LAPPEENRANNAN
TEKNILLINEN YLIOPISTO

*Aura Soininen*

# Patents in the Information and Communications Technology Sector - Development Trends, Problem Areas and Pressures for Change

Thesis for the degree of Doctor of Science (Economics and Business Administration) to be presented with due permission for the public examination and criticism in the Auditorium of the Student Union House at Lappeenranta University of Technology, Lappeenranta, Finland, on the 3rd of March 2007 at noon.

**Acta Universitatis Lappeenrantaensis 262**

**Supervisor**

Professor Jukka Kemppinen
Department of Business Administration
Lappeenranta University of Technology
Finland

**Reviewers**

Professor Lionel Bently
Herchel Smith Professor of Intellectual Property
Faculty of Law
University of Cambridge
Great Britain

Ilkka Rahnasto, Ph.D. (Law)
Vice President, IPR
Nokia Oyj
Finland

**Opponent**

Professor Lionel Bently
Herchel Smith Professor of Intellectual Property
Faculty of Law
University of Cambridge
Great Britain

ISBN 978-952-214-343-3
ISBN 978-952-214-344-0 (PDF)
ISSN 1456-4491

Lappeenrannan teknillinen yliopisto
Digipaino 2007

## ABSTRACT

Aura Soininen
Patents in the Information and Communications Technology Sector - Development Trends, Problem Areas and Pressures for Change
Lappeenranta 2007
354 pages, 2 Appendices
Acta Universitatis Lappeenrataensis 262
Diss. Lappeenranta University of Technology
ISBN 978-952-214-343-3, ISBN 978-952-214-344-0 (PDF), ISSN 1456-4491

The patent system was created for the purpose of promoting innovation by granting the inventors a legally defined right to exclude others in return for public disclosure. Today, patents are being applied and granted in greater numbers than ever, particularly in new areas such as biotechnology and information and communications technology (ICT), in which research and development (R&D) investments are also high. At the same time, the patent system has been heavily criticized. It has been claimed that it discourages rather than encourages the introduction of new products and processes, particularly in areas that develop quickly, lack one-product-one-patent correlation, and in which the emergence of patent thickets is characteristic. A further concern, which is particularly acute in the U.S., is the granting of so-called "bad patents", *i.e.* patents that do not factually fulfil the patentability criteria.

From the perspective of technology-intensive companies, patents could, irrespective of the above, be described as the most significant intellectual property right (IPR), having the potential of being used to protect products and processes from imitation, to limit competitors' freedom-to-operate, to provide such freedom to the company in question, and to exchange ideas with others. In fact, patents define the boundaries of ownership in relation to certain technologies. They may be sold or licensed on their own or they may be components of all sorts of technology acquisition and licensing arrangements. Moreover, with the possibility of patenting business-method inventions in the U.S., patents are becoming increasingly important for companies basing their businesses on services.

The value of patents is dependent on the value of the invention it claims, and how it is commercialized. Thus, most of them are worth very little, and most inventions are not worth patenting: it may be possible to protect them in other ways, and the costs of protection may exceed the benefits. Moreover, instead of making all inventions proprietary and seeking to appropriate as high returns on investments as possible through patent enforcement, it is sometimes better to allow some of them to be disseminated freely in order to maximize market penetration. In fact, the ideology of openness is well established in the software sector, which has been the breeding ground for the open-source movement, for instance. Furthermore, industries, such as ICT, that benefit from network effects do not shun the idea of setting open standards or opening up their proprietary interfaces to allow everyone to design products and services that are interoperable with theirs. The problem is that even though patents do not, strictly speaking, prevent access to protected technologies, they have the potential of doing so, and conflicts of interest are not rare.

The primary aim of this dissertation is to increase understanding of the dynamics and controversies of the U.S. and European patent systems, with the focus on the ICT sector. The study consists of three parts. The first part introduces the research topic and the overall results of the dissertation. The second part comprises a publication in which academic, political, legal and business developments that concern software and business-method patents are investigated, and contentious areas are identified. The third part examines the problems with patents and open standards both of which carry significant economic weight in the ICT sector. Here, the focus is on so-called submarine patents, *i.e.* patents that remain unnoticed during the standardization process and then emerge after the standard has been set. The factors that contribute to the problems are documented and the practical and juridical options for alleviating them are assessed. In total, the dissertation provides a good overview of the challenges and pressures for change the patent system is facing, and of how these challenges are reflected in standard setting.

**Keywords:** patents, innovation, software, business methods, patent strategy, standards, competition

UDC 347.771 : 65.012 : 004.4 : 006

## ACKNOWLEDGEMENTS

Even though I never considered myself an academic soul, the idea of writing a dissertation has been at the back of my mind ever since I was in high school. It was probably the defense of my father's dissertation ten years ago in November 1996 that first introduced me to the scientific world, and also to Lappeenranta University of Technology, which then, when the time was right, emerged as a fine place for completing my doctoral studies.

My father, Dr. Raimo Soininen, has always encouraged me on my own doctoral path. I also owe a great deal to my supervisor, Professor Jukka Kemppinen, who kindly took me under his wing in January 2001 when I began my work at Helsinki Institute for Information Technology (HIIT): at that time I started to write my Master's thesis on software patents for the University of Helsinki, Faculty of Law, in cooperation with Dr. Risto Sarvas, then a student of software engineering.

As the time passed, I began to develop an interest not only in the legal aspects of patents and the technical aspects related to software, which I simply needed to understand whether I wanted to or not, but also in the ways in which patents are utilized in business practice. Luckily, I was able to pursue these interests while I was working at HIIT as a member of the Digital Economy Core (DeCore) research project. It was during this period that I also had the opportunity to visit UC Berkeley, California, U.S. for one and a half years. In fact, without that visit I almost certainly would have given up this research topic, as after I had finished interviewing Finnish ICT companies in 2003 it appeared that patents only had minimal importance for companies operating in the field. You can imagine my enthusiasm when I was sitting in Boalt Hall School of Law at the first lecture of an IP Strategy course, and the lecturer started by saying that patents were the most important intellectual property right. Therefore, for making all this possible I would like to thank the Director of HIIT, Dr. Martti Mäntylä, and all my colleagues there. I am particularly indebted to Dr. Olli Pitkänen, who was always there to help me not only with my scientific dilemmas but also with more practical concerns such as how to buy a car and rent a house in the U.S. It has also been interesting and in many ways illuminating to work with young eager minds such as those of Dr. Mikko Välimäki, Ville Oksanen and Herkko Hietanen. Dr. Perttu Virtanen has also been very supportive of my work. Of the people I became acquainted with during my visit to UC Berkeley Patrick Reilly, the founding father of the IP Society, deserves explicit mention. He is the one who made it possible for me to improve my understanding of the trends in the IP world and to interact with several industry players by allowing me to take part in the various seminars he had organized. Adjunct Professor Henry Chesbrough also offered a helping hand when I and another doctoral student were constructing the interview questions for the U.S. ICT companies.

As the DeCore research project came to an end, it was time for me to decide whether to proceed with my dissertation as long as I could without starving to death or to take up a "proper" job. In the end, I managed to do both, even though finding the time to do it all has not always been easy. For the last two years I have been navigating between two places of work, Lappeenranta University of Technology (LUT) and Attorneys at Law Borenius & Kemppinen, Ltd (B&K), and at the same time focusing on completing my dissertation. Luckily, I have been allowed a lot of flexibility and freedom, and with the financial support of Liikesivistysrahasto - Foundation of Economic Education, Olga ja Kaarle Oskari Laitinen's Foundation and Lappeenrannan teknillisen yliopiston tukisäätiö I have been able to take some time off. Therefore I would like to express my gratitude to my employers and the research foundations that have made it possible for me to finalize my studies. There are also many people to thank. At B&K I have had the pleasure of working particularly with the attorney Ben Rapinoja, who has guided me in the world of patent law as it appears in the eyes of a practitioner. At LUT it has been a delight to work with Dr. Pia Hurmelinna-Laukkanen, with whom I became acquainted when she was still a single doctoral student and was my housemate for three months at Berkeley. We jointly conducted the interviews in the U.S. ICT companies, and co-authored two conference papers.

In addition to the people mentioned by name above, I would like to thank collectively all my interviewees and those who have read my publications in their role as reviewers or for some other reason.

Furthermore, I will be forever grateful to all my friends, my family, and my love, Jukka, for bearing with me throughout this process and for listening to all my complaints.

Last but not least, I would like to express my gratitude to Dr. Lionel Bently and Dr. Ilkka Rahnasto for their valuable comments, constructive criticism and encouraging words. I have been very fortunate to have the undisputed experts in the field as the pre-examiners of my work. Dr. Lionel Bently has also taken on the task of opposing my work, so I would like to thank him especially for all the time and work he has invested in this project.

Helsinki, 3 February 2007

Aura Soininen

# TABLE OF CONTENTS

# PART I: OVERVIEW OF THE DISSERTATION

# CONTENTS

# I. INTRODUCTION

The aim of this dissertation, which consists of three publications and an overview, is to increase understanding of the dynamics and controversies of the U.S. and European patent systems, with a focus on the information and communications technology (ICT) sector. Thus, it examines academic, political, legal, and business developments related to software and business-method patents, and thereby combines legal, technological and economic aspects as well as theoretical and practical studies. A further focus is on the dilemmas patents may cause with respect to standardization, and an attempt is made to evaluate whether the current legal framework is sufficient for alleviating some of them. Characteristics of the ICT sector as well as certain changes in the companies' innovation models and patent strategies are presented as the main factors creating pressures for adjusting the patent system that works best in fields, such as the pharmaceutical industry, which rely on proprietary models and in which research and development costs are high and there is stong correlation between a product and a patent. This introduction gives the background of the dissertation, discusses the prior research and the outline of the study, and sets out the research motivation, the objectives and the methodology.

