives Disney executives insight into their customers’ base, links IP with their customers, and builds brand awareness on the market. This strategy builds relationships with the community that is influencing the brand development. I would add to this the “Intel inside” trademark that Intel included on the case of the PCs and laptops that were sold having its processor; this built brand awareness.

In my view, a high-tech Scandinavian company has an advantage on the market, which is the better brand reputation because of assumed high levels of innovation and investments in R&D actions at both corporate and governmental levels, compared for

example with Easter European companies or firms from Asia, as an example. I would advise sending letters to customers, along with the request of a patch of products, in which they would assure the customers of the utmost care for the product, their development and support, in line with the tradition of Scandinavian simplicity and innovativity. Moreover, as Scandinavian countries did not take as active part in wars/conflicts throughout recent war history as other countries, I would advise searching for correlations between the company's history and the country of headquarter's history. Elements such as trust, care, innovation, respect, tradition, optimism, understanding and others might be linked with either the company's product, service or business strategy to build further the relationship of a reliable, trustworthy, listening partner no matter what, no matter when, always open for discussion and suggestions for improvement. It is my assumption that this would stand at the mutual benefit of parties, buyer and seller.

I would foresee that no matter how many tests have been performed before the launch of a new technology to market, there might still appear some bugs on the product. This is unavoidable, as it is a small percent of a volume. But if the volume is big, then it will happen. The idea I stress is to prepare for this long before. For example, a simple text such "as an established Scandinavian company, we offer this secure XYZ online platform link dedicated to suggestion for improvements of our products or real-time reporting, may you have encountered any problems or issues" might do miracles and work at a defensive level may the relationship experience difficulties. The user might feel entitled to report a small bug before that becomes critical for say, another customer. Therefore, the brand value increases, and so does the trust of the current database of customers (and future ones) in the intellectual property portfolio.

Considering a study that analyzes the influence of intellectual property strategies in different open-innovation environments [10], one may observe four cases, as in Figure 26.



Figure 26 IP strategies in different open-innovation environments [10]

The first strategy, "sign it, seal it and get delivered" IP strategy is specific to the 'closed,' traditional view of intellectual property, of a shield. An example is Procter&Gamble who considers licensing only after being used in a P&G product or five years after the patent covering the technology has been issued. If it is not possible to license the respective patent, the company shall not be renewed.

The "if you give it away, they will come" strategy is the exact opposite. The companies that use this strategy, such as Nokia or IBM, grant free access to large portions of their IP portfolios. IBM released publicly the source code of Eclipse in 200, and since then has become one of the reference software tools development. ARM Holdings Plc releases part of its IP and software to existing but also potential clients, and has created an ecosystem of users, and now dominates the market. Also, small companies open up their IP portfolio to attract third parties into their ecosystems, an example being Propellerhead Software in Sweden. They opened the architecture in order to allow user modifications. Transferring the IP rights to the new ecosystem might help protect it from attackers.

*“Spread the problem, secure the solution”* is the IP strategy which uses the *wisdom of the crowds*. The technology environment is stable and knowledge is evenly distributed among players on the industry. There should be a clause of full/non-exclusive transfer of licensing rights (royalty free) from the originator of the idea to the company who initiated the pool.

The *“For many eggs, get many baskets”* IP strategy is specific to intensive R&D companies, where research is costly and the market is hard to predict. Joint efforts regarding IP are a common perspective in this case. Platforms and dominant designs are established at first, but in time, the partners would become fierce competitors. The authors associate this strategy to pharmaceutical companies; however I would also include the semiconductor industry. This is because for a product to be successful, it should be easy to inter-connect it with all other devices on the market. Therefore, the success depends on standards, say LTE or USB. Therefore, a company should seek a balance between over-protecting with IP and being open with regards to it. This balance should be backed by smart IP policies, such as patenting only the valuable patents and considering licensing as a viable option for non-valuable patents.

With regards to the author's fourth recommendation [39], of having a flexible IP strategy, it seems useful to know that a strategy that is valid this year might not be efficient next year. This is because the market changes at a fast pace, so do customers' tastes, competition and even laws. The patent licensing should be separated from trademark license contracts. This is because if a trademark license is used for a product for which a technology is licensed, the licensor would see its sales affected by the newly established low reputation on the market, because of the low-quality products of the licensee. Moreover, these contracts should be built as such to allow adjustments to factors in the market. There is full exclusion, openness but also partial exclusion (it is based on a network effect for generating revenues, extending the brand or building the market position). The partial exclusion enables other parties to use proprietary assets on a limited basis. This comes as licensing, most often. Licensing to competitors may be a good idea if the market would thus expand; this is usually done through cross-licensing to ensure interoperability. For example, a category of users could be encouraged to use the products or services for something that one wishes them to do, but for which one does not require payment. This might raise brand awareness or familiarity with the product. A similar approach has been used by several computer game studios, case in which users were encouraged to develop their own extensions to the game (and even sell them by themselves), provided that they all must have run on the original game platform or programme<sup>52</sup>. Therefore, the goal is to create such an ecosystem around the proprietary product of the company. The company Monsanto (mentioned earlier) used this limited exclusion approach as described in the previous chapter. It offered the product at a low price to many companies, and then, after it dominated the market, it threatened with an increase of the price, knowing it had no competitors. Collaboration friendly strategies should be preferred to the ones of litigation, which is affecting not only finances, but also brand reputation and presents high risks with uncertain outcomes.

A recent article regarding intellectual property strategies, published recently in the Journal of Management is [35] by Associate Professor of Business Administration and Law too, Deepak Somaya, University of Illinois at Urbana Champaign. The author researched all Journal of Management papers related to IP, of the recent years. He refers to these *‘generic patent strategies’* as either proprietary, defensive or leveraging strategies. On the other hand, he links the *‘strategic management of patents’*: information disclosure strategies, managing patents as real options, strategies which are non-market and patent related managerial capabilities. The first theme helps gaining the competitive advantage

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<sup>52</sup> A similar example from the computer game industry, pointed out by Assoc. Professor Bjørn Otto Elvenes.

using lens of theory of resource-based view. The second subject analyzes actions and strategies that are more tactical in nature. There is a third dimension, the activity domains: buying patent rights, licensing/cross-licensing and patent leveraging (litigation).

With regards to the first theme, of generic patent strategies, the i) *proprietary strategy* is considered first [35]. It is the strategy in which patents are an isolating mechanism that protects the firm's assets from imitation. These patents may be reinforced by acquiring patents from the market. It might be a good idea to build a series of temporally overlapping rights. This often happens in the case of pharmaceuticals<sup>53</sup>, where companies plan the introduction of patents considering the expiration of the rights for drugs on the market. This might be interesting for some industries, although I consider that this strategy would not easily apply to the high technology sector, where technical knowledge does not advance at such a quick pace. However, it might not be impossible.

Once a suit has been filed, the firms that have adopted a proprietary strategy are less willing to settle with the infringer. This is because the company plans to obtain an exclusive patent position with the technology that it developed. Research has shown<sup>54</sup> that building patent fences increases the value of the firm, and this happens more so if the innovation in the respective industry is not drastic, but rather incremental. The patents around which patent fences are built are more valuable than those that are not cited as often. Therefore, this strategy is likely to be used when it is difficult to write and leverage exclusive licensing contracts. As an example, vital technologies that give access to the competitive edge of the company shall probably be kept proprietary and not licensed, as it supports current and future competitive edges<sup>55,56</sup>. This is also the case of patents that create new market opportunities or those that offer a unique, separated position, as they have few replacements<sup>57</sup>. Moreover, owners of patents with high "strategic stakes," with a high number of (self-)citations<sup>58</sup> and often included in reexaminations<sup>59</sup>, shall probably benefit too from this 'proprietary strategy.'

The second strategy of the first theme is ii) *the defensive strategy* [35]. As one might seek to be at competitive advantage through patents, it might also plan not to find oneself at a competitive disadvantage because of rents that are to be paid to other patent holders. This case might appear in multi-invention<sup>60</sup> contexts. The need for a defensive strategy is fueled as a patent confers the right to exclude others only, and not the right to use the technology that is to be patented. Therefore, patent owners might obtain substantial rents when threatening the infringer with a court injunction<sup>61</sup>. It is often that patent thickets are

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<sup>53</sup> Graham SJ & Higgins MJ 2008. Timing new drug introductions: The roles of regulatory rules and firms' complementary assets. Working paper, SSRN eLibrary

<sup>54</sup> Ceccagnoli, M 2009. Appropriability, preemption, and firm performance. *Strategic Management Journal*, vol. 30, no.1, pp. 81-98

<sup>55</sup> Stefanadis C 1997. Downstream vertical foreclosure and upstream innovation. *Journal of Industrial Economics*, vol.45, pp. 445-456

<sup>56</sup> Teece D J, Pisano G & Shuen A 1997. Dynamic capabilities and strategic management. *Strategic Management Journal*, vol. 18, pp. 509-533.

<sup>57</sup> Polidoro F & Toh P K 2011. Letting rivals come close or warding them off? The effects of substitution threat on imitation deterrence. *Academy of Management Journal*, vol. 54, pp. 369-392

<sup>58</sup> Somaya D 2003. Strategic determinants of decision not to settle patent litigation. *Strategic Management Journal*, vol. 24, p. 17

<sup>59</sup> Clarkson G & Toh P K 2010. "Keep out" signs: The role of deterrence in the competition for resources. *Strategic Management Journal*, vol. 31, pp. 1202-1225

<sup>60</sup> Somaya D, Teece D J & Wakeman S 2011. Innovating in multi-invention contexts: Mapping solutions to technological and intellectual property complexity. *California Management Review*, vol. 53, no.4, pp. 47-79

<sup>61</sup> Lemley M A & Shapiro C 2007. Patent holdup and royalty stacking. *Texas Law Review*, vol. 85, pp. 2163-2173

built in portfolios in order to be able to respond to a threat with own patents<sup>62</sup>. This lead to an “arms race” in industries like semiconductors [37], or in those in which firms made significant investments of capital. The author of [13] holds agreement with the view that patents in the semiconductor market are useful as a bargaining chip.

Licensing too (it has been seen that there is a correlation between cross-licensing large portfolios and fewer future law suits between the firms<sup>63</sup>), or patent pools serve the same strategy. Research<sup>64</sup> shows that ex-ante licensing is preferred to patent blocking in situations where competition on the market is strong and blocking is not intense. There are some limitations to this strategy (large patent portfolios, mutual holdup, cross-licensing), as if the focal firm’s patents may not be reached through agreements, the strategy is not viable. For example, the cross-licensing between a patentee with niche products and a company that owns a large patent portfolio would not be of much help for the small niche company in case of a lawsuit [35]. Similarly, mutual holdup is not an efficient strategy when dealing with universities, as they do not have their own commercial operations that might be hold up [35]. This holds for the “patent trolls” too, they are relatively invulnerable to being held up. For such entities, alternative defensive strategies might be planned. Among those, preemptive (ex. precautionary) patenting, disclosing technology, inventing around key patents or challenging the validity of patents [35]. Software firms take this latter approach, as they often have large patent portfolios, but they initiate litigation in order to execute others’ patents as invalid or unenforceable<sup>65</sup>. Another defensive strategy that has not received as much attention is directing the R&D efforts into technological areas where litigation although possible, is less likely [35]. As an example, research<sup>66</sup> shows that biotechnology firms that did not have much experience in litigation and avoided patenting in patent classes that were very crowded or where patents were owned by low litigation cost firms.

The third strategy of the first theme is the iii) *leveraging strategy* [35]. This strategy is based on the opportunities arising from patent licensing revenues. Some patents that protect technologies might not be present at the core of the company, but they might be valuable nevertheless. These help negotiating for rents through leveraging. Some companies might try to invent around or not be willing to license from others. In this cases, the reputation of the licensor, as “being tough” in settlement negotiations might credibly indicate to other firms that in the case in which litigation occurs, they would not find themselves in a favourable situation<sup>67</sup>. Indications point to so-called “patent trolls.” Their success is correlated to their ability of obtaining settlements from companies which have been threatened with a case in court. Essentially, they try to take advantage of their situation in which their patents allow them to hold up other firms, which have almost no leverage power over them. There are opportunities for indirect patent leveraging, such as

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<sup>62</sup> Somaya D 2002. Patent strategy viewed through the lens of patent litigation. Unpublished Doctoral Dissertation, University of California, Berkeley

<sup>63</sup> Shapiro C 2000. Navigating the patent thicket: Cross licenses, patent pools, and standard-setting. Paper presented at the Innovation Policy and the Economy conference, Washington, DC

<sup>64</sup> Siebert R & von Graevenitz G 2010. Jostling for advantage or not: Choosing between patent portfolio races and ex ante licensing. *Journal of Economic Behavior and Organization*, vol. 73, no.2, pp. 225-245.

<sup>65</sup> Graham S J & Somaya D 2004. The use of patents, copyrights and trademarks in software: Evidence from litigation. Paper presented at the OECD Conference Proceedings on Intellectual Property Rights, Innovation, and Economic Performance (Directorate for Science, Technology and Industry), Paris

<sup>66</sup> Lerner J 1995. Patenting in the shadow of competitors. *Journal of Law and Economics*, vol.38, no.2,pp. 463-495

<sup>67</sup> Agarwal R, Ganco M & Ziedonis R H 2009. Reputations for toughness in patent enforcement: Implications for knowledge spillovers via inventor mobility. *Strategic Management Journal*, vol. 30, pp. 1349-1374

the case in which a company would negotiate terms for tailoring a technology to a standard, if it owns patents for that standard<sup>68</sup>. Another example is when a company wins a contract because it holds a significant number of patents and it threatens to sue if the contract is awarded to another firm, be it implicitly or explicitly [35]. This was the case of the state of Maryland<sup>69</sup>, which changed the supplier for the lottery, but it kept some patent protected features of the supplier. As possible is for a firm to threaten another firm with litigation, in the case in which the latter managed to recruit an employee of the first<sup>75</sup>. The author did not find significant research regarding indirect leveraging of patents, and I did not find either [35].

Regarding the second theme, the strategic management of patents, i) *patents might be considered as real options*<sup>70</sup>. Most of the value is concentrated in a small number of patents from a portfolio. Technological, commercial and legal uncertainties might only be solved over time. Firms have the option to continue patent applications into new patent applications or to further divide them. Patents may be renewed or allowed to expire. In certain cases, they might be reexamined or reissued. They might give the firm an advantage in acquiring follow-up patents or further concentrate the investments in developing the technology. Another option is to license the patents, although this would limit future options with regards to the licensed patents. Of course, a company might enforce patents through litigation. However, with this, there are two perspectives, of potential negative or potential positive payoffs.

The second issue of the second theme is ii) *signaling and information disclosure* [35]. An effect of patents is signaling the quality of the firm to investors. Patents also give a signaling effect to potential licensing and alliance partners. Research<sup>71</sup> has shown that small firms which seek commercialization partners may signal the high quality of their innovation by showing a patent application. They are also a signal to potential partners, as they might be encouraged to license the technology that has been patented<sup>72</sup>. Disclosing technical advances by companies through defensive publications or public announcements might influence the easiness with which rival companies might obtain patents in the same technological domain. As such, the focal firm might catch up with competitors and own critical patents. According to a “strategy of commons,” firms might disclose inventions to the public in order to discourage further investments from competitors, and thus to discourage them from obtaining patents<sup>73</sup>. Thus the existing flow of royalties from the proprietary patent portfolio is maintained, and rents do not run the risks of being cannibalized. Some firms may apply for a patent, and then withdraw it, influencing the existing prior art at which patent office examiners look when deciding granting of a patent. Therefore, the information disclosure would influence the patent rights that competitors may obtain, either by adding contributions to prior art or by a signaling mechanism. As such, firms might also decide on patenting “bad” inventions in

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<sup>68</sup> Shapiro C & Varian H 1999. Information rules. Boston: Harvard Business School Press

<sup>69</sup> Andy Rosen, “Maryland Settles Claim with Scientific Games over Keno Feature,” Daily Record (Baltimore), August, 12, 2008

<sup>70</sup> Li Y, James B, Madhavan R & Mahoney J T 2007. Real options: Taking stock and looking ahead. *Advances in Strategic Management*, vol.24, pp. 31-66

<sup>71</sup> Gick W 2008. Little firms and big patents: A model of small-firm patent signaling. *Journal of Economics and Management Strategy*, vol.17, no.4, pp. 913-935

<sup>72</sup> Gans JS, Hsu DH & Stern S 2002. When does start-up innovation spur the gale of creative destruction? *RAND Journal of Economics*, vol.33, no.4, pp. 571-586

<sup>73</sup> Agrawal A, & Garlappi L 2007. Public sector science and the strategy of the commons. *Economics of Innovation and New Technology*, vol. 16, no.7, pp. 517-539.

order to mislead competitors<sup>74</sup>. Research<sup>75</sup> has shown that signaling strategies might have been used also in the cases in which companies that recruited scientists or engineers from a competitor were deterred from building on knowledge spillovers of the new employees. This was the case with competitors that in the past had a reputation for enforcing their rights through litigation. It seems, therefore, that information disclosure and signaling parts are important parts of the IP strategy [35].

The third issue of the second theme [35] is iii) *nonmarket strategies in patents*. For example, firms might use lobby and try to change laws and institutions, or be involved in actions with agencies or courts. Some firms tend to target some tribunals or courts for patent leveraging as they judge that there is a specific bias of the court, or that the court is specialized in a peculiar aspect of the patent law.

The fourth aspect of the second theme is iv) *patent management capabilities*. Research has shown<sup>76</sup> that patent attorneys have the same proportional impact on the number of patents that the company is filling for as the R&D spending. The organizations that benefit from patent knowledge of the management, pressures to patent from industry, and good coordination between legal and technical experts will have higher chances of reaching the competitive edge with regards to organizational capabilities. Moreover, research has shown<sup>77</sup> that firms that externalize their patent prosecution activities might affect the firm's access to innovation data, which translates in a lower likelihood of detecting and opposing competitor's patent applications. Some firms may outsource patent work to law experts in the field, but this might negatively influence the firm's strategy related capabilities over time. Moreover, there might be inter-relatedness between the firm's patents, the need to address the most knowledgeable suppliers in each technology area, and therefore even the outsourcing to external parties may need to be coordinated by management across supplier law firms or patent attorneys. It is maybe important to note that this advice might be more applicable to the USA IP market, where litigation is at high levels and where the influence of IP attorneys is higher in this process<sup>78</sup>. Other countries might avoid in-court settlement and seek alternative dispute resolution solutions.

Regarding the relation between patent strategy and appropriability, it is important to mention that research<sup>79</sup> has shown that firms are less likely to fill for patents when secrecy is more effective. Disclosing information at the time of filling for a patent may be particularly harmful to appropriability if the patent itself is weak. Other firms may improve on it and file their own consequent patents. Not only this, but research<sup>80</sup> showed that rivals will also be provided with information about promising areas or which issues to focus on. Such information might leak more slowly compared to the case in which a company fills for patents and discloses its product or process technologies details. Patents and secrecy might, therefore, be applied to protect different elements of a particular technology or product. Patents might be used in conjunction with other forms of intellectual property

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<sup>74</sup> Langinier, C 2005. Using patents to mislead rivals. *Canadian Journal of Economics*, vol.38, no.2, pp. 520-545

<sup>75</sup> Agarwal R, Ganco M, & Ziedonis RH 2009. Reputations for toughness in patent enforcement: Implications for knowledge spillovers via inventor mobility. *Strategic Management Journal*, vol.30, no.13, pp. 1349-1374

<sup>76</sup> Somaya D, Williamson I O, Zhang X 2007. Combining patent law expertise with R&D for patenting performance. *Organization Science*. vol. 18,no.6, pp. 922-937

<sup>77</sup> Reitzig M & Wagner S 2010. The hidden costs of outsourcing: Evidence from patent data. *Strategic Management Journal*. vol.31, no.11, pp. 1183-1201

<sup>78</sup> Note of Assoc. Prof. Bjørn Otto Elvenes on the matter.

<sup>79</sup> Arundel A & Kabla I 1998. What percentage of innovations are patented? Empirical estimates for European firms. *Research Policy*, vol.27, pp. 127-141

<sup>80</sup> Magazzini L, Pammolli F, Riccaboni M & Rossi MA 2009. Patent disclosure and R&D competition in pharmaceuticals. *Economics of Innovation and New Technology*, vol.18, no.5, pp.467-486



such as trademarks and copyrights in order to obtain higher yields of protection. A study was presented<sup>81</sup>, regarding a theoretical model for the tradeoff between secrecy and patents, it was found that lead time in the market increases the preference of keeping the invention secret. This is because it reduces the option of competitors reverse engineer the invention, but it does not alter the costs of approaching an “invent-around” strategy, which is at the same time non-infringing. Research<sup>82</sup> has shown that both defensive and proprietary<sup>54,82</sup> strategies impact positively the value of the firm. Moreover, in [43], the authors reference previous research [88], which determined that the semiconductor industry is characterized by relatively weak appropriability and therefore need complementary assets in order to increase it. Semiconductor firms are however more determined to patent their innovations, compared to the average industries [36]. This is because semiconductor firms gain bargaining power from owning complementary assets tied to their patents. Examples of complementary assets are greater level of marketing and higher involvement in technology support. These help the most when this type of firms is confronted with a radical technological shift or discontinuity, research shows.

Research<sup>83</sup> has also shown that patent strategy is affecting the value creation at society level and firm level. Companies were found<sup>84</sup> to have higher levels of patenting when their strategies were directed towards products, research and collaboration<sup>85</sup>. Patents help companies attract external finances, such the case of venture capital<sup>86</sup> and boost the companies’ industrial public offering (IPO) valuation<sup>87</sup>. As patent owners have preferential terms when accessing financing from the markets, they may afford to keep a lower level of cash amounts while sustaining a high level of R&D activity. Therefore, patents may be considered as being supportive with regards to increasing the value creation by the firm. Patent strategies that motivate R&D employees through incentives for their creative efforts show another notable advantage of patents<sup>88</sup>.

Research shows that technology transfer offices (TTOs) have experienced a decrease of the number of licenses concluded mainly due to a reputation of actively pursuing litigation<sup>89</sup>. It is important to note that the patents which are at the base of some standards not only increase innovation which is built on them, but they might help these technologies to become the main construction of the industry<sup>90</sup>. The trade-off is that firms

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<sup>81</sup> Zaby, A K 2010. Losing the lead: The patenting decision in the light of the disclosure requirement. *Economics of Innovation and New Technology*, vol. 19, no.2, pp. 147-164

<sup>82</sup> Reitzig, M 2004. The private values of “thickets” and “fences”: Towards an updated picture of the use of patents across industries. *Economics of Innovation and New Technology*, vol.13, pp. 457-476

<sup>83</sup> David, PA, & Hall, BH 2006. Property and the pursuit of knowledge: IPR issues affecting scientific research. *Research Policy*, vol. 35, pp. 767-771

<sup>84</sup> Peeters C, & van Pottelsberghe de la Potterie B 2006. Innovation strategy and the patenting behavior of firms. *Journal of Evolutionary Economics*, vol. 16, pp. 109-135

<sup>85</sup> Oxley, JE 1999. Institutional environment and the mechanisms of governance: The impact of intellectual property protection on the structure of inter-firm alliances. *Journal of Economic Behavior and Organization*, vol. 38, pp. 283-309

<sup>86</sup> Haeussler C, Harhoff D & Mueller E 2009. To be financed or not . . . : The role of patents for venture capital financing. Discussion paper 7115, Center for Economic and Policy Research, Washington, DC.

<sup>87</sup> Heeley MB, Matusik, SF & Jain N 2007. Innovation, appropriability, and the underpricing of initial public offerings. *Academy of Management Journal*, vol. 50, pp. 209-225

<sup>88</sup> Cohen W M, Nelson R R & Walsh, J 2000. Protecting their intellectual assets: Appropriability conditions and why U.S. manufacturing firms patent (or not). Working paper, National Bureau of Economic Research, Cambridge, MA

<sup>89</sup> Shane, S & Somaya D 2007. The effects of patent litigation on university licensing efforts. *Journal of Economic Behavior and Organization*, vol.63, pp. 739-755

<sup>90</sup> Rysman M, & Simcoe T 2008. Patents and the performance of voluntary standard-setting organizations. *Management Science*, vol. 54, pp. 1920-1934

have to make their patents available for widespread licensing in order to comply with the requirements set by the standard setting bodies. Firms with stronger, essential patents could leverage their patent position into more powerful market position and improvements their position in the network<sup>91</sup>. This might be especially the case of smaller firms that lack complementary commercialization advantages. Research<sup>92</sup> shows too that obtaining narrower patents may encourage other companies to build on the respective technology and thus to increase the overall value. The author mentions that it would be interesting to observe when the firms would be or not better off pursuing “weak,” nonproprietary patent strategies to enhance value creation from their innovations.

In [16], the author recommends various IP strategies for various industries, such as aerospace, chemical, petrochemical, automotive, food and fashion and many others. For the semiconductors, he recommends using a ‘battle for architecture’ IP strategy, which may be applied to computer, telecommunication services and networking equipment industries. These are characterized by a moderate time-to-prototype and a moderate time-to-market. This strategy is based on a few levers. The first is that the patents portfolio should be at a minimum at the upper 20% of the average patents portfolio size of the industry. This is in order to secure a position in a standard setting organization through cross-licensing. In case this is not possible, the company would face patent fences. Patent fences should be based on a generation, and not be focused or multi-generation, and should make it hard for competition to exploit and patent on the initial innovation. The patent velocity would have to be faster than that of competition, that is to have patent applications be issued faster than the average of non-self-citation ones. The portfolio should not be pruning, but building. The claim quality, claim scope and geographic coverage, should all be broad. These attributes have rewarded the software/semiconductor companies that implemented them, especially in patent-licensing agreements and information-sharing activities. I find the results of the study in line with the ones exposed throughout the thesis.

In line with [16] is a more recent study of the same author [23]. The desired attributes of the IP portfolio and IP landscape for a high-tech company (computers, networking equipments, semiconductor industries) is shown in Figure 27. The difference is that in this newer study, the author put an accent on the reactions of the IP owner in court, if challenged. This is I think because of the influence of infringement suits which started to have track since 2011 (see Figure 5), therefore the author made, in fact, an update to the IP strategy.

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<sup>91</sup> Bekkers R, Duysters G & Verspagen B 2002. Intellectual property rights, strategic technology agreements and market structure: The case of GSM. *Research Policy*, vol. 31, pp. 1141-1161

<sup>92</sup> Bar-Gill O & Parchomovsky G 2003. The value of giving away secrets. *Virginia Law Review*, vol.89, pp. 1857-1895

		<b>Battles for Architectures</b> (mass software, computers, Internet and telecom services, networking equipment, semiconductors)	
	<b>IP ENVIRONMENT</b>		
Desired IP Landscape	Patent Density	Jungle	
	Innovation & Patent Growth Rate	High	
	Typical Number of IP Holders	Many	
	Competitor's Citation Position	Present but no Predators	
	Non-Competitors' Citations	Many with trolls and predators but no sharks	
	IP Aggregators Presence	Trolls Present	
Desired Patent Owner Behavior	Portfolio Attributes	Size of Portfolio	Within 20% of Average; Participating Portfolio for standards control
		New Patent Velocity	Faster than Average First non-self Cite Time
		Self Citation Position	Patent Fences
		Portfolio Management Posture	Building
		Claim Quality	High
	Behavior	Claim Scope For Technology and Uses	Broad
		Geog. Coverage	Broad
		IP Holders' Posture versus Infringers	Aggressive
		IP Holders' Posture When Challenged	Proactively Defend Challenge

Figure 27 IP dynamics, typical versus best suited for success [23]

## 2.5 The analogy between military and patent strategy

As there are multiple definitions for the term “strategy,” proposed by various authors, so there are multiple definitions for the term “IP strategy.” For example, the author of [33] chose to make an analogy with the military strategy.

The principles of the military model are illustrated in Figure 28.

- |                      |   |
|----------------------|---|
| 1. Objective:        | Identify a decisive, obtainable, objective.                           |
| 2. Offensive:        | Seize the initiative and take offensive action.                       |
| 3. Simplicity:       | Simplify plans as much as possible.                                   |
| 4. Unity of command: | Unify and coordinate all forces.                                      |
| 5. Mass:             | Concentrate maximum available means at the point of decision.         |
| 6. Economy of force: | Employ minimum essential means at points other than that of decision. |
| 7. Maneuver:         | Position forces to place the enemy at a relative disadvantage.        |
| 8. Surprise:         | Strike the enemy in a manner for which he is unprepared.              |
| 9. Security:         | Deny information to the enemy and preserve freedom of action.         |

Figure 28 The nine fundamental principles of the military strategy model [33]

The author of [33] presented an equivalent set of ten principles for the patent strategy. These are shown in Figure 29. The extra item is the continuous change of strategy.

1. Extent of patent coverage desired
2. Method of acquiring intellectual property
3. Identifying competitive advantage
4. How will decisions be made?
5. The focus of efforts
6. Response to competitive patents
7. Maintaining up to date
8. Coordination of filings
9. Protection of unprotected property
10. Changing the strategy.