## A. BACKGROUND AND PRIOR RESEARCH

### (i) The Changing Business Environment and the Challenges of Innovation Management

The information and communications technology (ICT) sector, which is the focal point of this dissertation, spans manufacturing and service industries involved in information acquisition, processing and transfer, as well as communications, and touches on the electronics and electrical industries, telecommunication services, information technology and, depending on the definition, on content businesses[1]. ICT is one of the most significant and influential industries in the world these days and therefore studying it is of great importance. Software, for example, is indispensable and pervasive, and is to be found everywhere. It is embedded in products and manufacturing, and in information systems in all fields of technology and business. The effects of information technology extend even further. In fact, in conjunction with the development of communications technology, information technology has affected the whole of society. It has changed the way information is acquired and transferred, improving productivity at home and in the workplace. The development of the ICT sector has also created new ways of reaching a larger customer base than was previously possible. In particular, the expansion and vast utilization of the Internet have facilitated the flow of information[2].

The development of the information and communications technologies together with digital convergence[3] has led the way to a new, information economy in which access to and control of

---

[1] TEKES, *The Future is in Knowledge and Competence, Technology Strategy -a review of choices,* at 12 (June 2002) <http://www.tekes.fi/julkaisut/Tekes_Teknstrat_eng.pdf> (last visited 9/6/06). *See also* OECD, *Measuring the Information Economy 2002, Annex 1. The OECD Definition of the ICT Sector*, at 81 <http://www.oecd.org/dataoecd/34/37/2771153.pdf> (last visited 9/6/06).

[2] OECD, *Patents and Innovation: Trends and Policy Challenges*, at 15 (2004).

[3] Digital convergence refers to technological merger of several industries that have traditionally been distinct through various devices that exchange information in the electronic, or digital, format used by computers. These industries are computers, communications, consumer electronics, entertainment, and mass media. Examples of convergent services include Internet services delivered to TV sets via systems such as Web TV, E-mail and Internet

information and knowledge are paramount[4]. Furthermore, the highlighted importance of networks is characteristic of the "new economy". It could be said that in the networked world, companies are more specialized than those of the industrial economy, shedding their national focus to operate globally and in a decentralized manner relying on vast cooperation and production networks. For this reason, too, undertakings' operational models and value chains, *i.e.* the sets of activities required to design, procure, produce, market, distribute, and service a product or service, have gone through changes.[5] Generally speaking, the value chains of networked industries such as the ICT sector differ from traditional value chains in that that their value-producing activities are more fragmented, and there is interaction between each level. This signals high interdependency between the companies, all of which aim to be in a position in which they would represent the primary criteria influencing the choice of the end-user as this affects the strength of their leverage. Furthermore, positions within the value networks are not stable, and may change at a rapid pace.[6] It is also typical for many ICT companies to be business partners in one area, and to compete vigorously in another, which creates challenges for managing their business operations and their patent activities. This is one of the core areas under examination in this dissertation.

The fragmentation of companies' value-producing activities has also created challenges in the area of innovation management. The growing mobility of highly experienced and skilled people, the growing presence of private venture capital funding, and the increasingly fast time-to-market for many products and services have eroded company reliance on internal research and development (R&D) activities and the maintenance of control over building, marketing, distributing, servicing, and supporting its own products[7]. Indeed, according to Chesbrough (2003), many companies and industries have experienced a shift from the closed innovation model to the open model applied by those realizing that valuable ideas are not necessarily born in-house, and that it does not have to be the one to release these ideas on the market. An open-innovation company may commercialize its internal ideas through external channels, such as carve outs, joint ventures and other types of licensing arrangements, or bring outside ideas inside in order to commercialize them.[8] Obviously, the open innovation paradigm is not predominant in all industries, and there are variations also within the industries. Some companies are inherently more open than the others[9]. The characteristics of the closed and open innovation models are illustrated further in Table 1.

---

access via digital TV decoders and mobile phones, web casting of radio and TV programming on the Internet, and the usage of the Internet for voice telephony.

[4] *See e.g.,* Heli Koski, Petri Rouvinen & Pekka Ylä-Anttila, *Mitä "uudesta taloudesta" jäi?* at 20, 22 (Edita 2002).

[5] Ilkka Rahnasto, *Intellectual Property Rights, External Effects, and Anti-trust Law. Leveraging IPRs in the Communications Industry*, at 81-82 (Oxford University Press 2003). *See also* Dan Steinbock, *Finland's Wireless Valley: Domestic Policies, Globalizing Industry*, at 22 (TEKES, Technology Review 138/2003, 2002).

[6] Rahnasto, at 82-83 (2003).

[7] Henry Chesbrough, *Open Innovation. The New Imperative for Creating and Profiting from Technology*, at xxiii (Harvard Business School 2003).

[8] Chesbrough (2003).

[9] It was confirmed in a rather recent study conducted for the European Commission that particulalry small firms could be characterized as "vehicles of open innovation systems". They are more likely to license and to form new companies than large firms which, in turn, could be characterized as "repositories of unused technologies". (CERM Foundation, *Study on Evaluating the Knowledge Economy. What are Patents Actually Worth? The Value of Patents for Today's Economy and Society,* at III, V (Tender n° MARKT/2004/09/E, Lot 2, Final Report, 23 July 2006),

**TABLE 1.** CONTRASTING PRINCIPLES OF CLOSED AND OPEN INNOVATION[10]

| CLOSED INNOVATION PRINCIPLES | OPEN INNOVATION PRINCIPLES |
|---|---|
| The smart people in our field work for us. | Not all the smart people work for us. We need to work with smart people inside and outside our company. |
| To profit from R&D we must discover it, develop it, and ship it ourselves. | External R&D can create significant value; internal R&D is needed to claim some portion of that value. |
| If we discover it ourselves, we will get to the market first. | We don't have to originate the research to profit from it. |
| The company that gets an innovation to market first will win. | Building a better business model is better than getting to market first. |
| If we create the most and the best ideas in the industry, we will win. | If we make the best use of internal and external ideas, we will win. |
| We should control our IP, so that our competitors don't profit from our ideas. | We should profit from others' use of our IP, and we should buy others' IP whenever it advances our own business model. |

The fragmentation of value chains and openness in innovation is evident in the ICT sector, for example, in that cooperative, de jure standard setting managed by governments, various standards organizations and consortia is an essential feature of doing business, and the software and telecommunications industries in particular depend on standards. This is because it is characteristic of many technologies that consumers benefit from using a popular format or system indicating that the product or service exhibits network externalities or network effects, in other words that the utility of the product increases with the total number of users. It is not necessary for everyone to use the same product or even the same technology, however, and it is merely required that different products are compatible with one another through some form of common interface, and the technical specifications of that interface may be standardized. Telephones, e-mail, Internet access, fax machines and modems are examples of commodities that benefit from network effects. On the other hand, cooperative standard setting and the related publishing of open specifications that are available for everyone to implement is not inevitably required to assure interoperability. Companies may choose to open up their proprietary interfaces, for instance, and to offer attractive licensing terms to complementors and would-be competitors. In the end the markets determine, regularly as a result of a standards war the winning of which requires building alliances with other industry players, which of the competing technologies becomes accepted as the de facto standard. De facto standards include, inter alia, the Microsoft Windows operating system, the Sony/Philips CD-ROM format, the Matsushita VHS system and the Adobe pdf format. In fact, the establishment of both de facto and de jure standards has driven the industry evolution, which is also one of the reasons why I have chosen standardization as one of the focal areas in this dissertation.[11] It also explains why

<http://ec.europa.eu/internal_market/indprop/docs/patent/studies/final_report_lot2_en.pdf>(last visited 3/1/07)).

[10] Chesbrough, at xxvi (2003).

[11] *See e.g.,* Carl Shapiro & Hal R. Varian, *Information Rules. A Strategic Guide to the Network Economy*, at 13, 227-296 (Harvard Business School Press 1999); Robert M. Grant, *Contemporary Strategy Analysis*, at 354-352 (Blackwell Publishing, 5th edition, 2005); David G. Messerschmitt & Clemens Szyperski, *Software Ecosystem. Understanding an Indispensable technology and Industry*, at 229-244 (The MIT Press 2003); Rahnasto, at 84-85 (2003).

research on standards is plentiful. For instance Grindley (1995)[12] and Shapiro & Varian (1999) examined different strategies for establishing them, and Blind (2004)[13] has studied their economics. Studies on the intersection of the U.S. antitrust regulation and patent laws in the context of standard setting are also abundant, while fewer address the same issue from the perspective of European competition laws.

As an industry develops, grows, and matures it becomes necessary to make sure that there are effective ways of appropriating returns on initial R&D investments so that the positive development will continue, and new products, processes and services will be developed and brought to the market for the benefit of consumers. Patents are one of the many appropriability mechanisms discussed by Levin et al (1987)[14], Cohen, Nelson and Walsh (2000)[15], Teece (2000)[16] and Hurmelinna-Laukkanen (2005)[17], for instance. Together with copyright protection and the protection of trade secrets among other mechanisms, they help to define the boundaries of companies' intangible assets by limiting the use of patented inventions, copyrighted works, and the kind of technological and commercial information that is important for the company's business operations and which is kept secret[18]. Basically, intangible assets that include technological advances and know-how, innovative processes and procedures and the output of creative processes, such as art, text and music, are the lifeblood of virtually all companies today, and it has therefore become increasingly important to be able to make these intangibles proprietary in order to build and sustain competitive advantage.[19] Perhaps for this reason, computer programs, typically referred to as software in this dissertation, have also gradually entered not only the domain of copyrighted works but also that of patentable subject matter. Similarly, there has been increasing pressure to follow the developments that have taken place in the U.S., and to allow the patenting of pure business-method inventions in Europe, too. These developments are examined further in this dissertation.

Even though control over intangible assets is needed, it is also important to be able to relinquish some of it, but not too much, with regard to certain technologies or copyrighted works in order

---

[12] Peter Grindley, *Standards, Strategy and Policy. Cases and Stories* (Oxford University Press 1995, reprinted 2002).