**Figure 29 Important questions to consider when developing a patent strategy [33]**

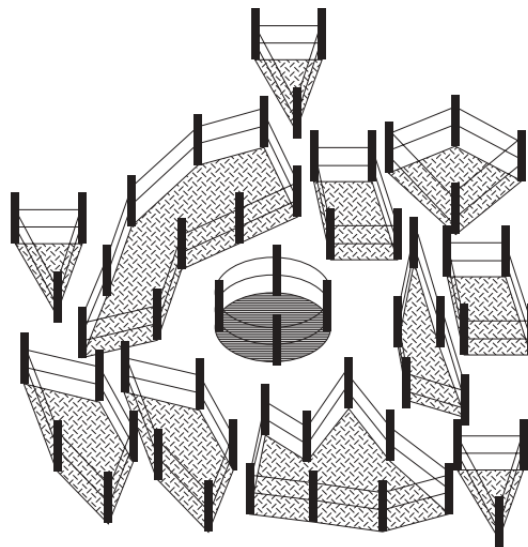
The “*extent of patent coverage desired*” is determined by setting the clear objective of the patent strategy. Here, one should set the business related objective (which advantage is to be obtained by being covered by IP protection). The research related objective should include the technology area from which new IP opportunities might arise. The first objective is linked to restricting the space of maneuver of the competition. The second is linked to scouting work which no other business pursued before. The author recommends to have set up this objective from the start, as one is to concentrate efforts on engines, and another is to concentrate them on aircraft engines. If broadness is determined from start, it would be easier to have a coherent patent strategy, and not have one with little meaning.

The “*method of acquiring intellectual property*” is the offensive level of the strategy. Here, the options are known: develop it by oneself, buy it from someone else, pay someone to develop it, or develop it jointly with another company or a research institute. The first option is most appropriate in the cases in which the technology area will prove to be a major part of the business, where a major commitment of resources is to be made. This approach also gives the most control and expertise regarding the information developed. Paying somebody to do it might be quicker as it does not involve own resources and it gives access to somebody else’s expertise which might not be available in-house. However it poses risks of breaching the confidentiality agreement by mistake or at the expiry date of the agreement. In joint developments, usually the other party is free to use the development for whatever purpose it chooses. In some countries, either of the developers will have the right to license the rights of the patents. Therefore, regulations regarding this issue should be stated in the agreement before pursuing joint development actions. There are some particularities depending on the geographical location of the stakeholders involved in the agreement, and this is presented in Chapter 3.

The third component is “*identifying the competitive advantage.*” This might be found in the technique of the manufacturing process, or the manufacturing process, or a special method of making a piece of equipment. One should consider if the entire competitive advantage is tied to one single invention. As shown in Figure 13, this might not be the case. Therefore, one should consider trade secrecy instead. Having selected an objective, one decides what is to be accomplished; by taking into account the competitive advantages, one evaluates whether or not the objective would be achieved in a way that would have lasting value. There are a few examples that the author presented. For instance, light bulbs have been made by others before Thomas Edison. However, he was the person to bring lightning to entire cities, not only one room as he designed not only the bulb, but also the system of distribution together with the dynamos that produced the electricity. Another illustration is the researcher which developed a polymer with important properties for the semiconductor industry. Even if the researcher has made the objective to develop the new polymer and the process of making it; by filling the patent

application to have the right to exclude others from making this polymer, the polymer might not have commercial success in the end because of its low purity or because it would cost more to produce than the value it would give to the customers. Therefore, part of the strategy had to be developing the polymer at a projected purity and cost level.

Moreover, the author [33] gives the example of a small company that never fills patents in the domain in which it operates. The reason is that it develops technology quickly and they do not have the resources of investigating multiple threads for the problems they face. They acknowledge the fact that any patent they would fill would lead competition developing alternative solutions, not covered by their patent, as in Figure 30. I consider though that this might not be the case of a small semiconductor company, as this industry is characterized by arms races between large companies with huge portfolio of patents that they try to assert against competitors.



**Figure 30 Patent blanketing around an original patent of another inventor- the original inventor has limited space of manoeuvre [33]**

The fourth aspect, *“how will decisions be made?”* represents the unity of command. Sometimes, there are good reasons for filling patent applications, but also good reasons for not doing so. This should be dealt with one person, the author suggests and he/she should also understand how the patent filling fits the overall patent strategy of the company. Thinking on a large scale and paying attention to small details is key to the decision-making process. An objective decision can not be made by the inventor, as he/she is too close to the invention. Neither the patent attorney would advise on this matter, as he/she would prefer to provide only a service and patent advice. The best decision maker seems then to be the research manager, as he understands both the business together with the impact of the technical innovation. Some companies have a liaison between the patent attorney and the business, or an IP manager. His duties and experience entitles him to manage the acquisition of patents, if he has enough authority from the organization. He is to work with the patent agent and the inventor. It is recommended that a procedure is established, where yearly the patent ideas are reviewed in line with the business strategy and decisions are taken. I would think that this makes it easier to combine patent applications, have easier control on patents fill and expiry date and ensure that the technology that is to be patented will be important to the company. It is important to note that the patent should be drafted not by the inventor, but by the patent attorney, as the inventor lacks legal knowledge and might draw a patent that is not enforceable.

The fifth element of the patent strategy model is “*the focus of efforts.*” Resources should be assigned to the area which is important to the business. If not, either the objective or the time will suffer modifications. Moreover, once the invention is ready, it should be further characterized as chances are that the company would try to develop further on the invention. Although it seems that the inventor would be the most appropriate person for this, it might not be the case. The reason is that the inventor usually develops a concept and plans to move to another intriguing area, it lacks the methodological view required at this stage. The allocation of resources should not be so tightly fixed as to exclude the possibility of developing the unexpected.

The sixth element of the patent strategy is “*the response to competitive patents.*” This principle deals with the fact that competition also files patents, and but their patent applications have to be detected, analyzed and a decision regarding which course of action should be taken. The author [33] suggests that best is to identify the key technical areas where such patents would have the most impact, and consider patent applications which occur in such areas. The reviewers should have both patent and technical training, because both analyses are necessary, technical and patent. The technical analysis will disclose how valuable it is the new technology, if it has flaws or assumptions that are unreasonable. The patent analysis would investigate the broadness of the claims, which areas the patent cannot claim, or if the patent has weaknesses. Then the impact of these two analyses should be assessed on the business. Some countries have opposition procedures, and a decision with regards to when to oppose a competitive patent is part of the strategy. If the patent is on a domain with consistent prior art, it could be opposed as such. The minimum one could do by taking such measures is to restrict the opposed patent to a narrower set of allowed requirements.

The seventh element is “*maintaining up to date.*” In the author’s view [33], researchers should have the means of obtaining recent patent informations. Such a search might supply the researcher with new test methods, ideas and knowledge that he might not obtain from elsewhere. An effective but expensive method is to subscribe to a domain of interest of the online electronic databases that provide the researcher with the information in electronic format, as a link in an email or alert. There are professionals who can do such searches, and they reduce the time that a researcher has to spend reviewing patent publications, as they are very experienced with this matter. It is important to keep up to date on the part of the business that is core of the company strategy. Being up to date gives a chance to license these inventions in a timely manner, or detect companies which infringe the patents owned by the business. If costs are an issue, instead of eliminating the search entirely, the amount of technology that is to be looked at could be reduced.

The eighth element is “*coordination of filings.*” This constitutes the surprise in the military model. The location where to patent requires attention on the global needs of the business. One should have a maximum time horizon of 10 to 20 years, and think where the sales are expected to grow during this time period. The efforts of the business might be local, or global, with expansions to other continents. Of same importance is the thought of where the competitors have manufacturing facilities, where they could use plants, and areas where they might plan to grow, too. If it is expected to have a series of inventions and since most of the countries in the world are first-to file countries, it would probably be a good idea to coordinate the filings on the same day, or that a previous application would not affect subsequent applications considering the information that they have contained.

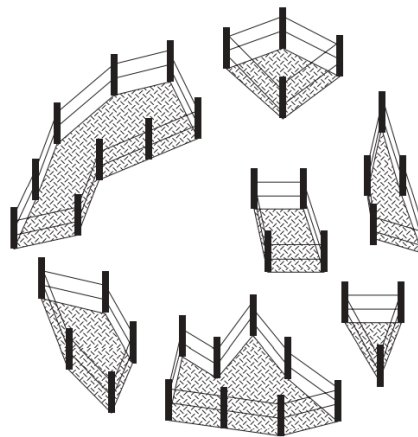
The ninth element is “*the unprotected property,*” referenced as security in the military model. Of particular importance is to decide how to disclose information to parties without forfeiting patent rights. Therefore, patent applications should be filed

before public disclosures. A confidentiality agreement would partly solve the issue, as if the outsider negligently discloses the invention publicly, some patent rights could be lost. There is a tradeoff between the information that is disclosed in a patent application and the ability of the patent to impede others from practicing the claims. It is recommended to have a legal aid, such as a patent attorney that would offer assistance early in the development. Some experimental data might be useful in the patent application (it may broaden the claims of the application or distinguish it from previous applications), and the patent attorney should be able to advise on this matter.

The tenth element is “*changing the strategy.*” The strategy should not be changed very often, but as a consequence of a deep analysis or of a change in the strategies of the competitors. The patent strategy could be reviewed once or twice a year, but the bulk of the strategy should not be changed a considerable period of time. It might change between the time the patent filling has been made to the time of issuance of the patent. It is always a tradeoff between the amount of investigations that may be performed before filling for a patent and the need to launch the product on the market in a timely manner.

Considering a series of inventions, if there is no clear line drawn between the patent strategy and the business strategy, the company may risk disclosing information helpful to competitors, or filling patents which are unuseful, in the author’s view [33].

A researcher may construct an indirect barrier through a number of patents which may work together as a fence. When such patents are used together, they can effectively prevent rival companies from using the invention. This situation is illustrated in Figure 31. Moreover, the competitor might be able to engineer around a single patent, but will find it harder to engineer around a set of patents.



**Figure 31** Narrowly claimed patents may form a maze [33]

The case when a competitor would invent around a broad single patent is illustrated in Figure 32. It might prove in the end that some of the claims claimed are in fact invalid.

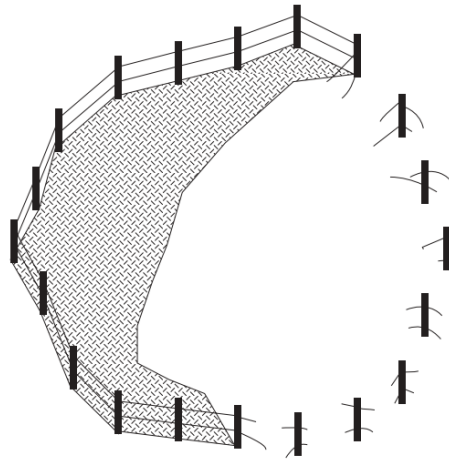


Figure 32 Broad patents that might be opposed by competitors because of the holes in protective claims [33]

## 2.6 The high tempo patent strategy

Achieving IP protection, creativity and innovation levels faster compared to competition might prove to offer a competitive advantage in the face of competitors. As example stands the view of the author of [41]. He states that patent strategy might improve the business strategy. He considers that “inventing and achieving appropriate protections on inventions at a pace beyond your competitor’s capacity to match, and then using that advantage to help you do what you ultimately want to do in business: to sell an ample volume of products want to buy for a sufficient enough return on your investment to make it worth your while.” He therefore advocates the idea that inventing at a higher tempo gives a competitive advantage.

The strategy he considers is based on four points. The first is “to set common viewpoints.” The second is “to measure and control the technical space.” The third is “to accelerate innovation.” The fourth is “to conduct invention/patent infiltration.”

With regards to the *first viewpoint*, the perspective of the participants should be the same. Along with communicating what is to be done, the intent of doing so should come in addition. The author considers that if the intent is known (what has to be accomplished), people will implicitly know how to handle issues that might arise and would not feel coming back to the leader for any problem. The communication of intent allows people to take greater ownership of a task. This is because they have the freedom of how to do it. Implicit communication seems to be the key regarding team efforts, in the author’s view. In other words, there is no one right approach, but there may be many, depending on context.

Regarding the *second viewpoint*, the success should be not measured using metrics such as patents per R&D dollar spent, or total number of patents compared to rivals. Instead, it should be based on the measured organization’s control of technical space. This translates to mapping the core invention, its elements, present and future enablers and its applications in order to see how much of the overall system is controlled. The most control with the least amount of resources is desired. As an analogy, the author took the Gibraltar and the Panama Canal, as they influence the traffic for large areas of oceans. If oceans are ideas and patents are straits, the straits should be temporary and fluid. The speed of innovation and a large quantity and quality of new inventions would become the critical factor of business success, not the total number of patents. Innovation might be



accelerated by using an advanced creativity technique, such as TRIZ; it may improve innovation. Being one cycle of innovation ahead of competitors, they would be forced to be more interactive with the company which took the leadership and access innovations through cross-licensing.

The second lever of the second viewpoint is the psychological protection. This implies the use of trade secrets and early technical disclosures, as they increase the control of the technical space while reducing the need for a patent. The possibility that a patent could exist discourages competitors from entering a space which could be instead protected by a patent. A “pending patent” could even be better at this, as an actual patent may be studied and probed for weaknesses, while a possible patent is a mystery.

As shown by horror movie scripts, people fear more the unknown than the known. Pending patents may discourage rival companies from infringing on all disclosures for 18 months like any other patent, as long as patent owners have the reputation of leveraging patents that are issued. Therefore, the patent owners may receive 18 months of psychological protection even if there is a small chance that they will be granted. This happens as the competitors would not willfully infringe disclosures that may end in a granted patent. Moreover, a rival player on the market may inquire about the patent status of a disclosure, and in this case, the applicant company would know which inventions are worthwhile in taking in along the entire application process. In the end, when leveraging physical protection with psychological protection, a larger technical space may be protected for a given amount of resources.

The *third viewpoint* concentrates on issuing many inventions at a higher pace. This is specific to dynamic high-technology sectors, where patent races are common [18]. It is not needed that all of them be patented. As an example, the author undertook an exercise that led to a product idea named *Ambert Alert Cell Phone*. The exercise was based on random operators from the *Innovation Planner Card Deck* set of cards. It is important to note that techniques such as this and TRIZ are techniques that improve creativity and innovation; they are approaches, not something unique to patenting and patenting strategies.

Going further with the *Innovation Planner Card Deck*, the first card “Use the Reverse Action” made the participants search for a reason a phone would call back. They found “child protection.” The second card was “Allow Partial Mobility,” and they decided to include GPS in the phone, as maybe the child left approved places such as home, school, or undertook a route different from the usual bus school route. The third card “Allow Both Flexibility and Rigidity” improved the GPS alarm, in the sense that it would detect if the child has travelled large distances in short time or send the location through a text message if the phone is crushed or destroyed. The fourth card “Move the Other Object” led to the idea of the phone calling the guardian if it has been still for a long time, or if it was dropped, or worse, if the child has been kidnapped and left the phone behind. The fifth card “Expand the Range of Options” pointed to the idea of the phone to allow the guardian to connect with the phone and receive information regarding its GPS location. The sixth card “Use Properties to Convey information” started the idea of the capability to detect biological signals, such as increased heartbeat. This could indicate stress or a medical threat. The last card, “Design for Variable Output” inspired the creators to come up with the idea of finding a different tone ring for the guardian’s phone in case the child would call for whatever other reason than emergency.