[13] Knut Blind, *The Economics of Standards. Theory, Evidence, Policy* (Edward Elgar 2004).

[14] Richard C. Levin, Alvin K. Klevorick, Richard R. Nelson & Sidney G. Winter. *Appropriating the Returns from Industrial Research and Development* (Cowles Foundation Paper 714, 1987).

[15] Wesley M. Cohen, Richard R. Nelson & John P. Walsh, *Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (Or Not)* (NBER Working Paper Number 7552, 2000).

[16] David J. Teece. *Managing Intellectual Capital* (Oxford University Press 2000).

[17] Pia Hurmelinna-Laukkanen, *Dynamics of Appropriability – Finding a Balance between Efficiency and Strength in the Appropriability Regime* (Lappeenranta University of Technology, Academic Dissertation 2005).

[18] For basic information about patents, copyrights and trade secrets as well as other intellectual property rights *see e.g.,* Pirkko-Liisa Haarmann. *Immateriaalioikeus* (Talentum 2006); Morgens Koktvedgaard & Marianne Levin, *Lärobok i Immaterialrätt* (Norstedts Juridik AB, 6th edition, 2000); Robin Jacob, Daniel Alexander & Lindsay Lane, *A Guidebook to Intellectual Property* (Sweet & Maxwell 2004); Guy Tritton, Richard Davis, Michael Edenborough, James Graham, Simon Malynicz & Ashley Roughton, *Intellectual Property in Europe* (Sweet & Maxwell, 2nd edition, 2002); Mark A. Lemley, Peter S. Menell, Robert P. Merges & Pamela Samuelson, *Software and Internet Law* (Aspen Law & Business 2000); Robert P. Merges, Peter S. Menell, Mark A. Lemley, *Intellectual Property in the New Technological Age* (Aspen Publishers 2003).

[19] Jeffrey L. Brandt, *Capturing Innovation. Turning Intellectual Assets into Business Assets*, at 66 (in Bruce Berman (Ed) *From Ideas to Assets. Investing Wisely in Intellectual Property* (John Wiley & Sons, Inc, 2002, 65 – 81)).

to gain profit in the long run. For instance, the setting of technological standards is important for commercializing new technologies implementing them, as compatibility implies significant benefits to consumers[20] and thus better sales figures for the manufacturers. It could be said to be more likely that a company giving away its technology to anyone who wants it is able to maximize market penetration and establish market leadership than one that is restrictive in enforcing its rights and seeks to maximize the profits in the short run. For instance, Matsushita's VHS format won against Sony's Betamax format not because it was technically superior, but because the company did not insist on such tight control of its technology and was hence more effective in gaining acceptability on the market.[21] Then again, at the other end of the spectrum of maximizing market acceptance on the one hand and maximizing appropriation of profit on the other is open-source licensing, the business logic of which is based on quite a different mind-set than most commercial software-licensing models, as described by Weber (2004)[22], Rosen (2005)[23] and Välimäki (2005)[24], among others. Basically, if a very open model is followed, the returns the company is able to appropriate with respect to the technology in question are rather low, and in order to survive it needs to found its business on complementary technologies or services, for instance. This is discussed in some detail in the first publication.

### (ii) The Role of Patents in ICT Companies' Business Operations

As mentioned earlier, this dissertation examines ICT companies' patent strategies, which should, as a general starting point, align with their business models. According to Grant (2005) and Porter (1985), a firm may derive competitive advantage from cost leadership or differentiation based on technological innovations, and/or business innovations such as new business concepts and models, which in fact have been thought of as the key source of success in the new economy[25]. The means of sustaining competitive advantage and protecting the business from imitation include first-mover advantage, deterrence, *i.e.* signalling aggressive intentions toward imitators, pre-emption, *i.e.* exploiting all available investment opportunities, and the acquisition of resources and capabilities, *i.e.* buying or amassing immobile and difficult-to-replicate resources and capabilities, which are needed in order to build up competitive advantage.[26]

Patents that provide their holders with the right to prevent others from utilizing their inventions (commercially) for a certain period of time may prove essential in building and maintaining competitive advantage, particularly when the company is technology-based and aims for technological leadership. Given the possibility of patenting business-method inventions in the U.S., however, competitive advantage gained through differentiation derived from novel ways of doing business on the Internet, for example, may also benefit from patent protection. Indeed,

---

[20] Ove Granstrand, *The Economics and Management of Intellectual Property. Towards Intellectual Capitalism*, at 202 (Edward Elgar 1999).

[21] Grant, 351 (2005).

[22] Steven Weber, *The Success of Open Source* (Harvard University Press 2004).

[23] Lawrence Rosen, *Open Source Licensing. Software Freedom and Intellectual Property Law* (Prentice Hall Ptr 2005).

[24] Mikko Välimäki, *The Rise of Open Source Licensing. A Challenge to the Use of Intellectual Property in the Software Industry* (Turre Publishing 2005).

[25] Gary Hamel, *Leading the Revolution* (Harvard Business School Press 2000); Grant, at 229 (2005).

[26] Grant, at 223- 236 (2005). *See also* Michael E. Porter, *Competitive Advantage. Creating and Sustaining Superior Performance*, at 12-14 (Free Press 1998).

the business literature suggests that patents could be utilized for the deterrence and pre-emption purposes described earlier as they have the capacity of limiting competitors' technological opportunities, even though the company may not have employed its patented inventions itself, provided that it signals its intentions to enforce its rights (so-called blocking patents).[27] They could also help the company in acquiring relevant resources and capabilities, and in gaining first-mover advantage by giving it a head start over its competitors, provided of course that the technology they cover is feasible and successful. The role of patent rights in the acquisition of relevant resources and capabilities could also be substantial, depending on the business model and area in question: patents make it more difficult for others to replicate a company's technology-based resources and capabilities, and thus it might be able to extract more revenue from its products and services than it would with no protection. At the same time, they define the undertaking's bargaining power in relation to others operating in the industry, a function that is essential in a networked economy in which the ownership of relevant IPRs is often divided between different companies and access to the technology of others is therefore needed[28]. Patents may further help the company to avoid litigation and provide it with the freedom to operate, and could attract new resources and capabilities to the firm through joint R&D projects, strategic alliances, mergers and acquisitions. They provide companies with the tools to exploit their innovations through joint ventures and licensing too, and thus create a revenue stream. Finally, they could also influence the undertaking's competitive advantage indirectly in terms of enhancing its reputation as an innovative company, and thus help it to obtain financing.[29]

A company's patent activities, which incorporate patent acquisition, licensing, infringement surveillance and enforcement procedures, among other things, should support and be in line with its corporate strategy in terms of deciding which industries it should be engaged in, and with its business strategy in terms of deciding how to prosper within the industry and to establish competitive advantage over its rivals[30]. Therefore, the importance of patents with

---

[27] For instance, Xerox is a famous example of a company that protected its market position by building a portfolio of 2000 patents. Even though the company did not employ many of these patented inventions in its business, it was able to sue IBM for patent infringement when IBM introduced its first copier in 1970, and thus delay its market entry. (Grant, at 234 (2005); *See also* Pankaj Chemawat, *Xerox in 1973* (HBS Case Services, 1986, 259-271).

It was found in the study on patent value conducted for the European Commission that about one third of European patents with priority date 1993-1997 and granted at the EPO in eight countries, the UK, Germany, the Netherlands, Denmark, France, Spain, Italy and Hungary, are not used for any industrial or commercial purpose. Approximately half of the unused patents are so-called blocking patents, while the other half consists sleeping patents, *i.e.* patents that have been left unexploited. As to the comparison between small firms (less than 100 employees), medium-sized firms (100-250 employees) and large firms (more than 250 employees), small firms used 80% of their patents, while medium-sized companies used approximately 75% and large firms used less than 60% of their patents. The share of unused patents was particulalry high in semiconductors (43,3%) and telecommunications (42,6%). (CERM Foundation, at II, 35 (2006)).

[28] *See e.g.,* Rahnasto, at 83-84 (2003).

[29] *See e.g.,* Patrick H. Sullivan, *Value-Driven Intellectual Capital. How to convert intangible corporate assets into market value,* at 48 (John Wiley & Sons, Inc 2000); Granstrand, at 210-213 (1999).

According to the EC Patent Study, about 5% of European patents with priority date 1993-1997 and granted at the EPO in eight countries, the UK, Germany, the Netherlands, Denmark, France, Spain, Italy and Hungary, are used to form new companies. In the information technology sector the number was 4,26% and in telecommunications 4,18%. (CERM Foundation, at III, 9-14, 38 (2006)).

[30] Grant, at 22 (2005).

respect to the company's business model and the other appropriability mechanisms it has to hand determines how much money and resources it should invest in managing them.

Patent strategies, like corporate and business strategies, are company specific, and could also be roughly categorized as defensive and offensive. A defensive strategy is adopted in order to lower the probability of attack, and to divert any attacks to less threatening avenues or lessen their intensity: thus it makes the company's competitive advantage more sustainable[31]. Offensive strategies are based on the idea of nullifying the competitive advantage of the market leader while avoiding full-scale retaliation[32]. Defensive uses of patents include filing them so that others will not be able to obtain patents on the disclosed information, and acquiring rights covering technologies that compete with the company's primary products, thereby preventing others from entering the field[33]. These uses, together with the primary motivation to protect one's products and processes from imitation, have been broadly favoured in many companies. As the importance of intellectual property rights has increased fundamentally due to the transition from an industrial to an information economy, and as patent holders' rights have simultaneously become stronger - as will be discussed later on, companies have become more interested in the idea of deriving more revenues out of their patent portfolios and using patents more strategically as business tools rather than purely as legal instruments. In fact, some companies have based their entire business models on patent licensing. As a consequence, a lot of business literature reports success stories and offers guidance to companies in exploiting their underutilized intellectual assets. Perhaps the most trend-setting contributions are those of Rivette and Kline (2000)[34] and David and Harrison (2001)[35].