Therefore, such cards expand the possibilities one has regarding innovation ideas in a clear and structured way. These complete set of cards may be ordered from <http://www.innovationplannercards.com> (accessed July 2014).

It has been proved that such (TRIZ) exercises improve the inventive output of organizations: one automotive parts manufacturer has seen the monthly patentable inventions number climb from 10 to 90 after the use of these TRIZ techniques. A book that treats in detail the TRIZ method is [42]. I considered it is a good idea to refer at least the TRIZ creativity triggers in Figure 33.

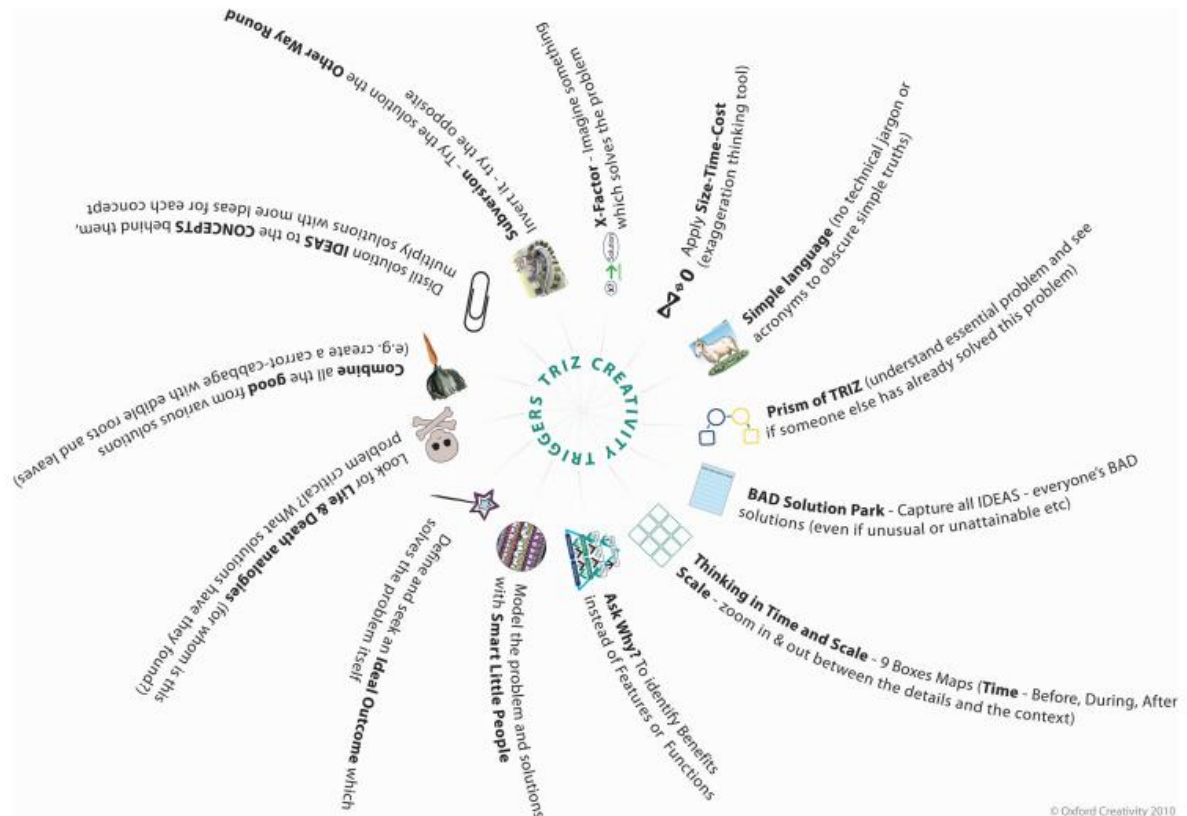


Figure 33 TRIZ creativity triggers [42]

I am an advocate of the idea that the ideas/concepts for patents come from creative employees. The authors of [89] discovered that a small elite of inventors accounts for the large part of a firm's patent portfolio. Common knowledge is that with the departure of such a valuable employee, so would disappear the time and effort invested in the relationship with the respective employee. There is a paper however [11], which shows that this might not always be the case. For example, in the situations in which the employee departs to a customer, supplier or a partner, this might not be as bad as it first seems. The reason is found out in the network relations that the employee might bring with a future return, or even while working for the new party. The authors also advocate the implementation of an alumni program that may offer product discounts and other benefits in order to maintain a positive relationship with the departed employees.

Therefore, the general idea defended by the authors [11] is that companies should use a portfolio approach strategy with regards to former employees: do they depart to a competitor or to a cooperator. I found these insights very useful for the company strategy, and I consider them to be related to the IP strategy in general. This is because a limited number of employees are the drivers of the patent drafts in the company.

Finally, *the fourth point of view* is to infiltrate in a patent area. This is done in order to gain space on the market or to trade in hostile patent settings. It is based on applying the steps discussed before to inventions belonging to competitors instead of own inventions. This helps creating patent thickets that may block their technical space on the market. It is

very effective if the competitor assumes that innovation is determined to a certain measure by randomness while in fact, it has become a science in itself. Overall, an organization may benefit from agility by having investigated to a certain level the techniques and ideas exposed in this chapter. It should be kept in mind that not all patent ideas should be applied for, but a selection should be made, and that trade secrets should be decided if any. Overall, continuous monitoring should be ensured with regards to competitors' actions and patents, but also with regards to own patents and activities.

It may seem at first that increasing the output levels of patents, and thus the patent portfolio, increases the competitive advantage. As exposed before, this is not the case; it is not the number of patents that matters, but the technical space of maneuver. In [50], the author considers the "*Patent Arms Races*." These denote situations in which companies compete for establishing thick patent portfolio. The author has identified indeed, at the level of the machine industry, that once a firm starts to create patent thickets, the competitors feel threatened and they imitate the behavior of creating a patent portfolio of smaller patents. They are harder to be tackled by the competitors, as licensing technology is expected to be more difficult.

The author [30] has found out through research that the benefit the first mover obtains is only short term. On the long run, the entire market suffers, as low value patents are as costly as high value patents, but they also constitute wasteful expenditures from the societal viewpoint (time, R&D costs and legal efforts). Therefore, the welfare implications of patents arms races are not favourable. Moreover, they tend to increase infringement litigation (also antitrust issues). According to the opinions often stated in literature, the opportunistic overuse of litigation is harmful to society. The author discovered that at a higher level of patenting, there will be a "truce," a level-off. This happens as at high patenting rates, the benefit-cost ratio of the increase becomes less favourable. The author also draws attention to the fact that the backlog of the patent offices should not be associated with increased levels of innovation throughout society, but rather with such strategies that make use of the 'lax' policy of patent offices. Therefore, the author recommends raising the patentability threshold.

I find that although the study of [50] is limited to only several players of the printing machine industry, it re-iterates the idea that a company should only fill for patents that are valuable, and not intensively patent the minor inventions; an exception may be considered for the industries where cross-licensing is important, and where the patent portfolio (taken as patent value and patent numbers) is important.

Another example of higher patent tempo in history is the evidence of [88]: between 1991 and 2001, 95 publicly traded semiconductor companies doubled their patent output per R&D dollar.

I would add that where this is possible, a company should maybe have such a patent as "a pending patent" to confuse competition, but not to ask for examination. Thus, unvaluable patents are assessed as a psychological weapon, not as a costlier physical weapon. Moreover, I think a high tempo patent strategy should be used with care, rather to innovate more, not to patent more and to expand the coverage of the to-be-filled patents. This can be done by thinking of new uses and applicability for the respective technology.

## 2.7 IP strategies at internal level

Although some strategies have been presented above, their focus was mainly on the external level, on the market, and not on the internal processes that are run in the department. I consider these to be equally important.

I think that there are strategies that might be pursued at internal level, in order to encourage innovation. An article that considers this view mostly is [1], written by Oxford University professor Robert Pitkethly. For example, the small and medium enterprises should promote awareness among the employees. A crucial error might take place, such as revealing an idea to the exterior world. That idea could have been patented. Also, companies should ensure that they have an active reward policy for the inventors, as chances are that they will be the main source of future intellectual property. Licensing and cross-licensing deals should not be frowned upon internally, especially at the early stage of the invention, as this gives access to technology that is otherwise costly to obtain. A patent would probably be followed by other complementary inventions, and this should be taken into account when applying for a patent. As it is costly, I think best is if it would have as vast claims as possible and if the possible substitutes are thought upon before the time of the application.

The author states [1] that as a small company gradually expands, its ability to exploit subsequent innovations should develop. He continues with “*an IP strategy is not something that a small company cannot afford to have, but rather something it cannot afford to be without.*” I consider that a small company might render obsolete some inventions that might prove useful in the long run, either defending an innovative technology on the market, either by having lost the possibility of securing steady revenues through a licensing deal. On the other hand, large corporations, although they have the resources, they might miss communication among departments or people. Communication between IP generators and IP managers should be facilitated. For large corporations, it might be imprudent not to consider IP as a source of technology to exploit, by engaging in a “Not invented here” attitude.

An article that treats the subject of internal strategies is [12]. The author shows the view of encompassing the entire “IP value chain” of a company, from IP generation to enforcement. It should also include the corporate, business-unit and functional levels of the organization. The findings of the study are that the IP requires attention at all levels (functional, business and corporate) and that corporate top-management should be involved early in the IP process of planning. In Figure 34 it is illustrated the way a company should deal with the IP strategy at its levels, in the view of the author.

	IP ACQUISITION AND GENERATION	IP PROTECTION	IP EXPLOITATION AND ENFORCEMENT
<b>Corporate Level</b>	Mergers and Acquisitions	Resource Deployment	Major Litigation Taxation
	Analysis of industry attractiveness from an IP perspective	Design of organizational IP structures/procedures that interconnect different parts of the IP value chain	
<b>Business-Unit Level</b>		Competitive strategy for IP-based value appropriation, from IP generation to enforcement: <ul style="list-style-type: none"> <li>• Defining competitive advantage</li> <li>• Horizontal competition</li> <li>• Vertical competition</li> </ul>	
<b>Functional Level</b>	Identification of technologies relevant to customers	Filing procedure	Litigation
	IP filing scope		Out-licensing of IP
	In-licensing of IP		Product design
			Branding

Figure 34 "Crafting an integrated IP strategy" [12]

The same author reveals in [13] that the company might use IP rights to differentiate vertically (the case of radical innovations or luxury brands) or for differentiating horizontally (the case of Kellogg with trademarks, for cereals and of Nokia with a combination between trademark, patent and design combination, for mobile phone interfaces). This holds for the horizontal competition.

Competing externally-vertically might be improved too, as Nokia did with its patents on the loudspeakers: it obtained power in a different segment of the value chain. This is because thus it could influence disputes between suppliers and users of Nokia equipment. The senior IP manager Peter Halkjær declared that Nokia had such patents not to press suppliers, but “*to forearm against price increases in an upstream segment where competition is not too high as there are only a handful of suppliers*” [13]. Moreover, IP rights help protect a standard, as Motorola did with the GSM standard, for example. But these decisions are taken internally by management, and the author of [13] stresses the importance of having created IP functions at the corporate and business unit levels. A temerarious company of this approach is Toshiba, which allocated IP departments at both business-units and corporate levels.

An article that gives some guidelines in how to select the best innovation ideas is [93]. Their suggestion is to consider group submissions by business unit or countries, to impose a minimum or maximum description length, to ask the submitters to stress the advantages of their solutions, and to reduce/add layers of decisions between the inventors and the decision makers. These recommendations would have to be adjusted as the model dictates (if the final decision is to be taken by the highest chain-of-command, for example the CTO).

The author of [24] advises companies to run yearly checkup of their patent portfolio and to decide if they plan to sell or license their patents. He gives as example Thomson CSF (now Technicolor) which in 2007 performed such an audit and reduced its patent numbers by 15%, saved €2.3 million per annum in renewal fees, without impacting its annual €480

million licensing revenues. The author's rule of thumb [24] is that for a typical patents portfolio, 10-20% of the patents could be abandoned without impact, 10-20% are protecting key incomes of the business while 60% sit on the middle and in the future could be either abandoned, sold, licensed or protected.

The key factors that dictated this were the strategic importance to business, the market demand and the relative patent strength. In Figure 35 it is shown this in a graphical way.

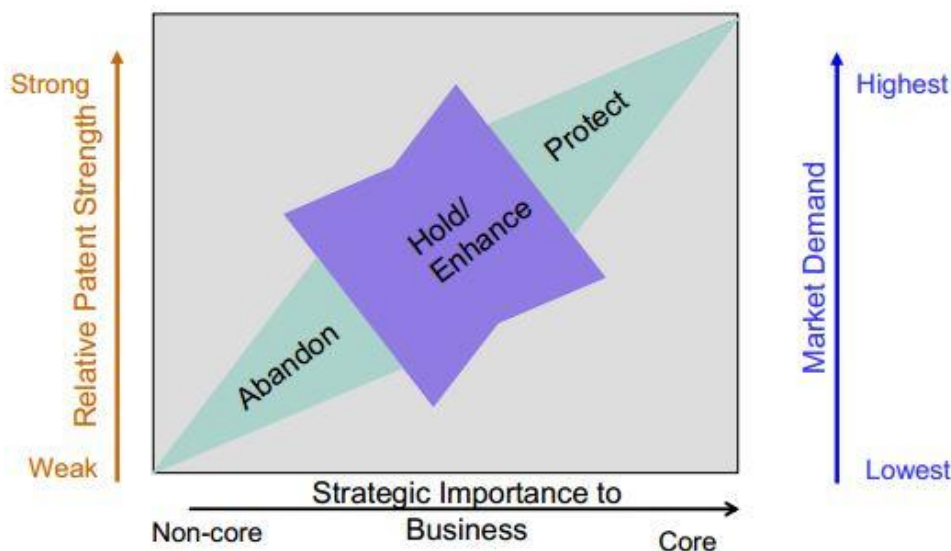


Figure 35 Patents portfolio decisions according to [24]

Sometimes, there is a need for a platform for the management of the IP portfolio. An example is the evidence that has to be kept regarding the filling date, the expiry date, the geographical location, if the technology is core or not, and the list may continue. For this, an intellectual property management solution might come in useful. An example is the IBM innovation [99]. IBM claims that it may help implementing and managing IP assets more effectively. The approach they propose is showed in Figure 36.

	Plan		Implement		Leverage		
	Evaluate	Enable	Invent	Manage	Defend	Influence	Capitalize
Direct	Culture of innovation and strategy development		IP strategy deployment		IP enforcement and business model development		
Control	Establish organizational infrastructure		Drive innovation and a high quality IP portfolio		IP licensing and collaboration		
Execute	IP policies, practices and education		Portfolio development and evaluation		Negotiation, M&A and change management		

Figure 36 IBM's approach to determining and implementing the most suitable IP strategy [99]

It is almost certain that IBM offers this platform as a price-based solution. I have researched the internet and found an IP management system that is cost free, as a lite edition. It may be downloaded from <http://www.iamanager.se> [accessed July 2014]. It

allows the design of an easy interface in order to keep track of the IP portfolio, as shown in Figure 37.

Serial	Title	Category
TA-001	CIGS solar cell with thin absorber layer	Technical solution
Description	A CIGS thin film solar cell with a CIGS absorber layers that is less than 1,5 μm thick and still enabling an efficient light trapping scheme.	
Primary utility	The thin absorber reduces the consumption of scarce and expensive CIGS materials and can be grown in shorter time. When used in combination with a reflector layer, the normal problems of electronic losses are eliminated.	
Creators	Name 1 Name 2 +	
Carriers	Name 1 Name 2 Name 3 Name 4 +	
Tags	Project A Publication A Technology area A Patent application A P	

Project A  
 Publication A  
 Patent applicatio...  
 Add "P"

Figure 37 IA Manager-design of an interface for managing the IP portfolio [from <http://www.iamanager.se/take-a-tour>, accessed July 2014]

It also lets the user find an asset using an intuitive interface, as shown in Figure 38.

Search	Serial	Title	Category
Title, Description, Utility	TA-007	CIGS layer production control system	Technical solution
CATEGORY <b>x</b>	TA-002	CIGS solar cell with thin absorber layer	Technical solution
Data (0)	TA-003	Production process with added steps	Technical solution
Data correlation (0)	TA-010	Co-evaporation process for CIGS layer	Technical solution
Database (1)	TA-011	Composite back contact	Technical solution
Theoretical framework (1)	TA-012	Protective back reflection layer	Technical solution
Technical solution (10)	TA-005	Electrical feed-through	Technical solution
Instruction (4)	TA-017	CIGS production process	Technical solution
Visualization and simulation (1)			
Software (0)			
CREATORS <b>x</b>			
Ajdin Dahlberg (1)			
Henrik Wright (1)			
Hermann Maier (1)			
Maria Svensson (8)			
Olof Göransson (5)			
Pär Malmgren (4)			
Add filter			

Figure 38 IA Manager-selection of an asset from the IP portfolio [from <http://www.iamanager.se/take-a-tour>, accessed July 2014]

In Figure 39 it is shown the way assets from the IP portfolio may receive marks for various parameters such as: “Development level, Uniqueness, Value for commercial offer, Value for further R&D, Difficulty of imitation, Secrecy-based control, and IPR-based control.”

Serial	Title	DLEV	UNIQ	V-COM	V-RND	C-DIF	C-SEC	C-IPR
TA-001	Electrical feed-through cooling trap	4	2	2	1	2	4	1
TA-002	CIGS solar cell with thin absorber layer	4	5	1	2	3	4	5
TA-003	Production process with added steps	2	4	2	1	3	4	1
TA-004	Electrical feed-through	5	2	3	3	4	4	1
TA-005	CIGS layer production control process algorithm	3	2	2	1	4	4	2
TA-006	A light trapping scheme for optical absorption for ...	4	4	3	1	4	2	1
TA-007	CIGS layer production control system	4	3	4	5	3	4	2
TA-008	CIGS cell cleaning method	2	2	1	1	2	5	1
TA-009	Inverter technology	1	2	2	1	3	5	1
TA-010	Co-evaporation process for CIGS layer	2	3	4	3	2	4	2
TA-011	Composite back contact	4	4	4	5	3	4	5

Figure 39 IA Manager-assessment on a scale from 1 to 5 for different parameters [from <http://www.iamanager.se/take-a-tour>, accessed July 2014]

The portfolio may be assessed in order to reach agreements with third parties, be it licensing, sale or cross-licensing, among others. In Figure 40 it is shown the visualization option of a portfolio ranking. It is based on commercial value and difficulty of imitation.

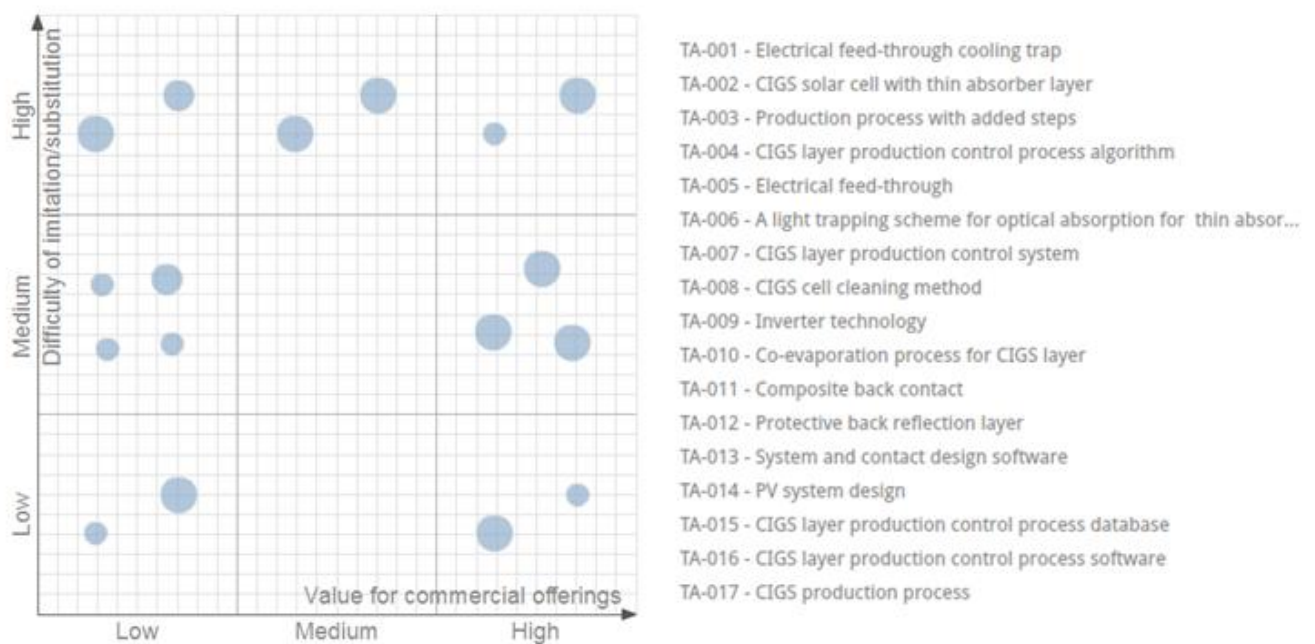


Figure 40 IA Manager-portfolio analysis [from <http://www.iamanager.se/take-a-tour>, accessed July 2014]

The IA Manager is free for use as a lite version, and the developers guarantee the privacy of the data stored on their servers. Here I would recommend caution, as a new patent application or non-disclosure agreement (NDA) should not be managed using the free version. The reasons I currently think of are the storage location and the developers' (practical and legal) control of the storage facilities. It may be that the data is stored in cloud, in a country that does not pay much consideration to intellectual property rights, and where information leakages are possible. Therefore, I recommend testing the free



program with granted patents only, not to-be-granted, nor NDAs, where confidentiality terms are also very strict.

In a Journal of Business and Economics paper [15], the authors advocate establishing an intellectual property management office, equipped with full-time intellectual property employees. The second lever they recommend is to strengthen the implementation of patented technology: in other words, it is not that the patent application should be of good quality and be often applied, but it also has to be implemented in the products. Moreover, decisions should be taken to combine it with a standard. Thus technological innovation would be furthered, however I would add that the market by doing this, the market would be easier to be established, cross-licensing would become an interesting option and if one has a dominant position in the standard, it could steer it to own interest (as close to own product as possible, to avoid further re-design in order to comply with the respective standard).

The authors [15] also draw the attention on the relation of IP to stocks: intellectual property is an intangible capital and determines an important part of the high-tech industrialization. Another lever is the patent consciousness, which should be increased internally, for all members of the team, but especially the leaders. The management of patent information (collection, management and utilization) plays an important role too, as it is better if the company discovers itself that it may infringe some technology, compared to the competitors discovering it. On the innovation strategy level, they advertise the shift *“from production dominant to market dominant, from capital first into knowledge first, from pursuing quantity and quality of technological products into pursuing technological content of them, from market price competition into technological innovation competition, from human-basis doctrine into intelligence-basis doctrine, from managing human, capital and things into managing knowledge and technology.”*

An “observe-orient-decide-act” (OODA) IP strategy is proposed by the author of [4], team member of 3LP Advisors LLC ([www.3lp.com](http://www.3lp.com) accessed July 2014). This is shown in Figure 41 and described in the following paragraph.

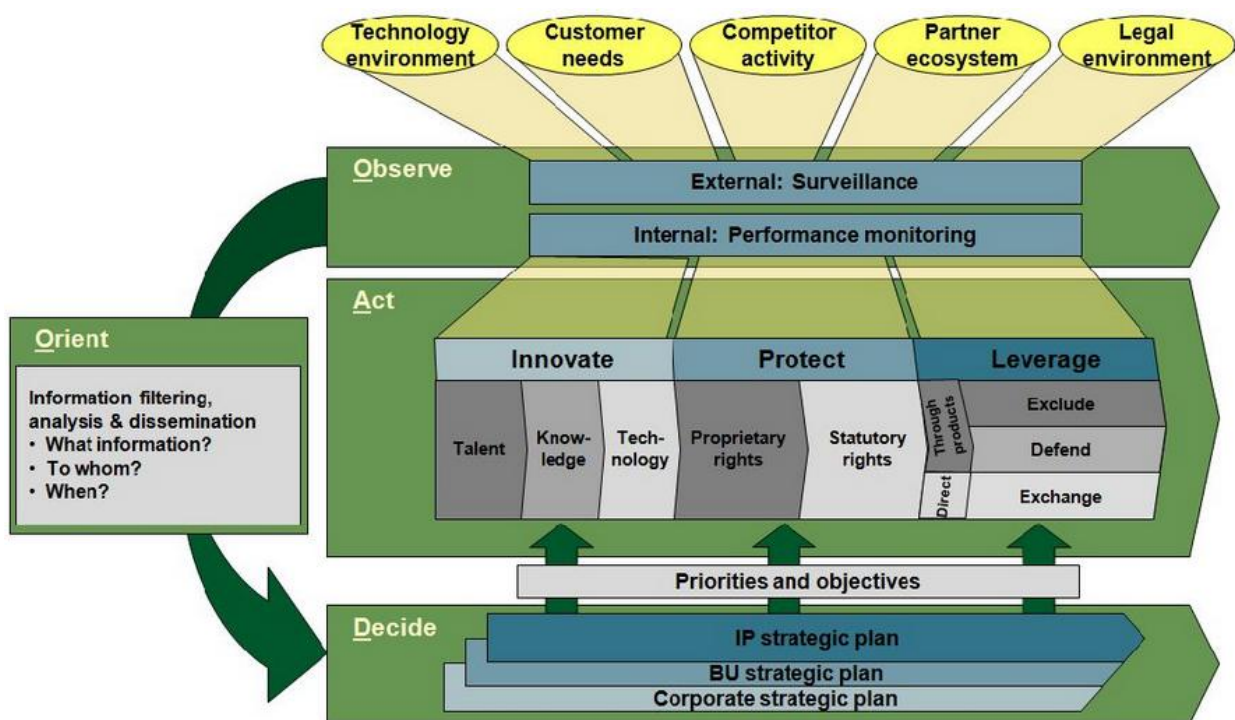


Figure 41 The IP strategy OODA loop [4]

The *observation* is to be concentrated at both the external and internal levels. Then the strategist should direct attention (*orientate*) to the most critical circumstances and facts, then *decide* on a course of action, and finally *act* upon that decision. The most important part is considered by the authors to be the orientation. The decision should be aligned with the overall business strategy. Each component of the OODA is described in detail in the figure, and I consider that the figure is self-explanatory. I would stress the importance of continuously reviewing the data obtained at any moment of time.

Depending on the stage of the IP value chain, various solutions may be proposed for alignment of IP with business objectives. A similar article with [4] is [5], written by Ron Carson, Sales Director of Innovation Asset Group, IP advisory firm and IP management software supplier (<http://www.innovation-asset.com>, accessed July 2014). The main idea of the article is shown in Figure 42.

Stage of the IP value chain	Solution requirements for IP business alignment
Innovation	<ul style="list-style-type: none"> <li>• Provide easy access to invention disclosure forms (web-based).</li> <li>• Automate workflow for rating, approval and prioritisation.</li> <li>• Categorise inventions to relevant portfolio segments.</li> <li>• Track competitive portfolios.</li> <li>• Create a centralised repository of invention information and prior art.</li> <li>• Track and relate potential acquisition portfolios.</li> </ul>
Portfolio management	<ul style="list-style-type: none"> <li>• Integrate data from disparate data sources to enable a holistic view of the portfolio.</li> <li>• Categorise assets based on business management vectors such as products, departments, technology areas and outside counsel firms.</li> <li>• Monitor characteristics and trends of the portfolio that are pertinent to the company's business objectives.</li> <li>• Control costs.</li> </ul>
Commercialisation	<ul style="list-style-type: none"> <li>• Map intellectual property to licensing agreements.</li> <li>• Manage workflow to automate and distribute tasks.</li> <li>• Monitor incoming and outgoing obligations associated with the portfolio.</li> </ul>

**Figure 42 Requirements for aligning IP management activities with business goals [5]**

During the second stage for example, a company might decide to use the non-core IP assets for potential licensing. Regarding the last stage (commercialization), the author claims that statistically, only three percents of the patents generate royalty revenues. However, the vast majority of the agreements are mismanaged to such an extent that “almost half of the licensing royalties are under-collected by twenty-five percents or more.” The organization should be able to obtain at any time information regarding licensing agreements, non-disclosure agreements. These should be monitored continuously, together with their respective payments. I consider these facts as very good insight, from an established IP practitioner who has daily contact with the IP market, however maybe representative for several specific industries of the clients, not the entire IP market.