Most writing on the strategic use of patents describe the U.S. patent system and the patent strategies employed by American firms. As far as European companies are concerned, the literature is considerably limited, although the studies conducted by Mansala (1994)[36], Granstrand (1999), Blind et al. (2002)[37], DLA (2004)[38], Birk/ECON Analysis (2006)[39] and CERM Foundation (2006)[40] should be mentioned.

---

[31] Porter, at 482 (1985).

[32] Porter, at 513 (1985).

[33] H. Jackson Knight, *Intellectual Property "101". What Executives and Inventors Need to Know About Patent Rights and Strategy*, at 19-20 (in Bruce Berman (Ed) *From Ideas to Assets. Investing Wisely in Intellectual Property* (John Wiley & Sons, Inc, 2002, 3-25))

[34] Kevin G. Rivette & David Kline, *Rembrandts in the Attic. Unlocking the Hidden Value of Patents* (Harvard Business School Press 2000).

[35] Julie L. Davis & Suzanne S. Harrison, *Edison in the Boardroom, How Leading Companies Realize Value from Their Intellectual Assets* (John Wiley & Sons Inc 2001).

[36] Marja-Leena Mansala, *Teollisoikeudet osana yrityksen strategiaa yhdentyvillä markkinoilla* (Helsingin yliopiston Kansainvälisen talousoikeuden instituutin julkaisuja 15, Hakapaino Oy 1994).

[37] Knut Blind, Rainer Bierhals, Nikolaus Thumm, Kamal Hossain, John Sillwood, Eric Iverser, Rik von Reikum & Bruno Roxius, *Study on the Interaction between Standardization and Intellectual Property Rights* (EC Contract No G6MA-CT-2000-02001, 2002).

[38] DLA, *European Intellectual Property Survey* (2004) <http://www.dlanordic.com/files/DLA%20-%20European%20Wide%20IP%20survey.pdf> (last visited 9/5/6).

[39] Flemming Birk (ECON Analysis), *The Use of Intellectual Property Rights among Nordic Service Companies* <www.nordicinnovation.net/_img/05010_ipr_in_nordic_service_companies_final_report_english.pdf> (last visited

Given the role of patents in the ICT sector in particular, the field could be described as rather technology-intensive. In 2002, ICT manufacturing industries accounted for more than a quarter of total business enterprise sector R&D expenditure in most OECD countries, and in Finland, for instance, this figure amounted to 53%[41]. Thus, even though it appears that, in line with the general shift to a service-based information economy, industry is moving little by little toward more service-oriented business models that build upon the existing infrastructure[42], patents still seem to have a significant role to play in creating and sustaining competitive advantage. In fact, the number of ICT-related patent applications and granted patents has increased significantly compared to the overall increase in patenting[43], which also speaks for such an assumption.

However, certain technological features such as fast development, cumulative innovation and complexity appear to indicate that patents are an excessively expensive, slow, cumbersome and inefficient instrument with which to protect inventions in the ICT sector in practice, and thus to encourage innovativeness in the industry. Such a conclusion is supported in the studies conducted by Cohen, Nelson and Walsh (2000)[44], Hall and Ham Ziedonis (2001)[45], Bessen (2003)[46], Kortum and Lerner (1999)[47] and FTC (2003)[48], among others. Reporting the situation in the U.S., they show that it is mainly competition that spurs the development and introduction of new commodities in the industry. On the other hand, even though patents are not necessarily considered very effective in protecting the company's products and processes from imitation, they are commonly applied for defensive purposes, such as in order to be able to negotiate licenses and cross-licenses with other companies in a situation in which the costs and risks of infringement have spiralled due to changes in the legal environment: this also partially explains the surge in patenting. One industry executive estimated in 1998, for instance, that a new semiconductor manufacturer would need to spend $100 – $200 million of revenues to license what are now considered basic manufacturing principles but which do not transfer any currently

---

9/5/6). This research report was published after the first publication included in this dissertation was published and it has therefore not been taken into account in that study.

[40] This research report was published after the first publication included in this dissertation was published and it has therefore not been taken into account in that study.

[41] OECD, *Science, Technology and Industry Scoreboard –Towards a Knowledge-based Economy* (2005), <http://oberon.sourceoecd.org/vl=12667702/cl=14/nw=1/rpsv/scoreboard/> (last visited 9/5/06); OECD, *Key ICT Indicators* <http://www.oecd.org/dataoecd/20/7/34083298.xls> (last visited 9/5/06).

[42] OECD (2005). According to Chesbrough and Spohrer (2006) for instance GE and IBM, leaders in the manufacturing sector, find that services are the fastest growing parts of their business. In fact, IBM currently receives the majority of its revenues from its Global Services Business unit, which did not exist prior to 1990s. (Henry Chesbrough & Jim Spohrer, A Research Manifesto for Services Science (Communications of the ACM, Vol 49, Number 7, July 2006, 35-40). See also Jerry Sheenan, *Understanding Service Sector Innovation* (Communications of the ACM, Vol 49, Number 7, July 2006, 43-47).

[43] OECD (2005).

[44] *See also* Levin, Klevorick, Nelson & Winter (1987).

[45] Bronwyn H. Hall & Rosemarie Ham Ziedonis, *The Patent Paradox Revisited: An Empirical Study of Patenting in the US Semiconductor Industry, 1979-95* (Rand Journal of Economics, Vol 32 Number 1, 2001, 101-128).

[46] James Bessen, *Patent Thickets: Strategic Patenting of Complex Technologies* (Research on Innovation, Working Paper 2003).

[47] Samuel Kortum & Josh Lerner, *What is behind the recent surge in patenting?* (Research Policy 28, 1999, 1-22).

[48] Federal Trade Commission (FTC), *To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy* (2003), <http://www.ftc.gov/os/2003/10/innovationrpt.pdf> (last visited 9/6/06).

useful technologies.[49] Similar considerations appear to hold particularly in the telecommunications and electronics industries, as reported by Cunningham (2005)[50] and Watts and Baigent (2002):[51] they, as well as Lemley (2002)[52], Mueller (2001)[53], Blind et al. (2002) and Rahnasto (2003), among others, examined the problems patents may pose with respect to standardization. In fact, the management of companies' patent portfolios, consisting of rights that are essential for using the elected standard and rights that are related but non-essential, and ensuring that third-party use of the rights can be effectively controlled and policed in a manner that benefits the technology and the business, is potentially challenging[54]. Then again, the studies of Blind et al. (2001)[55] seem to indicate that the European software industry is not particularly burdened with patents. This dissertation provides further information about the exploitation of patents by Finnish ICT companies is provided, and also reports on interviews with U.S. companies.

As indicated above, the patent system is not stable. It is slowly adapting to the changes that are taking place in the environment in which patents are employed, and light is shed on these changes in the dissertation at hand. From the business perspective these legal developments and pressures thereof fall within the external environment of the company, and understanding them is, as Grant (2005) puts it, a critical ingredient of successful corporate and business strategic management. More specifically, the key issue from the company's perspective is to understand how the more general environmental factors such as economic trends, changes in the demographic structure, and social and political trends affect its industrial environment, which consists of its relationships with three sets of players – customers, suppliers and competitors.[56]

### (iii) Innovations and the Patent System

The modern patent system dates back centuries: the first patent law was enacted in Venice in 1474, and in 1623 the English Parliament passed the Statute of Monopolies that specified appropriate circumstances in which patents could be issued in order to reward inventors. Since that time, during the Industrial Revolution of 1750 - 1850 and thereafter, the system has been implemented throughout the industrialized world. In fact, the Paris Convention of 1883 that obligating its members to grant patent rights for technical inventions has been joined by over 160 member states. Other international agreements include the Patent Cooperation Treaty

---

[49] Hall & Ham Ziedonis, at 109-110 (2001).

[50] Alan Cunningham, *Telecommunications, Intellectual Property, and Standards* (in Ian Walden & John Angel (ed.) *Telecommunications Law and Regulation* (Oxford University Press, 2005, 341-375))

[51] Dr J.J.S. Watts & Dr D R Baigent, *Intellectual Property, Standards and Competition Law: Navigating a Minefield* (IEEE, 2002, 837-842).

[52] Mark A. Lemley, *Intellectual Property Rights and Standard Setting Organizations* (UC Berkeley Public Law and Legal Theory Research Paper Series, Research Paper No. 84, 2002).

[53] Janice M. Mueller, *Patenting Industry Standards* (John Marshall Law Review, Issue 34, Number 897, 2001).

[54] Watts & Baigent, at 837 (2002).

[55] Knut Blind, Jakob Edler, Ralph Nack & Joseph Straus, *Mikro- und makroökonomische Implikationen der Patentierbarkeit von Softwareinnovationen: Geistige Eigentumsrechte in derIinformatinstechnologie im Spannungsfeld von Wettbewerb und Innovation,* at XXII (Forschungsprojekt im Auftrag des Bundesministeriums für Wirtschaft und Technologie, Forcshungsauftrag 36/00, 2001), <http://www.computerundrecht.de/docs/computerprogrammen.pdf> (last visited 9/6/06).

[56] Grant, at 68-69 (2005).