Some companies might consider outsourcing some of their activities. A study regarding organizational behavior showed that there are some costs related to doing this [92]. The authors found that the firm’s ability to detect competitors for litigation purposes decreased the more it outsourced the patent filings activity. They also suggest that by outsourcing, a company “forgets” much of the prior knowledge. Therefore, a decision to outsource IP activities should not be taken only on a cost/benefit analysis, but rather keeping in mind the organizational learning versus forgetting. The authors suggested that “forgetting through outsourcing may happen more rapidly than learning through

integration” and that firms “should avoid taking the (short-term) bait of outsourcing without considering its potential impact on their performance in preceding or subsequent steps of the value chain.” A balance between in-house patenting activities and external filling activities is suggested in [94]. It seems to be best practice to detect infringers in-house, as it would not happen through agents outside of the organization, because of lack of the technical knowledge at the expense of the legal one. In the very recent article [68], the case study of Thales is analyzed. It seems that the authors [94] share the views with the authors of [92], as they state that there is a choice between transaction and integration costs (they cut the costs by 20-25% over five years, as planned, but they found it challenging to integrate the external processes, especially the legal competencies that they outsourced). Thales kept in-house the decisions to file, maintain, abandon, renew or grant licenses, and these decisions are taken at the highest decision level.

As a matter of fact, the mere existence of an IP department indicates that a firm may have developed a practice in enforcing its patents and that it can identify and pursue infringers effectively calling for litigation suits and challenges of competitors’ patent applications, at least in the view of authors of [18]. I consider that the conclusions regarding outsourcing of [92] and [94] apply rather to very large corporations with dedicated IP departments and activities at business unit level, and not to small and medium enterprises that might avoid law suing in general and not having the resources or expertise to draft legally broad patent applications themselves. For example, there are risks that executives of high-tech companies with good scores on innovation activities may not be fully aware when pursuing a strategy of aggressive patent litigation, as shown in [2] (as an example, “the misfortune of being assigned a conservative judge” as the authors illustrated in the article).

At internal level, the inclusion of IP trained researchers in the strategic inventing process, before the product is advocated by the author of [47]. This is contrary to the procedures observed on the market in 2005, when legal reviews took place not during the concept development, but after the definition of the product. Moreover, a prior art search should be performed at the concept level phase, in the author’s view. I agree indeed, that a technology or method might not be feasible without first acquiring the license for using it. Potential costs in terms of lawsuit and foregone R&D costs may be avoided by issuing such an organizational procedure at internal level.

Moreover, the different levels of decisions should dominate one of the five degrees of freedom, according to the author of [57]. These are market, timing, breadth and location. The suggested approach of the author is shown in Figure 43, each decision level tackling two degrees of freedom.

Decision-level	Degrees of freedom			Location
	Market	Timing	Breadth	
Board of directors	×	×		
Staff /IP department			×	×
Business unit	×	×		
Inventor/R&D laboratoru			×	×

**Figure 43 Internal patent strategy divided between levels of management and degrees of freedom [57]**

The timing aspect is relevant especially for the board of directors, as they know probably best the market and the timing of product launches. The illustration related to this aspect is shown in Figure 44.

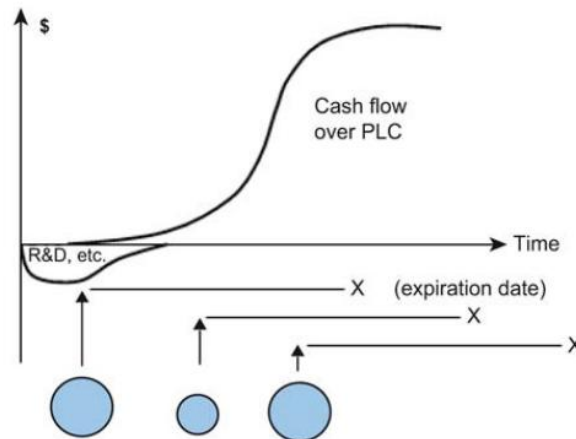


Figure 44 Cash flow and patent timing [57]

For high technology domains such as semiconductors, I consider that timing is very important. Technologies frequently shift and times between shifts are short, and therefore the time the patent is filled is more important in my view to the time when the patent expires (usually around 20 years). This is different from the market of pharmaceutical products. There is a risk that a competitor patents an improvement of the own application filled some time before. Therefore, for this type of industry, I think that the top level management shall have one degree less of freedom to deal with, just the market, and not the expire date timing in particular.

I find it interesting to observe the presentation of the IP strategy of a high technology company. This is done by the author of [78], which offers an overview of the strategy of Fujitsu. Its IP strategy is to obtain influential patents, to actively utilize patents, while avoiding infringing the competitors' patents. Moreover, the company strives to align business strategy with R&D strategy and IP strategy, adopting a 'three-in-one approach.' It also employs the Fujitsu Techno Research, a department that does the clearance survey (to avoid infringement) and that surveys other companies' technologies prior to patent application. Between 1996 and 2005, it increased the share of overseas applications from 25% to 60%, while patents' applications overseas remained relatively flat. It also implemented IP programs to raise IP awareness among employees (new employees: patent basics; mid-level employees: information management & IP and managers: leveraging IP, which means strategic alliances, standardization activities, participation in business strategy planning through involvement of IP unit from initial stage of project plus support for spin-off ideas, licensing and IP disputes). Regarding its patent compensation system, it does not have a ceiling, it takes into account the impact on competitors when evaluating it, and is based on two reward systems: at time of application and upon registration.

I think that this system is particularly encouraging innovation, as inventors may find themselves unmotivated to innovate as fast as possible if the reward comes rather after the registration.

### 3. Patent peculiarities of different geographical locations

#### 3.1 Introduction

According to [77], there are a few aspects to consider when planning filling for patents globally. The first one is the competitive value of the patent, the second is the

competitive value of the country, and the third one is the marketing value of the innovation. The authors did not consider the IP system related to the possibility and costs of defending the intellectual property.

Patents that describe processes that the competitors may do without having little competitive value. Equipment and process inventions are useful especially in the countries where competitors fabricate products, too. However, it is important to keep in mind that a company may protect a market through patenting, even if it does not have production facilities in that specific geographical area. Even if a country would present a lesser degree of an enforcement system, a patent in such a country might help marketing efforts. Marketing could show that the company has an advantage over competition, which in turn translates to an advantage of the customer over its peers. Moreover, the company might show customers through its patents that it is serious about building a long lasting relationship with the respective country. In addition, it shows that it has innovative staff which is ready to make more innovations.

Patent databases help obtaining information regarding the location where patent filings have been made, regarding possible competition. A search for a specific technology would reveal not only details about the technology in several patents, but also the inventors and their locations. This thread may be followed as to see where they filed the patent applications. This reveals information on where the competitors think the markets are or will be, where they intend to concentrate efforts and which countries from the originally selected filling destinations of PCT would finally receive the filling applications. Such a (subscription-based) database is [www.actionablepatents.com](http://www.actionablepatents.com) [accessed July 2014] which offers a list of patents ranked by their value from A+ to C, including “alive” and “dead” patents, patents recently bought or acquired by competitors or involved in litigations in the recent seven years. I would certainly advise a company to encourage its (senior) engineers to browse through expired patents whenever they are looking for a new concept, as old ideas from other domains might be suitable for newly developed ones. The risk of infringement is eliminated in the case of expired patents. Moreover, it may be that the patent is not old, but the fees for it have not been paid. The engine allows the user to create alerts for more expensive subscriptions. Price is offered only on request, as per a contact form, and not through the website.

Being up-to-date with regards to competitors’ movements involving IP is also recommended by the authors of [37]. They have found evidence that this is even more useful when the competitors used outsourced counsel. They proved through analyzing empirical data that experienced inventors are more likely to omit relevant prior art known to them when an outsourced counsel is used to represent the patent application.

An example of IP strategy in a high tech company is the overview offered by [30], in 2012. The author shows that since 2010, Hitachi has reduced its patent applications for Japan and US, thus concentrating its efforts on Asia and PCT applications. According to the data presented in the presentation, Hitachi has constantly been among the top 10 patent owners in markets such as Japan, US, China and PCT and it put weight on US patents.

There are intellectual property particularities for each geographical area, and these shall be presented in this chapter.

### 3.1 Europe

For Europe, the institution that deals with the intellectual property is the European Patent Office (EPO). A trademark could be registered as a Community Trademark (CTM),

thus registration across the European Union is ensured. Costs of registering the mark separately in each member state are avoided. However, for patents, the situation was different in 2002. A single patent that covers the European Union was not possible at that time. The European Commission's website ([http://ec.europa.eu/internal\\_market/indprop/patent/index\\_en.htm](http://ec.europa.eu/internal_market/indprop/patent/index_en.htm) accessed July 2014) shows that it is not possible to obtain a unitary patent yet, however, since 2012, tremendous progress has been made in this direction. This is in line with the information provided by The EPO website (<http://www.epo.org/law-practice/unitary/unitary-patent.html> accessed July 2014), moreover "A unitary patent will be a European patent granted by the EPO under the provisions of the European Patent Convention to which unitary effect for the territory of the 25 participating states is given after grant, at the patentee's request."

According to the authors of [77], the reform to patent law is a long a painful way to the community patent. The reasons are that the European society is risk-averse; it does not encourage entrepreneurship to the same extent as U.S., among others. The taxation is high too, on innovators, entrepreneurs, employees, managers and companies, in the authors' view. Compared to Japan and US, Europe does not allocate as many resources to research and development (in terms of percentage of GDP, U.S.-2.8%; Japan 3% and EU-1.8% in 1998/1999). These figures are in line with a study presented by the European Investment Bank, with its relevant plot shown in Figure 45.

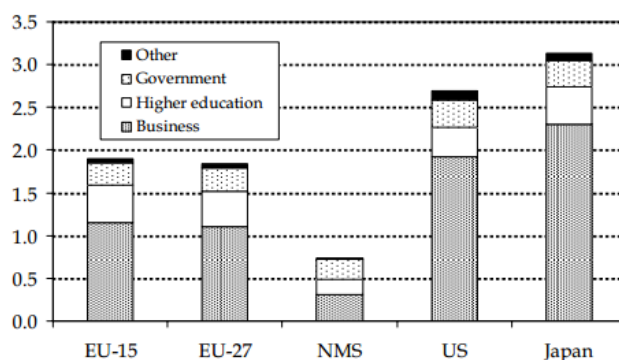


Figure 45 Breakdown of R&D spending as percentage of GDP, 2000-2004 (European Investment Bank study, <http://aei.pitt.edu/32615/1/54>. R%26D in Europe.pdf accessed July 2014)

There are also several other issues that create difficulties in achieving the goal of the unitary patent. *First*, it is the language regime. Obtaining a European Patent costs three times as much as a U.S. patent, while 40 percents of its cost is due purely to translation. Therefore, from the user's perspective, the language issue is connected directly to cost.

*Second*, the Court of Justice of the European Union (CJEU) has no competency regarding the litigation between private parties; it may only interpret the EU treaties. An agreement that establishes a Unified Patent Court is to be ratified ([http://ec.europa.eu/internal\\_market/indprop/patent/index\\_en.htm](http://ec.europa.eu/internal_market/indprop/patent/index_en.htm) accessed July 2014) by the contracting Member States.

*The third* is the decentralisation issue: some states ask for compensation for the possible loss and skill of their respective national offices. As such, they would like to be entitled to make prior art searches or even examinations for Community patents. The EPO was founded on the principle of centralization 37 years ago, in order to ensure impartiality and excellence in the assessment of patent applications. If the patent applications were not centralized at EPO, applicants might try to apply to the national office that is the most permissive or that advertises the lowest costs for the patent application.

The *fourth issue* is the membership of the European Union in the EPO. EU would like to be a member of the EPO in order to ensure that the law and procedures that lead to the grant of Community patents take into consideration the *Acquis communautaire*. It could take part as a new member state, but this would not be considered fair by some non-EU EPO members, such as Switzerland or Norway, among others (Iceland, Turkey, Serbia, Albania, Monaco, Former Yugoslav Republic of Macedonia, San Marino are not members of the European Union, but are members of the EPO).

Last but not least, ensuring the framework for a Community Patent might be more complicated compared to creating a single currency, mainly because of the issues of language and laws, which many countries consider a matter of sovereignty.

### 3.2 China and Hong Kong

The IP market in China and Hong Kong, has its peculiarities. There are special considerations when negotiating with the Chinese. Their negotiation style is described by the authors as a blend between the Byzantine and the Evangelical. Chinese trust more the personal contact compared to the laws. This is because, in their view, laws are made by the ruling class to suppress opposing classes and to suppress the people. As a consequence, successful business deals depend in China on personal relationship, which in China is known as *guanxi*. A sincere commitment to work together is preferred by the Chinese to an airtight legal package. They tend to rely on the personal relationship to find solutions for the unexpected situations that could not be covered by the legal terms of the (licensing/joint venture/partnership) contract. Moreover, nothing is carved in stone. When the contract is signed, this means that the first round of negotiations is over. This would be followed by more discussions and more compromises and concessions. Therefore, a signed contract does not imply that the deal has been reached. The Chinese counterpart will probably continually bring up small matters. By doing so, they would be testing if the foreign counterparts are committed to the *relationship* as opposed to the *contract*.

There are three distinct stages in negotiations with the Chinese. The first part is a sound-out stage, where they assess the trustworthiness of the foreign partner and where fundamental issues are discussed. It is important to determine the rank of the Chinese counterpart and find as much information as possible. This is also because there might be internal conflicts in the parent organization to whom the Chinese reports to. Negotiations extend beyond the negotiating room, to social activities. This is not only to cultivate the business relationships, but also to deliver messages. The authors [77] offer the following example: a positive message is praise from the Chinese negotiators, while a negative one would be to ask the foreign counterpart to do the impossible by violating a base company policy. In the second part, the more specific issues are to be discussed. Foreigners are used to solving issues one by one as they arise, while the Chinese prefer to make concessions at the end of a negotiation.

There are some Chinese negotiation strategies that are often used, and of which foreigners should be aware of, in the authors' view [77]. The Chinese shall like to control the location and the schedule of the negotiations in order to keep the upper hand and minimize expenses. They will also observe weaknesses in the other side's position, a tactic that might extend to the personality of the foreign negotiator. For example, if (s)he is susceptible to flattery, the Chinese may lavish the negotiator with praise. They are also accustomed to using shame tactics. As an example the authors offer [77], they would not lose the opportunity of reminding their Japanese counter-parts of the attacks they did on

China in the 1930s and 1940s. They would try to embarrass the foreigner into carrying out the negotiations their way. There is a tactic favoured by the Chinese, which is to set competitors against one another through a bidding war. In order to gain concessions, they might also suddenly fly to a rage, pack their papers and leave the room. They also tend to reuse old issues that might have even been closed. As a solution, foreign negotiators should keep notes and sign a protocol that determines the main areas of agreement after each negotiation stage. Often, they will try to control expectations, would express a strong sense of urgency in order to gain concessions or re-negotiate previously negotiated issues. This would be more so if the foreign negotiator liked to end the negotiation quickly and return home, for holiday for example.