(PCT), the European Patent Convention (EPC), the Trade Related Aspects of Intellectual Property Rights (TRIPS) agreement and the Patent Law Treaty (PLT). The European Community (EC) has also issued regulations aimed at harmonizing the patent laws of its member states.[57]

As stated above, the patent system was created for the purpose of encouraging innovation by means of rewarding inventors and giving them a limited right to exclude others from using the invention, thereby increasing their expected returns on investment. Thus they stimulate investment in R&D, enhance technology transfer and the commercialization of new commodities, and thus also increase production and marketing investments. Furthermore, they stimulate the disclosure of information, and by simultaneously directing technological innovation to unexplored fields thus diminish duplicative research.[58] Other ways in which governments direct research and encourage innovation include grants that are given ex ante and prizes that are given ex post. Indeed, governments and wealthy individuals have an important role in this respect. While under the patent system returns on investment are dependent on market conditions and consumer sovereignty, these other types of incentive systems might be better fitted to the funding of basic science and curiosity-driven research.[59]

The question that has been puzzling people for centuries is whether the patent system is, in fact, appropriate for the protection of certain kinds of inventions, and how the rules should be formulated so as best to encourage innovation. Indeed, although a patent system that dates back centuries could be regarded as an essential part of the innovation system, and even if it has been adopted throughout the world, it has never been without fault. Controversies have arisen in a cyclical manner following changes in patent policy, and the system has been criticized for its complicated application processes, its high transaction costs, the quality of the patent-review process, and ruinous enforcement costs. Furthermore, patent litigation has been said to cause uncertainty and to slow down industrial growth in areas such as telephone services, the film industry, the automobile industry, radio, television, and the aircraft industry.[60] Furthermore, whenever a totally new technology area has emerged, there has been discussion on its nature as a patentable subject matter. It is revealing to realize that, with the exception of industry-specific viewpoints, the arguments presented today are surprisingly similar to those put forward in the 19th century. Indeed, the U.S. patent system has faced particularly severe criticism stemming from the strengthening of protection by increasing patent holders' options in enforcing their rights, and by the granting of software and business-method patents.

The criticism concerning the proper functioning of the patent system is multi-level. Many economists, including Scotchmer (1991)[61], O'Donoghue, Shotchmer and Thisse (1998)[62], Gallini

---

[57] Suzanne Scotchmer, *Innovation and Incentives*, at 8-9 (The MIT Press 2004); Rainer Oesch & Heli Pihlajamaa, *Patenttioikeus*, at 27-38 (Talentum 2003); Haarman, at 5-9 (2006).

[58] *See e.g.,* Robert W. Hahn, *The Economics of Patent Protection. Policy Implications from the Literature*, at 5 (2003), Granstrand, at 83 (1999).

[59] Scotchmer, at 2 (2004).

[60] Scotchmer, at 14 (2004); Adam B. Jaffe & Josh Lerner*, Innovation and Its Discontents. How Our Broken Patent System is Endangering Innovation and Progress, and What to Do about It*, at 78-95 (Princeton University Press 2004).

[61] Suzanne Scotchmer, *Standing on the Shoulders of Giants: Cumulative Research and the Patent Law* (The Journal of Economic Perspectives, Vol 5, Issue 1, Winter 1991, 29-41).

and Scotchmer (2001)[63] and Horwitz And Lai (1996),[64] have focused in their studies on the basic economic aspects and have attempted to find out what would be the optimal patent term, breadth and patentability standards. Some researchers, such as Gallini (2002)[65], Hall and Ham Ziedonis (2001), Bessen and Hunt (2003)[66] and Lerner (2002),[67] have assessed whether the strengthening of patent protection has, in fact, led to more R&D investments and thus to more innovations, and have aired their scepticism with regard to such a positive relationship in an area in which innovation is sequential and cumulative. Moreover, Gallini (2002), Arora and Merges (2000),[68] and Arora and Fosfuri (2000)[69] investigated whether patents facilitated technology transfer, and Aoki and Spiegel (1998)[70] looked at whether they stimulated disclosure. Generally speaking, it is not possible to draw definitive conclusions from the literature concerning the extent to which patents promote or do not promote innovation[71].

Complementing the studies representing the research traditions of law and economics that are widely followed in the U.S., several scholars, including Merges (1999)[72] and Jaffe and Lerner (2004), have pointed out the practical flaws the patent system is facing. The recognized problem is that a large number of software and business-method patents are being granted that do not fulfill novelty or non-obviousness requirements. Indeed, the Federal Trade Commission (FTC, 2003) and the National Academy of Sciences (NAS, 2004),[73] for instance, have suggested multiple amendments to the U.S. patent system.

This research tradition has not taken as tight a hold in Europe as it has in the U.S., and it is perhaps for this reason that argumentation in Europe appears to be largely founded on studies conducted in the U.S. It was argued in the context of the directive proposal on computer-

---

[62] Ted O'Donoghue, Suzanne Scotchmer & Jacques-Francois Thisse, *Patent Breath, Patent Life, and the Pace of Technological Development* (Journal of Economics & Management Strategy, Vol 7, Number 1, Spring 1998, 1-32).

[63] Nancy Gallini & Suzanne Scotchmer, *Intellectual Property: When Is It the Best Incentive System?* (UC Berkeley Working Papers, No E01-303, August 2001).

[64] Andrew W. Horwitz & Edwin L. Lai, *Patent Length and the Rate of Innovation* (International Economic Review, Issue 37, Number 4, 1996, 785-801).

[65] Nancy T. Gallini, *The Economics of Patents: Lessons from Recent U.S. Patent Reform* (Journal of Economic Perspectives, Vol 16, Number 2, Spring 2002, 131-154).

[66] James Bessen & Robert E. Hunt, *An Empirical Look at Software Patents*, at 15 (Federal Reserve Bank of Philadelphia Working Papers, Working Paper Number 03-17/R, March 2004), <http://www.researchoninnovation.org/swpat.pdf> (last visited 9/11/06).

[67] Josh Lerner, *Patent Protection and Innovation Over 150 Years* (NBER Working Paper No. 8977, 2002).

[68] Ashish Arora & Robert Merges, *Property Rights, Firm Boundaries and R&D Inputs* (Carnegie Mellon Working Paper 2000).

[69] Ashish Arora & Andrea Fosfuri, *The Market for Technology in the Chemical Industry: Causes and Consequences* (Revue d'Economie Industrielle, Number 92, 2000, 317-334).

[70] Rieko Aoki & Yossi Spiegel, *Public Disclosure of Patent Applications, R&D, and Welfare* (Berglas School of Economics Working Paper, 1998, 30-98).

[71] Hahn, at 3 (2003).

[72] Robert Merges, *As Many as Six impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform* (Berkeley Technology Law Journal, Electronic Commerce Symposium, Vol 14, 1999, 577-615).

[73] National Academy of Sciences (NAS), *A Patent System for the 21st Century* (April 2004), <http://www.nap.edu/books/0309089107/html/> (last visited 9/11/06).

implemented inventions, for instance, that "software patents damage innovation by raising costs and uncertainties in assembling the many components needed for complex computer programs", and a methodologically debatable study conducted by Bessen and Hunt (2003) that found a negative correlation between R&D spending and software patenting in the U.S. was cited in support[74]. In fact, the discussion on the software patent directive proposal that was eventually rejected by the European Parliament revealed many controversies in relation to patent protection, one of them being compatibility and the need to guarantee access to interfaces.

Thus, the ability of the patent system to fulfill its goal has been questioned, as is illustrated further in the first publication. Nevertheless, common faith in the system appears to be rather strong, and there has been intense lobbying for its implementation in developing countries. Meanwhile, in developed countries universities founded for the purpose of promoting scientific research have become increasingly interested in engaging in patenting and licensing activities. While in the U.S. the Bayh-Dole Act of 1980 made it possible for universities and other non-profit organizations to retain title to patents resulting from federally funded R&D without the need for an explicit waiver from the government agency funding the project[75], researchers in many European countries have, as a default rule, been free to decide what to do with their research results and have owned the rights to their inventions: the universities have only had a minimal role in managing these rights. However, it is the prevailing trend to transfer the ownership of university-born inventions to the universities, which then assign or license these rights to companies, and the rules governing the matter are currently in the process of being amended in many European countries.[76] There is more information about the university-industry relationship in the U.S. in a book written by Mowery, Nelson, Sampat and Ziedonis entitled "Ivory Tower and Industrial Innovation. University-Industry technology Transfer Before and After the Bayh-Dole Act" (Stanford Business Books 2004). The focus here is mainly on the utilization of patents by companies rather than by research institutes, universities and individual inventors.

## B. OUTLINE OF THE STUDY

As illustrated in the background section, there is an ongoing need to balance the patent system in a way that best encourages the introduction of new products, processes and services to the benefit of consumers. At the same time, companies' are facing the challenge of managing their patent activities so that they will be able to maintain enough, but not too much, control in order to maximize the value of their innovations. Similarly, universities are balancing their tasks of promoting scientific research, the methods and results of which should be published and submitted to review and criticism, and acquiring patent protection for the purpose of transferring technologies from universities to industry in order to amplify their commercial application.

---

[74] Hahn, at 1 (2003); An open letter to the European Parliament Concerning the Proposed Directive on the Patentability of computer-implemented Inventions (2003), <http://www.dauphine.fr/imri/Foray/Economists/An%20Open%20Letter%20to%20the%20Europ.pdf> (last visited 9/11/06).

[75] Hahn, at 23 (2003).

[76] *See e.g.,* Ben Rapinoja & Aura Soininen, *University-Industry Collaboration and Technology Transfer* (European Biopharmaceutical Review, Autumn 2005, 20-24).

The focus in this dissertation is on the developments and controversies faced on the patent system level mostly with respect to software and business-method patents and on the ways in which companies use patents in the ICT sector. Consideration is also given to the utilization of patent rights in the context of cooperative standard setting managed by standards organizations or consortia, and to whether so-called submarine patents, *i.e.* patents that have not been detected during the standardization process for one reason or another, in fact create problems. The factors that contribute to the potential dilemmas are also considered, and an attempt is made to determine how it would be possible to diminish the risk of submarine patents and to alleviate the controversies so that societal losses could be avoided.

The dissertation consists of three parts: the overview, the general part comprising the first publication entitled "The Software and Business-method Patent Ecosystem: Academic, Political, Legal and Business Developments in the U.S. and Europe", and the specific part that comprises two further articles. The first of these is entitled "Patents and Standards in the ICT Sector: Are Submarine Patents a Substantive Problem or a Red Herring?" and the second "Is Our Legal Framework Sufficient for Solving the Problems with Submarine Patents and (Open) Standards in the ICT Sector?". The first-mentioned publication has been peer-reviewed, the second is an invited publication founded on a peer-reviewed conference paper entitled "Open Standards and the Problem with Submarine Patents" (SIIT 2005, Geneve 21-23 September 2005), and the third has been submitted for review to IPR University Center Publications, IPR Series B.

The overview of the dissertation is divided into three chapters. Chapter I, "Introduction", provides the general background and points out the type of prior research that has been conducted in the area (Part A), introduces the motivations of the study and the research objectives (Part C), and ends with a methodological discussion (Part D) simultaneously identifying the research gaps. Chapter II summarizes the contents of the publications and describes their interfaces and roles in the dissertation. Chapter III comprises the discussion and conclusions, drawing together the results and highlighting their academic and practical implications.

## C. MOTIVATION OF THE STUDY AND THE RESEARCH OBJECTIVES

The leading objective in writing this dissertation was to enhance understanding of the evolution of and various controversies and pressures for change surrounding the U.S. and European patent systems and the ways in which patents are utilized in business, with a specific focus on the ICT sector and the problems that have arisen in the context of standard setting. The idea was to study the "law in practice" instead of focusing merely on the "law on the books", which is relatively typical particularly for many European legal scholars. In fact, this approach appears to be indispensable in the area of software patents since it has been possible to obtain patent protection for such inventions for decades on condition that the patent claims are drafted appropriately, while the language of the national patent laws of many European countries and the European Patent Convention still suggests that computer programs cannot be patented. This has therefore been a source of various misunderstandings[77]. Similarly, even though theoretical

[77] *See also* Julie E. Cohen & Mark A. Lemley, *Patent Scope and Innovation*, at 7 (California Law Review, Vol 89, 2001).

studies on the economics of the patent system indicate that it is not functioning properly, companies may have been able to overcome some of the problems in practice.

The execution of this study has been strongly influenced by the realization that the patent system is like an elephant examined by blind men, all forming their opinions of the target based on the body part they simply happened to touch (*see* the poem by Saxe on the right). Indeed, we all have our own understanding of the patent system, and it may occasionally be difficult to relate to the other person's perspective. For some it is a legal construction falling within the category of intellectual property rights, and constituting patentability requirements, patent holders' rights and exceptions thereto, remedies, and procedural factors having to do with patent prosecution and litigation - all of which are subject to various interpretations and legislative changes. Some consider patents to be business tools that provide the company with a right to exclude others from utilizing an invention. For them, the value of the right depends on the commercial significance of the technology it "reads on", and the leverage gained by patenting depends on the scope of the patent and its expected and actual strength. Furthermore, the extent to which it is possible to enforce the rights affects this strategic view. Then again, for some, patents constitute a nuisance that restricts their ability to invent and design new products. Moreover, patent propensity could be regarded as a sign of innovativeness, and the patent system as a tool for encouraging such innovative activities.

Indeed, given the multiplicity referred to above, this dissertation aims to bring various perspectives together and to provide a more holistic view of the patent system and how it functions in practice, and at the same time to call attention to research gaps and some general misunderstandings. This is not to say that it provides an unambiguous representation of the entire elephant, in this case the patent system, but it is one step forward.

The secondary objective in writing this dissertation was to provide new information about the ways in which Finnish ICT companies in particular exploit patents in their businesses, as this information has not been readily available. New perceptions such as the "no patents strategy" are also introduced, thereby contributing to the field of strategic management. A further aim was to examine whether the conflicts with standards and

John Godfrey Saxe's (1816-1887)
version of the famous Indian legend,

It was six men of Indostan,
To learning much inclined,
Who went to see the Elephant
(Though all of them were blind),
That each by observation
Might satisfy his mind.

The First approach'd the Elephant,
And happening to fall
Against his broad and sturdy side,
At once began to bawl:
"God bless me! but the Elephant
Is very like a wall!"

The Second, feeling of the tusk,
Cried, -"Ho! what have we here
So very round and smooth and sharp?
To me 'tis mighty clear,
This wonder of an Elephant
Is very like a spear!"

The Third approach'd the animal,
And happening to take
The squirming trunk within his hands,
Thus boldly up and spake:
"I see," -quoth he- "the Elephant
Is very like a snake!"

The Fourth reached out an eager hand,
And felt about the knee:
"What most this wondrous beast is like
Is mighty plain," -quoth he,-
""Tis clear enough the Elephant
Is very like a tree!"

The Fifth, who chanced to touch the
ear,
Said- "E'en the blindest man
Can tell what this resembles most;
Deny the fact who can,
This marvel of an Elephant
Is very like a fan!"

The Sixth no sooner had begun
About the beast to grope,
Then, seizing on the swinging tail
That fell within his scope,
"I see," -quoth he,- "the Elephant
Is very like a rope!"

And so these men of Indostan
Disputed loud and long,
Each in his own opinion
Exceeding stiff and strong,
Though each was partly in the right,
And all were in the wrong!

MORAL,
So, oft in theologic wars
The disputants, I ween,
Rail on in utter ignorance
Of what each other mean;
*And prate about an Elephant*
*Not one of them has seen!*

submarine patents that are indicative of some of the problems the patent system is facing today truly exist, and to consider the factors that contribute to the problems and whether these predicaments could and should be reduced by certain practical or legal means.

## D. RESEARCH STRATEGY AND METHODOLOGY

As indicated earlier, this study was written with the purpose of combining various aspects of the evolution and functioning of the patent system and the utilization of patents in business. Furthermore, it includes a specific part addressing standardization in the ICT sector and patent-related difficulties in this context. Indeed, the dissertation is interdisciplinary, founded on prior legal, economic, managerial and technological writings and on empirical research data collected by interviewing representatives of ICT companies based in Finland and in the U.S. It was written under the assumption that its readers may come from different backgrounds, and that their ability to understand one another is absolutely critical if interdisciplinary research in this area is to be conducted successfully.

However, even though the dissertation leans on other scientific fields, mainly in the contexts of strategic management and innovation, and presents findings associated with them, the thesis is strongly anchored in the legal research tradition. It is therefore necessary to explicate how it is positioned within this methodological framework before moving on to describing the empirical studies.

### (i) The Legal Research Tradition and Methodology

One of the features separating science from the arts, fiction and mere beliefs is that the research results are obtained by following a scientific research method. Indeed, it is important that the outcome of the study is achieved through the systematic collection and analysis of data, and that it is possible to verify the results by replication if the need arises[78]. In many branches of science, the analysis proceeds in accordance with the following pattern: the researcher proposes specific hypotheses as explanations of natural phenomena, and designs experimental studies that test these predictions. These steps are then repeated so that increasingly dependable predictions can be made. Theories serve to bind specific hypotheses together into logically coherent wholes, and this helps in the formation of new hypotheses, as well as in the placing of groups of specific hypotheses into a broader context of understanding.[79]

The above procedure is not typically followed in mainstream legal research, known as legal dogmatics, in which the focus of attention is on the systematization and interpretation of the statutes. In studies based on such methodology, the politically created legal system is approached from the inside and the statutes, preparatory work, case law, legal principles and other allowed interpretative materials are organized into a coherent whole weighting and balancing the different aspects. Basically, research rooted in legal dogmatics produces a variety of notions of

[78] Juha Häyhä, *Minun Metodini*, at 22 (WSLT 1997)

[79] *See e.g.,* Aulis Aarnio, *Oikeussäännösten systematisointi ja tulkinta*, at 35 (in Juha Häyhä (ed.), *Minun Metodini*, WSLT, 1997, 35-56); Wikipedia, *Scientific Method,* <http://en.wikipedia.org/wiki/Scientific_method> (last visited 9/14/06).

law rather than definite results. It is legal argumentation founded on the accepted sources of law and their interpretations.[80]

Legal dogmatics lays the foundation for every lawyer's understanding of the legal system and it gives us the ability to practice law[81]. It is therefore clearly visible in this dissertation, particularly strongly in the third publication and in some sections of the first one, which segments also lean on comparative legal studies. It is nevertheless worth noting that the intended audience comprises not only Finnish readers, and therefore the focus with respect to the legislation in Europe is on the international agreements harmonizing the area such as the European Patent Convention and the European Community level regulation. Finnish legislation and case law is only referred to as an example of national legislation. Due to this broader perspective, it is also clear that this dissertation is only able to scratch the surface when it comes to the juridical analysis. Therefore, it must be kept in mind that there are also other interpretation options which may be warranted, and that in the end the specific features of the case determine the possibility of invoking certain legal means.

Legal dogmatics is not the only method applicable to the study of law. In fact, the method of forming hypotheses and testing them may well also be applied in research based on law and economics, for instance. This research branch utilizes the methodology followed in economics, mainly constituting quantitative research methods, and the results of law and economics studies may be a factor in the legislative process or they may be used as arguments guiding the interpretation of the laws.[82] Nevertheless, even though research papers examining patent economics and addressing whether the patent system fulfils its purpose of promoting innovation are referred to in this study, the methodology is not directly utilized.

A further line of study, sociological jurisprudence, borrows from methods applied in other fields, in this case sociology, and it characteristically involves examination of the legal system from the outside[83]. The law is seen as coupled with society, and it is thought to evolve in a societal context and at the same time to influence societal development. The aim is to describe and explain the practices followed in society by employing mainly qualitative research methods, and to make predictions on this basis by producing information about the effects of the laws on the work of legislators and practitioners.[84] This corresponds with the view of the legal system embraced in this dissertation, and it could be said that the research interest is sociological. The aim is to describe the ways in which patents are employed in the ICT sector in general, and in the context of standardization in particular, and to weave this information into the legal framework. However, the findings of this dissertation are not intended to be confined only to jurisprudence, and for this reason the study cannot be categorized merely as a piece of research following the methodology of sociological jurisprudence.

---

[80] *See e.g.,* Aarnio, at 35-37; Raimo Siltala, *Oikeustieteen tieteenteoria*, at 108-109, 783-795 (Suomalaisen lakimiesyhdistyksen julkaisuja A-Sarja N:o 234, 2002).