The authors [77] consider that the negotiations with the Chinese would be much more effective if the foreign part leader has status and credibility, if the same team is sent for negotiation (continuity of the relationship without misrepresenting previous understandings), if the real decision maker on the Chinese part is identified (it often takes a low profile during negotiations), if calmness is ensured during negotiations (frustration or abusive language are signs of defeat and weakness to the Chinese), litigation should be used as a last resort (in licensing agreements mainly, not in patent infringement cases-though they prefer negotiations to court suits), and last but not least, the door should be left open. Moreover, professor Lucian Pye, a China scholar from Harvard University, advised that the negotiations in China should be patient, prolonged periods of no movement should be accepted as normal, exaggerated expectations should be avoided, not blame oneself for difficulties, and overall, a desire to understand Chinese cultural traits should be sought for. He also added “foreigners should never believe they can practice Chinese tactics better than the Chinese.”

I find it interesting and surprising to see that in the case of licensed technology after termination, licensors cannot deny licensees continuing to use the licensed technology after termination of the license, in the case of China. As a consequence, I find it safer for a foreign part to license-in compared to license-out, as it seems that the legal framework in China does not enforce the licensors’ rights that should in principle come into force with the termination of the contract. As a conclusion, China and Hong Kong have their unique particularities with respect to the IP and business world, may it be the negotiations or the set of laws enforced by the Government.

### 3.3 Japan (and South Korea)

With respect to Japan, it seems that its economy was in decline, at least relevant to the year 2002, when the [77] book has been written. Between mid 1980s and 1990, Japan experienced a bubbling period, when money was lent to Japanese corporations, who then reinvested it into real estate and the equities market. The speculative process ended in 1990, with consequences for the economy of Japan.

There are several trends that the authors observed at the level of 2002. The licensing experienced a short up-swing, up to 1990s, when Japanese companies were licensors. After this time, Japanese companies seem to be interested in license-in technologies, to help the stagnant economy and benefit from new opportunities. The second trend is that the Japanese entrepreneurial class is missing. This might be as Japan made a mistake focusing on building impressive physical facilities instead of developing the human systems that develop new companies. Most of the research in Japan emerges from larger traditional corporations, not incubators. The third trend is the lack of venture capital in Japan. Most of the money intended for financing venture capitalists’ projects was coming from outside



Japan, rather than from Japan. The fourth trend is the issue of Japanese Multinational Corporation as a partner. Some years ago, a company that wanted to penetrate the Japanese market had to cooperate closely with such a company.

Most Japanese corporations are less powerful and influential compared to decades ago. Some Japanese companies took some measures to cut costs, such as Toyota. It is ironic to observe that it was the shock of the Japanese competition that forced the US companies restructure and improve the way they do business [77]. The fifth trend is the bypassing phenomenon. This is the most serious trend influencing the future of Japan, in the authors' view. On short, companies interested in doing business in Asia, do not longer go to Japan first. At the time when the [77] book was written, China was the most preferred destination for companies seeking business opportunities in Asia. South Korea on the other hand, grew over two generations to a prosperous country, by implementing an economic model similar to that used by Japan. This was done by loaning high amounts of personal savings to private companies with heavy subsidization of Korean industries by the central government. Koreans are also aggressive entrepreneurs. They understood early the need to seek out licensed technologies (some of the computer technologies in South Korea have been licensed in from Japan, for example, and they entered the nuclear power industry with licensed-in technologies from Westinghouse Electric).

The authors note also the flexibility of Koreans, as despite being surrounded by China, Mongolia and Manchuria, Korea maintained for centuries the peace. This was done through excellent diplomacy and negotiations with its much more powerful neighbours. As Koreans have installed high-speed communications in all schools, it appears to the authors that Koreans are willing to share their knowledge and information with others.

### 3.4 Russia

According to the authors of [77], Russia sold most of its licenses to former socialist countries (about 66 percent). Nowadays, Russian firms seek buyers/sellers from all countries. It is important to note though that many Russian firms fail to protect their technology, and therefore difficulties are to be encountered in the transfer. They also tend to transfer incipient technologies, which are on an early stage of development, or tend to license purely scientific technology without providing complementary expertise (such as trade secrets, manufacturing technology). It has been observed too that Russian managers fail to understand that royalties are only a part of the costs. The other part is, for example, production costs, where the cost of the equipment used for production may very well be two to three times higher than the royalties for the license.

The most promising fields for establishing agreements for licensing Russian technology were, at the time of print of the [77] book: plasma technologies, informatics, optical instruments and spectrometers, laser technology, production technologies for special materials and biotechnology equipment.

Tax payments for export licenses and patents have been exempted from value added tax (VAT), according to Article 148 of the Tax Code of the Russian Federation (at the level of year 2002, according to [77]). There are four sets of problems within the legal system of Russia. *The first* is that the legislation is vague with respect to ownership rights in the cases where the intellectual property covers results of federally funded research and/or development; the way in which to transfer know-how and trade secrets that support product implementation and how to restrict monopolistic licensing activities. *The second* is that participants of the licensing process often find a different interpretation to the same

term, or not take into account the specificities of legislative bases of the countries in focus. *The third* is that many foreign partners do not take into account that most Russian research organizations are state enterprises financed by the state. *The fourth* is that Russian participants are not up-to-date with new foreign technologies. However, the ecosystem of intellectual property and technology transfer continues to improve steadily. Effective protection of IP becomes more and more important for Russia. The authors [77] refer to the website [www.LES-Russia.org](http://www.LES-Russia.org) (accessed July 2014) that offers a list of the patent attorneys of Russia that are specialized in licensing technology.

In the authors' view [77], the foreign licensor/licensee should consider the fact that some contracts might be rendered invalid. The grounds are either provisions not fulfilled, either not registered with Rospatent either the patent/legal guarantees are not fulfilled. A contract may also expire prematurely due to patent/legal guarantees, payment or technical warranties.

In conclusion, Russia recognized the importance of licensing in the last few years, and has been taking steps in making the intellectual property hold a proper position. Already, corporate policy of Russian corporations includes intellectual property as part of the overall business development strategy.

However, I should add that nowadays, Russia is facing sanctions on trade with partners such as EU and USA among others, for its implication in the recent events in Ukraine. Therefore, I would further conclude that there are several specific risks when doing business in Russia, determined mainly by the political level.

### 3.5 Australia

Another interesting geographical area to look at is Australia. Australia leads the world in terms of the impact of the research it funds in the medical and biomedical science. Other domains of significance are atomic, molecular and chemical physics, astronomy and astrophysics.

As of 2001, Australia introduced the *innovation patents*, which have a shorter term of eight years compared to the standard of twenty years. They are also characterized by a lower standard of inventive step compared to standard patents. An innovation patent is granted after a formalities check, without examination. However, innovation patent owners may enforce their rights only if the patent has been certified, and for this an examination is necessary. An innovative step is required, compared to an inventive step, in the case of *standard* patents. The innovative step has two parts: "*there has to be a difference between the invention and what is currently known about that technology*" and "*the difference must make a substantial contribution to the working of the invention.*"

Australia seems to be a potential market or partner for technologies related to medical and biomedical applications, among others. I consider that qualification to these domains comes with additional responsibilities and costs for the companies interested in developing their technologies in this direction, because of extra standardization work and deeper checks. Also, the risks of prosecution for high sums of money and reputation loss in case the device did not function and lives have hypothetically been lost as a consequence, are high too. Therefore, a decision regarding this aspect should be taken at the business strategy level first. In any case, the government of Australia is supportive, and there are licensing opportunities for Australia, but mainly concentrated into some very specific areas-mentioned above, where it is among the world leaders.

### 3.6 Arab industries

I consider that the Arab countries may present themselves with a business opportunity to a high technology company depending on the level of correlation of the respective technology with the petroleum industry, the main industry of this part of the world. If this is appealing, the owner of the technology should in principle apply for IP protection in this part of the globe, too.

The main office in the Middle East, which tackles issues, is Abu-Ghazaleh Intellectual Property ([www.agip.com](http://www.agip.com) accessed July 2014). The Chairman of this company wrote a chapter in [77]. According to him, a company interested in entering a licensing agreement with an Arab firm, should be flexible and seek for a local counsel. Moreover, it should note that licensing was not a well-understood practice, at least at the level of the year 2002. On short, the Arab countries are finding difficulties in acquiring foreign technology because the Arab world is not familiar with technology transfer or licensing; the perception is that the IP laws are weak (although major improvements have been done); the foreign perception which is altered by past experiences of international companies which did business in the area; the infrastructure of science and technology, which is not sufficiently developed. In general, intellectual property rights have been seen as a foreign concept for the benefit of foreign entities. This is the historical aspect of the issue. Nowadays, progress has been made with regards to the laws implemented by the Arab states; however the patent attorneys still find it difficult to work with foreign firms, probably also because of the lack of experience.

The author also mentioned a society founded in 2000, the Licensing Executives Society –Arab Countries ([www.lesarab.org](http://www.lesarab.org) accessed July 2014) which is a professional development association. It offers courses on different topics related to licensing, such as contracts, valuation, strategy, patenting, living with the deal, and many others.

I considered it is worth mentioning this geographical area, which seems not important for the moment for the IP world, as it is a developing market with new IP laws, and not much experience. However, if the technology owned by the company might be of use for the petroleum industry, be it in the form of exploration, exploitation or alarming the threat of hazardous events, as well as maybe real-time positioning or reporting of the health state of personnel or machines. Then this market should be of interest, especially for a first mover possibly connected to a multi billion US dollars industry that is more concerned by the value a technology adds to the company rather than its price.

### 3.7 Latin America

The Latin American countries are part of an area where businessmen consider there is still plenty of space for business opportunities. Among these, Mexico seems to be the country that has no controls or restrictions regarding the acquisition of foreign technologies, and license agreements may be negotiated freely. Historically, there have been some restrictions [77] when licensing in Latin America, namely: after the licensing agreement would have expired, licensees would have to be let to freely use the technology; the restrictions regarding confidentiality would apply only for a few years after the termination of the agreement; usually training would have been requested by licensees for its labour force in order to ensure the acquisition of skills and know-how; licensees would also consider that preference should be given to local Engineers and technicians, and that hiring of foreign Engineers and technicians should be limited; payments would be

restricted for an average of five years; there would be limitations on the tax-deductibility of the expenses relative to the license agreement; payments abroad would be highly taxed (such as withholding income tax or taxes on purchase of foreign currency), together with high taxes on the payment of royalties.

Historically, these measures have been in line with the political measures of the Latin Countries that encouraged producing all goods locally and the same for the services needed. With the globalization trend from the 1990s, this started to change, and Latin American countries became more open to foreign businesses. Argentina and Brazil have amended their laws in the last recent decades, and the patent applications are increasing rapidly as a consequence. Trade relations went to a different level too, also because Mexico has been included in the North American Free Trade Agreement (NAFTA) between Canada and the United States. In fact, Mexico became a world class exporter as a consequence of NAFTA: it was twenty-sixth largest exporting nation in the world before the agreement has been signed, and the fifteenth exporting nation several years after it has been signed, at the level of year 2013 (according to <http://www.indexmundi.com/g/r.aspx?v=85&t=10> accessed July 2014).

The competitive advantage of countries like Argentina and Brazil lies in agriculture, in the view of the authors [77]. Therefore, if the proprietary of a technology is interested in doing business with this domain, I think that maybe if it may enhance productivity/quality of grains, or monitor parameters such as humidity of grains, health of animals, or offer possibilities of tracking them, or determining the needs of water and other substances autonomously and safely, this part of the planet could be considered an opportunity for registering IP. This is more so as the major countries in this area have taken extensive reforms of their IP systems and law systems. Of course, some Latin American countries are involved in oil and gas exploitation. Therefore the conclusion from Chapter 3.6 Arab industries might be well applied here too, for countries such as Venezuela and Mexico.

Regarding patenting in remaining parts of the world, among which US and Europe in special, I think that given their developed IP systems, it is safe (but maybe expensive and necessary) to submit a patent application in these areas, more so because of their relatively high income economies, compared to the rest of the world.

#### 4. Conclusions and proposed IP strategy framework

The thesis has offered some insight into current status of the IP market and its main players, be it practicing entities or non-practicing entities, with websites and lists of potential partners to choose from. Moreover, for a sub-domain of the high technology sector, the semiconductor industry, I find of great use the following list of top 60 semiconductor start-ups to watch ([http://www.analog-eetimes.com/en/ee-times-silicon-60-hot-startups-to-watch.html?cmp\\_id=7&news\\_id=222906532&page=3](http://www.analog-eetimes.com/en/ee-times-silicon-60-hot-startups-to-watch.html?cmp_id=7&news_id=222906532&page=3) accessed July 2014). It is proposed by Analog EE Times, a magazine part of the EDN group providing specific information to Engineers since 1956, with more than 46,000 subscribers in 40 European countries. The study is published on 15 July 2014, and it is announced once in 18 months.

It is interesting to keep an eye on, as these start-ups are usually based on a novel technology, which I expect they patented/filed a patent for. Therefore, at least licensing if not buying the patent seems plausible. An established semiconductor company might present to the startup with a distributor network and a sales team that the startup cannot

afford or does not have yet, not to mention its network capabilities. I consider that some of the start-ups listed there, based in various continents, would be successful while others will surely not.

In my opinion, the reasons failure would not be due to the lack of innovation proposed by their technologies as to the greatest extent, but to lack of funding, not optimum timing on the market, lack of possibilities for development, lack of sales force, lack of negotiation power with de-facto standard-setting entities, partnership with the wrong entities, takeovers by wealthier and corporations without experience in the respective domain, bad management, and even bad-luck (for example, a very big earthquake such as the one in footnote<sup>93</sup>, that could have consequences on the economic growth of a country or market, its sellers, distributors and consumers), if not anything else. The unsuccess of the start-ups translates to the fact that the technologies they probably have patented have expired or are about to expire. I would recommend patent searches for the technologies that are interesting, in order to see if the technology they started to use recently might be of interest for acquisition or licensing. In this case, the options described in the report in chapter 2.2, that the (non-)IP owner has might be pursued.

A partnership, a joint venture is also possible. On the other hand, if the patent is lapsed, the technology could be merged with the current technology and thus a competitive edge compared to competitors might be temporarily ensured. However, improvements may be patented, and a patent thicket could be established, thus ensuring adequate protection and power of negotiation in standards setting organizations (specific for the semiconductor industries) who agrees with this.

I think that a good piece of advice is to be open and receptive to the surrounding environment ideas (from clients, customers and even competitors in order to develop the ecosystem), which is in line with the recent recommendations of the author of [39], Harvard University scholar John Palfrey. The drift with the environment has been acknowledged in the literature related to project management many years ago, as early as 1991 as the authors of [98] reveal. Therefore, I consider and stress that this is a very important and should be considered when dealing with IP: observe the environment.

The patents may be a weapon and a shield [39]; however an application for a patent is not indicated in all cases, as shown in the report. Its place might be taken by trade secrets as they never expire and do not divulge information publicly.

Care should be given to the internal organization of the confidential information that flows within the company, as an employee divulging an idea without intent might still give reasons for a patent examiner to invalidate a patent application.

There are techniques that some organizations have used in the past to increase creativity levels, such as TRIZ techniques [42]. I find these intriguing and interesting, and not trying them might cost more than spending a bit of time and seeing if they are of use. History shows that big corporations have researched them in the past with success, and as strange it may seem at first, they might prove to discover new ideas or applications for known ideas.

Also at internal level, it seems it is better to have some in-house knowledge through a company patent attorney as company related knowledge and detection of infringement, together with search, is easier and more probable to be made. At internal level, a database that is updated with granted patents, pending patents and applications that are to be

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<sup>93</sup> [http://www.usgs.gov/newsroom/article.asp?ID=2727&from=rss\\_home#.U\\_zkJfmSxql](http://www.usgs.gov/newsroom/article.asp?ID=2727&from=rss_home#.U_zkJfmSxql) [accessed August 2014]

made, is probably a necessity, given the cost of a patent over time (see Figure 2). Moreover, searches for recently lapsed or expired patents (also in other domains) might offer access to interesting technology that could be further developed. Involvement of senior managers in charge with the company's strategy is necessary with each patent application, in order to make sure that the technology to be patented follows the main business strategy.

According to research<sup>94</sup>, the IP department should interact with other departments of the firm such as marketing and supply chain, production, in order to decide how the patent portfolio might be synchronized with other concepts, such as secrecy, lead time or other complementary features, in order to obtain a maximize the value for the company. At internal level too, it seemed surprising for me to read a paper that stated that employees that would leave the company might prove to be an asset of the firm in the long run, through the connections that the employee might bring with the new network and the new knowledge, if a balanced relationship is maintained with the departing employee.

Patents in general have been shown from their economic perspective, but their social influences have also been discussed. The main possibilities that an IP owner has have been offered [3]. The options of the non-IP holders have been showed, too, with their implications [3]. Although sometimes companies are brought to court, it has been shown that this is not really aleatory, but measures may be taken at internal level (monitoring of technology before release) and even through a special type of insurance. The outcome of lawsuits may not be known, as the judges have their personal biases, as well as the jury and even the IP system, through its precedencies not to mention the media exposure and pressure. Moreover, there are alternatives to costly litigation suits, such as mediation and arbitration, among others. It is acknowledged that litigation is the last stage of an on-going IP conflict, and because it is very costly, both parties (prosecutor and defendant) would rather tend to avoid it. There may be second-order implications to business strategy when an entity decides to litigate the other, as it has been shown that Samsung concentrated its sales in the Asia region, where the IP system was less developed compared to Europe or US [39]. This caused a certain level of surprise to Apple's strategists.

It has been revealed also that the patent system in Europe is used by some companies as such to benefit from pendency, either to scare competitors, or lead them to a false track regarding the strategy of a company, or to gain media appreciation for innovation, or in order to gain time to adjust the patents and the technology to a standard set by an organization. Building a large patent portfolio helps not only negotiating entry in a standard setting organization, but also defending prosecution from alleged infringement accusations. Infringement compensations and suits took track since 2011 (see Figure 5), along with the big suits mentioned in the introduction chapter.

As a patent application is showing information to the public, I recommend the applicant describe the invention, but keep a small detail for itself. Such as, if an alloy is used for a printed circuit board, its precise purities not be divulged, or the order of the materials that are to be lay out, or the temperature that they are heated to. Thus, a key missing piece of information might help when infringers would try to imitate the technology, probably without much success. I consider this to be my personal idea, as I did not read it through literature.

In addition, I think that discovering a specific process that would give economies of cost for the manufacturer but no advantages for the distributor or integrator would lead to

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<sup>94</sup> Fischer T, Henkel J 2010. Capturing the Most Value from Innovation - Strategy Choices of R&D and Marketing Managers, Working Paper, Technische Universität München, Munich

the very lucrative situation in which the owner of the technology would be paid by an entire industry just not to shift the technology. An analogy might be the electric motors for the car industry, the inventor of the most efficient electric motor, with a range of say 1000 km per full charge (and of size and weight comparable to petrol/diesel cars), could probably as well obtain significant revenues from most of the car industry players, if not also the petroleum exploration and exploitation companies, in order not to sell or license the rights of the patent to any of the players in the car industry. At the same time, it could do ensure such revenues for many years, without having to qualify the technology, bear responsibility for fatalities or failure to penetrate the market. This situation I did not see hypothetically described in any of the articles or books I have read, therefore I consider it is a personal contribution to the theory of the IP strategy. It is true that although it might be economically profitable, it would not improve the social welfare.

It might also be worth mentioning that in the “Dimitrie Leonida” National Technical Museum in Bucharest, Romania, lies a piece of interesting technology that nobody until now has been able to decode. It is named “Pila Karpen” and has been producing electricity continuously since 1950. It is shown in Figure 46.



Figure 46 Karpen's pile (<http://i2.wp.com/www.greenoptimistic.com/wp-content/uploads/2010/12/karpen-pile1.jpg> accessed July 2014)

In 2006, specialists measured its output voltage and it was the same as over 60 years ago, 1V precisely. The technology had been patented in 1922, but it seems that there is/are one/more elements that has/have been intentionally left out of the description of the patent description by its inventor, the Romanian Nicolae Vasilescu-Karpen. Various international teams have tried to explain its functioning, without success. Among them, there is the study of Romanian researchers M. Dogaru and M.D. Cazacu ([http://snet.elth.pub.ro/snet2004/Cd/circ/circ\\_O1.pdf](http://snet.elth.pub.ro/snet2004/Cd/circ/circ_O1.pdf) accessed July 2014). It is not hard to imagine that the company/inventor that would manage to discover the remaining secret of this device and scale it to higher voltages (and smaller occupied space) would almost certainly alter the battery changing behavior of consumers, not to mention the electricity consumption from private companies, in households, or the petroleum derivatives consumption (petrol and diesel). In this scenario, comes the idea of receiving income for not applying the idea at large scale, as it would affect many industries in the world, including electricity generating companies, battery manufacturers and integrators, car manufacturers, and maybe portable devices companies, if the solution could be scaled to lower dimensions. I did not find such an idea when reading literature.

However, on big lines, a supplementary framework (to [3]) might be suggested for a company looking at its IP strategy at the process level, rather than at/in addition to the

options the IP and non-IP holders have at hand. In Table 1 it is shown the framework that I recommend.

Number	<i>Processes available for IP holders</i>	<i>Processes available for non-IP holders</i>
1	<i>Make use of patent pendency when applying, if applicable</i>	<i>When asking for permission, avoid asking NPEs for IP licenses; also offer to expand the ecosystem through the good sales network/reputation/brand name</i>
2	<i>Keep a small detail for oneself, in each patent application</i>	<i>Keep an eye on the environment: IP applications of competitors, but also IP of startups</i>
3	<i>Consider specifying ADR terms in license contracts, together with IP insurance</i>	<i>Search for and retrieve ideas from (recently) lapsed or expired patents</i>
4	<i>Develop and maintain an internal IP database (such as <a href="http://iamanager.se">iamanager.se</a>); do IP checks for infringement before product launch on market</i>	<i>If thinking about the unethical option of rapid dissemination on the market, at least start considering the process of doing some research on IP insurance and settlement history of the company of which the technology is to be infringed.</i>
5	<i>Update IP strategy continuously (to also avoid drift with the environment)</i>	
6	<i>Consider specificities of various geographical locations (do not attempt to patent in all 196 countries of the Globe, but in areas of expected growth/production facilities/affinity of population with respective products)</i>	
7	<i>Ideally, be paid by all competitors and players in the market for not applying the technology in any existing product</i>	

**Table 1** The proposed IP strategy framework, dealing with the recommended processes as compared with the options presented in [3]

In any case, even with the most careful planning, unexpected events and situations might arise, as planning (time, resources, slack) for the unexpected should be part of the overall strategy, in my view.

I discovered on the internet a list<sup>95</sup> of top 50 mistakes in IP strategy. It has been added to the Appendix, in Table 3. Although I did not do an extensive analysis of the mistakes presented due to time and report size constraints, it is interesting to observe for example IP strategy mistake number 46, which is “*Think that there are only 50 IP mistakes that you can make*”. I recommend the reader go through the list, and click on the respective links with the mistakes and find more details and thoughts about each of them. This should help in principle determining better the course of action of an IP strategy for a company, without depending on either options, or processes for the decisions. It is in

<sup>95</sup> [duncanbucknell.com/2013/04/22/50-intellectual-property-mistakes-and-how-to-avoid-them/](http://duncanbucknell.com/2013/04/22/50-intellectual-property-mistakes-and-how-to-avoid-them/) accessed August 2014



essence a list of the top things one should consider when taking important decisions regarding intellectual property.

To conclude, as a general idea, it is interesting to observe that there is not a unique IP strategy that is the most successful, or the most recommended. Instead, an IP strategy is shaped determining first the threats and opportunities that exist in an environment, including its geographical specificities, while adapting it continuously to changes and threats from the outside world, to which it is connected.

In any case, patents are more a necessity rather than a threat, but it is for the patent systems (and laws) to be updated and even increase the inventive step requirement in order to avoid a patent thicket through which is costly and time consuming to navigate, both by applicants and by patent examiners or patent attorneys.

As future research direction, I would consider investigating at empirical levels the strategies related to misleading the competitors, for example that of pendency for patents, publishing or even donating IP. Although I did not see it mentioned in any article, I wonder why a company would not consider joining multiple de-facto standards, expressing interest for more than the company thinks about putting efforts in. This could be just to mislead competitors and make them pursue a very long, resource-intensive and very expensive path, for researching a (new) technology they think one is going to deploy in several years, having joined such a new de-facto standard or initiative.

I would add that thinking about everything when tailoring an IP strategy is close to impossible, however being better prepared for the IP market, in comparison with competitors, should give the competitive advantage on the market. Nowadays, the value of the company is determined more and more by the intangibles (human resources, knowledge, creativity, value of IP, value on the stock exchange, past experience with technologies, business network, relationships with clients and partners, power of negotiations in de-facto standards, etc.), rather than tangibles (value of headquarters, value of regional offices, value of machinery, value of PCs, laptops, office furniture, company cars, etc.).

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## Appendix

Entity	US Patent Publications	Patent Families
Intellectual Ventures	25-30k (Est)	-
Interdigital	3571	1537
Round Rock Research LLC	3487	1195
Wisconsin Alumni Research Foundation (WARF)	2368	1714
Rockstar Consortium LLC	2362	1868
Conversant Intellectual Property Management Inc (fka Mosaid Technologies Inc)	2196	1231
Acacia Technologies	1757	755
Rambus	1555	674
Tessera Technologies Inc	1301	635
IPG Healthcare 501 Limited	1052	989
Unwired Planet Inc	1032	901
Walker Digital LLC	888	213
Wi-Lan	847	629
Commonwealth Scientific and Industrial Research Organisation (CSIRO)	804	591
Global OLED Technology LLC	799	750
Institute for Information Industry (III)	527	514
STC.UNM (aka Science & Technology Corporation @ UNM)	415	299
Scenera Research LLC	353	289
Intertrust Technologies Corp	325	44
Altitude Capital Partners	289	227
Innovative Sonic Ltd	253	180
Interval Licensing LLC	243	117
Spherix Inc (and other entities affiliated with Anthony Hayes)	238	211
IpVenture Inc	211	59
Pendrell Corp (fka ICO Global Communications (Holdings) Ltd)	209	36

**Table 2 Non practicing entities by the number of patents in the portfolio**  
<https://www.patentfreedom.com/about-npes/holdings/> accessed June 2014)

Number	IP Mistake
1	<i>"Fail to protect IP"</i>
2	<i>"Fail to exploit IP"</i>
3	<i>"Fail to maintain IP"</i>
4	<i>"Fail to recognize IP"</i>
5	<i>"Fail to protect associated IP"</i>
6	<i>"Infringe IP"</i>
7	<i>"Loose Freedom of operation"</i>
8	<i>"Have no publication strategy"</i>
9	<i>"File too early"</i>
10	<i>"File too late"</i>
11	<i>"Treat IP as a purely legal issue"</i>
12	<i>"Fail to think globally"</i>
13	<i>"Fail to think locally"</i>
14	<i>"Spend too much to protect too little"</i>
15	<i>"Spend too little to protect too much"</i>
16	<i>"Misunderstand the strength of IP"</i>
17	<i>"Build static instead of dynamic defenses"</i>
18	<i>"Underestimate competitors"</i>
19	<i>"Overestimate competitors"</i>
20	<i>"Fail to leverage outside innovation"</i>
21	<i>"Become mired in the day-to-day"</i>
22	<i>"Fail to optimize the portfolio"</i>
23	<i>"Fail to align IP strategy with business strategy"</i>
24	<i>"Treat IP as a cost center"</i>
25	<i>"Accept the tyranny of the toos: too hard, too expensive, too difficult, confusing, etc."</i>
26	<i>"Take the advice of counsel on faith"</i>

27	<i>"Mismanage outsourcing"</i>
28	<i>"Be satisfied with the status-quo"</i>
29	<i>"Create your competition"</i>
30	<i>"Fight in the wrong places"</i>
31	<i>"Fight in the wrong way"</i>
32	<i>"Choose the wrong fights"</i>
33	<i>"Develop IP that no one wants"</i>
34	<i>"Fail to monitor IP"</i>
35	<i>"Fail to abandon IP"</i>
36	<i>"Fail to value IP literacy in staff at all levels"</i>
37	<i>"Fail to include IP awareness on staff training agenda"</i>
38	<i>"Fail to communicate IP strategy as part of your marketing plan"</i>
39	<i>"Claim too much (in patent claims)"</i>
40	<i>"Fail to clearly assign IP responsibility within the organization"</i>
41	<i>"Seeing things as we wish them to be"</i>
42	<i>"Planning without the ideal IP strategy in mind"</i>
43	<i>"Do it yourself IP strategy"</i>
44	<i>"Withholding important information from legal advisers"</i>
45	<i>"Miss the point on benchmarking"</i>
46	<i>"Think that there are only 50 IP mistakes that you can make"</i>
47	<i>"Make dangerous interpretations"</i>
48	<i>"Focus on the lesser value in licensing"</i>
49	<i>"Use questionable ethics"</i>
50	<i>"Fail to lead"</i>

Table 3 Top 50 IP mistakes collected from readers by Mr. Duncan Bucknell over two years, founder of <http://duncanbucknell.com/services/> IP advisory firm, list retrieved from <http://duncanbucknell.com/2013/04/22/50-intellectual-property-mistakes-and-how-to-avoid-them/> [accessed August 2014]