[81] Siltala, at 67-68 (2002).

[82] Kalle Määttä, *Oikeustaloustieteen aakkoset* (Helsingin yliopiston oikeustieteellisen tiedekunnan julkaisut 1999).

[83] Määttä, at 10 (1999).

[84] Marjo Ylhäinen, *Oikeussosiologia lainopin tutkimuksessa*, at 42-45 (OPTL:n tutkimustiedonantoja 64, Empiirinen tutkimus oikeustieteessä seminaari, 2004).

### (ii) Empirical Research Data

As mentioned earlier, the legal system is viewed in this dissertation as part of the societal structure. In order to find out how these legal rights to exclude, *i.e.* patents, are employed in business, empirical research data were collected in interviews with representatives of nineteen ICT companies in Finland in 2003, and eight in the U.S. in 2004. It should be noted, however, that this qualitative research material is used mainly as complementary background material. This is not the type of qualitative research in which the collection of the data and the analysis thereof plays a major role. In fact, as indicated below, the interviews were originally conducted for use in other studies, but since the data were directly applicable for the purposes of this dissertation they were used here as well. As to the reliability of the empirical research results, it should be realized that the topic is rather sensitive and therefore a lot of relevant information may have been left unsaid. Furthermore, the views of the interviewees are always reflected in the interview results, and therefore it is possible that a different set of answers could have been obtained by interviewing another representative of the same company. These empirical studies are described further below. The interview questions are attached as Appendices 1 and 2.

*Interviews with Representatives of U.S. ICT Companies*

The interviews with representatives of the eight U.S. ICT companies were conducted with a view to examining patent strategies and technology-licensing practices, in addition to which certain appropriability issues were addressed. The aim was to determine what characteristics changed with regard to these appropriability and patent strategies and the companies' technology-licensing practices when they were placed between the closed and the open innovation models described by Chesbrough (2003) (see Table 1).

The companies concerned were situated in the San Francisco Bay Area, CA, U.S., and they were selected on the basis of prior knowledge of their main characteristics. Existing contacts were used and secondary data from the websites and annual reports was collected and evaluated in order to find different types of companies. Of the nine that were contacted, only one refused to participate in the research: it considered the subject matter too sensitive to be discussed.

The companies were of varying sizes (the average number of personnel fluctuated from a little over 200 to over 36,000 and their revenues varied from a little over $60 Million to well over $18 billion), and the size of their patent portfolios varied between zero and 2,000. They further differed in their operational models. In particular, two of them stood out in that one had no internal R&D activities but relied on external technologies, and the other founded its business primarily on technology and patent licensing. Furthermore, of the eight companies, seven operated globally, and one operated in the U.S. and Canada.

The interviews were carried out in October and November 2004 by personally interviewing company representatives[85] (General council, vice president of licensing, or vice president of intellectual property, and sometimes both). The interview questions were delivered to the companies in advance, and the interviewees were asked to fill out a short questionnaire before the interview took place. In the questionnaire we asked them to evaluate their company's operational models and attitudes, including the principles of open innovation, as well as the

[85] Six of the interviews were conducted together with Pia Hurmelinna-Laukkanen, while I did the interviewing alone in two companies.

industry conditions (*e.g.,* the number of start-ups, venture-capital activity, labour mobility). We also looked at the volume of licensing, how much weight the firms placed on their own R&D, and how important control over resources was to them. With regard to patents, we asked about the role they played in their business, about their patenting practices, the exploitation of rights, and infringement surveillance. The interview also included questions about in-licensing and out-licensing practices, and a couple of questions related to standardization.

On the basis of the questionnaire responses and some secondary data we placed the companies along a continuum between closed and open innovation, and analyzed the features that changed when moving from the closed end towards the open end. However, while this exercise resulted in two conference papers[86], these publications are not included in this dissertation. The results of the interviews were used in publications 1 and 2 in order to illustrate the patent strategies and technology-licensing practices of the U.S. ICT companies. Since many generalizations have been made for the purposes of this dissertation, it should be kept in mind that there certainly are variations between the companies' licensing practices and patent strategies depending on whether the company's operation model is closer to the open end or the closed end of the spectrum.

*Interviews with Representatives of Finnish ICT Companies*

Interview data was collected from 19 Finnish ICT companies in two sets, one comprising eleven and the other eight interviews. The first set of interviews (eleven companies) was conducted by the author while working on a Digital Economy Core research project run by the Helsinki Institute for Information Technology (HIIT). The purpose was to find out what role patents had in the businesses of Finnish ICT companies, what kind of patenting practices they had, how they utilized their rights and monitored infringements, and how their patent activities were organized. The selection of the interviewees was driven by the objective of obtaining a representative sample of Finnish ICT companies, and existing contacts were utilized in setting up the interviews. The sizes of the companies' patent portfolios varied between zero[87] and well over 2,000 (eight of them had less than 30 patents/patent applications), their revenues spanned from less than €100,000 to well over €25 billion, and the number of employees varied from less than five to over 30,000. Of the fifteen companies contacted, two did not respond to the interview request and two declined on the basis that they did not consider themselves good candidates for the research.

The interviews with the representatives of the eleven Finnish companies were carried out face-to-face (*e.g.,* legal counsel, head of IP, vice president). Two of the companies were interviewed twice, first in order to gain preliminary information and the second time in order to discus certain aspects in more detail, while the other nine were interviewed only once. The interviews were so-called in-depth theme interviews, meaning that certain themes were discussed, but interviews were discussion-like events and therefore the exact form of the questions and the order in which they were presented varied[88].

---

[86] Pia Hurmelinna & Aura Soininen, *Appropriability and Licensing in Closed versus Open Innovation Models* (EURAM, Munich, 4-7 May 2005); Aura Soininen & Pia Hurmelinna, *Patent Strategies and Licensing Practices in Closed versus Open Innovation Models* (R&D Management, Pisa, 6-8 July 2005).

[87] This company was, at the time of the interview, making preparations to file a patent application.

[88] *See e.g.,* Jari Eskola & Juha Suoranta, *Johdatus laadulliseen tutkimukseen*, at 86-87 (Vastapaino 2000).

The results of the interviews with the eleven Finnish ICT company representatives were utilized in publications 1 and 2 of this dissertation. The results of the second set of interviews have only a marginal role as they involved eight ICT companies with no patents. This interview data was mainly used in the section that concerns the "no patents" strategy in publication 1, while the conclusions in other parts are mainly drawn from the first set.

This second set of interviews was conducted in the context of a student assignment in an IT Law course organized at Helsinki University of Technology in spring 2003. The interviews were carried out in groups consisting of four to five students, and the students were instructed to independently select ICT companies that had no patents. The questions/themes were given, and the students were encouraged to deepen the interview when appropriate. The purpose was to provide the students with a practical perspective on the subject matter studied, and also to explore whether the companies had implemented a "no patents" strategy in practice. The firms in question were mainly small information technology (IT) companies operating primarily in Finland.

# II. A SUMMARY OF THE PUBLICATIONS AND A REVIEW OF THE RESULTS

## A. COMPLEMENTARY STUDIES ON PATENTS IN THE ICT SECTOR

As explained above, this dissertation comprises two substantive parts, a general part that includes a rather broad research paper focusing on the software and business-method patent ecosystem, and a specific part addressing the problems with patents and standards in the ICT sector. The relationship between these two parts is largely self-explanatory. The first publication sets the framework by examining the developments that have taken place in academic studies, political discussions and with respect to the legislative amendments and interpretations of the statutes. Furthermore, changes in companies' patent strategies are studied. The second publication and the third research paper then draw from that with a focus on one of the areas that carries significant economic weight in the ICT industry: the setting of open, interoperability standards, which makes it possible to design products that are complementary and interoperable. On the other hand, the approach adopted in the specific part is broader than that taken in the first publication: while the focus in the latter is on software, which is an information good, the second and third publications make no general distinction between the various information and communications technologies.

Both of the papers included in Part III of this dissertation address the submarine-patent problem, *i.e.* the problem with patents that remain undisclosed during the standard-setting procedure either because the member participating in the standard setting did not disclose these rights or because the patent holder was a third party. The seriousness of the dilemma is assessed in the first publication, "Patents in the ICT Sector: Are Submarine Patents a Substantive Problem or a Red Herring?". Example cases are provided and the main causes of the quandary are identified by considering the technology-licensing practices and the utilization of patents in the industry, and the routines companies follow in order to monitor whether they are infringing the patents of others, and by analyzing the patent policies of standards organizations that oblige, or at least encourage, their members to disclose their essential rights and to make a statement on their willingness to waive or license these rights. The second publication analyzes the legal framework that is applicable to solving disagreements that reach court in the areas of antitrust/competition laws, unfair and deceptive business-practice regulation, patent laws, contract enforcement and fraud, and consideration is given to whether amendments need to be made in order to resolve matters so that societal losses resulting from the need to abandon a standard could be avoided and the efficiency of well-functioning markets for intellectual property rights could be promoted. The main objectives and contributions of the selected publications are presented in the following.

## B. THE SOFTWARE AND BUSINESS-METHOD PATENT ECOSYSTEM

### (i) The Overall Objectives of Publication 1

The first publication examines one of the most controversial areas of the patent system: software and business-method patents. It describes four interrelated and partially overlapping trends encompassing academic/public discussion, political views, the law and its interpretation, and the business climate.

The study is interdisciplinary and was written with a view to providing a more comprehensive picture of past, current and future developments in the area than single studies dealing with the topic from a legal, economic, managerial or technological perspective. The aim was to add to the basic understanding of various aspects related to software and business-method patents, and to point out some of the problems and common misunderstandings.

Previous studies are analysed and brought together in order to form a coherent whole and thus to create something new, and the study then leans on the empirical research data described in the methodology section of this dissertation. Perceptions based on this empirical data are presented, and a further objective of this paper was to provide information particularly on the patent strategies of Finnish ICT companies.

**(ii) The Main Contributions of Publication 1**

The first publication sheds light on various trends related to software and business-method patents, and it was found that they tend to fluctuate following the form of a sine-shaped wave. In fact, in the academic realm it could be said that mainstream research has flowed from heavy criticism to the endorsement of strong rights and back. Currently it is no longer assumed that strong patents, measured in terms of breadth, term and enforceability, will induce more innovations, particularly in areas characterized by sequential and cumulative innovation. Nevertheless, there seems to be no proof that, in the absence of practical concerns such as the limited resources of patent offices to conduct proper patentability analyses, the patent system does not function properly. In the meantime, in the political arena concerns about industrial stagnation and the lack of technological innovation led to the strengthening of rights in the early 1980s, and underlying faith in the patent system is still solid. In fact, there has been heavy lobbying for international harmonization and the implementation of patent regulation in developing countries, for instance. Yet, the erosion of some of that confidence can be detected. For instance, the directive proposal concerning the patentability of computer-implemented inventions was ultimately dropped in Europe, and various propositions to improve the U.S. patent system have been presented. It thus seems that concerns about the effectiveness of the system have been taken seriously.

Then again, a shift in the legal regime, which includes legislative changes and the interpretation of laws, from an anti-patent to a pro-patent era took place in the early 1980s. In association with this change, some new technological areas such as software and certain biotechnological inventions, and later also Internet business methods, were granted patent protection. In fact, one of the problem areas discussed in this publication concerns the defining of proper boundaries in terms of what constitutes patentable subject matter. The intricacy involved has also been a source of perplexity. There are currently some indications of the dwindling of the patent-holder-minded view, however, particularly in the U.S. Meanwhile, in Europe the importance of effective remedies has been highlighted in the TRIPS Agreement and the directive on the enforcement of intellectual property rights (2004/48/EC) among other things. Indeed, the pro-patent trend, which has never been as pronounced in Europe as in the U.S., is still waiting to turn. Since the development of competition and antitrust laws also affects the strength of patents, this is also considered in the publication. No indication was yet to be found of a more restrictive attitude to the way in which patent holders may utilize their rights, even though their misconduct with respect to standard setting has caught the eye of the competition authorities.

In terms of business developments, it is pointed out that the importance of patents is tied to the other means companies have at their disposal in order to create and maintain competitive advantage. Due to deterioration in some of these means resulting from the shift from an industrial to an information economy, patents and other intellectual property rights have played a more central role in business operations. Furthermore, the interplay between the availability and strength of different means of IP protection, such as copyrights and trade secrets, determines the significance of patents as a protection mechanism for software and business methods. This relationship is affected by technological changes and market developments, as well as by legal amendments. It is, for instance, more difficult for Internet vendors to keep their business models a secret than it is for conventional retailers, which partially explains the urge to patent Internet business models.

One of the prevailing trends in the ICT industry is service orientation, driven by the commoditization of certain technologies. Operators have been forced to redirect their businesses from an infrastructure level to a more service-based model, for instance, and it has been estimated that the next stage after the service and content-driven information economy will be its industrialization. This is likely to have an effect on the role of patents and the subsequent need for protection in the long term.

As far as recent developments in patent strategies are concerned, following a long period of patent amity there is evidence of a more strategic, active and aggressive use of patent rights, particularly in the U.S., and so-called patent-trolling companies have also emerged. These firms do not conduct any R&D or produce products. They rely on the enforcement of their patents in order to generate revenues. Then again, the role of patents is still tangential for many, although not all, ICT companies in Finland. Patents are applied for mainly in order to protect the company's key innovations from imitation, and they appear to be only seldom licensed or cross-licensed, even if they are not employed by the company in question. Similarly, companies' infringement surveillance is mainly concerned with their fiercest competitors and core technologies. The prevailing atmosphere is not litigation-oriented, and companies are not, generally speaking, concerned with infringing the rights of other firms. On the other hand, there are some areas in which the patent density is much higher, which naturally affects the strategies employed, and in other areas too, companies are becoming increasingly interested in acquiring more patents and managing their rights. It is in this environment that the employment of a "no patents" strategy could be considered. This refers to the systematic planning of the company's operations so that it does its best to avoid the infringement of third-party rights and to secure its position through alliances and contracts, just in case. It could also publish its inventions in order to prevent other companies from patenting them.

In sum, it is suggested in the first publication that a shift toward weaker patent protection is on its way, even though the revisions will in all probability be delicate. There is no indication that the entire patent system will be reformed. Then again, in the business domain the overall importance of patents as a means of protecting innovative new technologies is likely to decrease slightly in the long run following the commoditization and service orientation in certain segments of the ICT sector in particular, and the maturation of the industry. Simultaneously, the possibility of patenting business methods is about to become more interesting.

## C. THE PROBLEMS WITH SUBMARINE PATENTS AND STANDARDS IN THE ICT SECTOR

### (i) The Overall Objectives of Publication 2

The second publication falls into the contemporary research area of finding a proper balance between openness and control in terms of patent law and policy aimed at encouraging innovation, as well as in terms of companies' internal operations. The latter concerns the decision-making processes regarding, for example, whether to rely on proprietary, closed interfaces, open them up to all other suppliers, or promote well-specified open standards that are available for everyone to use. Whatever the decision, intellectual property rights such as patents define the control over technical specifications. They therefore also have the potential of endangering an open standardization process during which the standard setters are typically asked, in accordance with the standard organization's patent policy, to disclose their essential rights and to make statements about their willingness to license them. Negotiations over the exact commercial terms are then held between the parties. The way in which patents are utilized in this context depends on the dynamics of the industry, and on the interests and strategies employed by the parties concerned.

The second publication addresses the problems that have to do with patents and standards in the ICT sector. It focuses particularly on the issue of whether so-called submarine patents that have been reported to have caused dilemmas with respect to standardization are in fact a substantive problem or merely a red herring. Submarine patents are defined broadly as patents that remain unnoticed during the standardization process and emerge after the standard has been set, and in the worst case is broadly adopted. The more broadly the standard is in use, the greater the losses resulting from the need to abandon it.

In addition to rating the submarine-patent problem, examples of it are provided. Furthermore, certain aspects of patent legislation are elicited, industry trends concerning patent strategies and technology-licensing practices are analyzed and the patent policies of standard-setting organizations are examined in order to identify the main causes of the dilemma. Basically, problem-creating patents could be divided on the basis of ownership into those that originate from standard setters and those that belong to third parties.

Submarine patents are merely one of the complications that relate to intellectual property rights and standards. Thus, in order to find out, whether the solving of the submarine-patent problem would have any practical effect, and therefore whether it is a topic that needs further attention, the licensing perplexities that appear to be rather common are also briefly examined. In fact, there is a strong connection between the submarine patent and licensing perplexities as both of them have to do with the difficulty of estimating the costs and the risks associated with the use of a particular standard. While in the licensing context the patent holder has typically made some kind of a statement concerning the terms under which he is willing to license his essential rights, no such agreement exists in the context of submarine patents. Indeed, this is the core of the problem: submarine patents have both the potential of surprising an industry and the ability to cause friction in the market place due to the lack of established licensing fees and terms.

### (ii) The Main Contributions of Publication 2

The contribution of the second publication is three-fold. Firstly, the main causes of the submarine-patent problem are identified. Secondly, the problem is quantified, and thirdly, an assessment is made of whether the fixing of the problem would have any effect in practice. These key findings are presented one by one below.

As mentioned above, the main causes of the submarine-patent dilemma are identified in the second publication. These include certain characteristics of the patent system, which have made patent ownership desirable and have hence contributed to the increased number of applied for and granted patents. This, in turn, has increased the risk of being unaware of relevant rights, even though patents are public documents. The possibility of keeping a patent application secretly pending long enough for the industry to mature on the basis of the technology it claims also increases the risk of patents remaining unnoticed during the standardization process and thereafter, even until its adoption. Furthermore, the validity of a patent and its scope remains obscured until tested in court, resulting in uncertainty over the relevance of the rights, and hence it may be difficult to find out about relevant rights up front.

Given these inherent features of the patent system described above, the means of reconciling the urge to maintain control over the technology and to prevent all others from using it or to allow its use only by selected business partners, and the need to promote the selection of well-defined, open specifications that allow everyone to develop complementary products and services on top of the standardized functions, do not appear to be efficient enough. Thus, even though the benefits of interoperability standards may very well be lucrative enough and allow many companies to deviate from their overall patent and licensing strategies, some rights holders may not be willing to participate in standard setting at all because they consider the remuneration too low. These companies are not bound by the patent policies and it may be that their rights are not detected on time for that reason. Companies may also take up the opportunity, and hide the fact that they have relevant rights. Moreover, patent policies are not without loopholes. Thus, in the absence of coherent policies that guide the members of a standards organization in disclosing all their essential rights, and due to the practical dilemmas of identifying these rights, such non-disclosure could also happen by accident.

There are several characteristics of the ICT industry that, together with certain features of the patent system and standard-setting practices, add to the submarine-patent risk. These include fast technological development, technological complexity and cumulative innovation, which have contributed to the birth of patent thickets and indicate that in certain technological areas the avoidance of patent infringement is not necessarily possible, even if companies implementing the standards conduct proper patent due diligence. Moreover, the fact that patent trolling has become a more attractive business model, particularly in the U.S., has increased the conflict potential because companies' defensive patent strategies do not work well against them. Since standards carry a lot of economic significance in the industry, having a patent that reads on one may turn out to be a valuable source of licensing revenues, particularly if the company has not participated in setting it. Meanwhile, for companies dependent on other firms, the benefits of maintaining successful business relationships might out-weigh the benefits of asserting one's rights over others.

In terms of the extent of the problem, it is suggested in the second publication that difficulties with patents are more common than generally assumed, and the fact that litigation has resulted with respect to the patents of both standard setters and third parties indicates that the problem is indeed relevant. Furthermore, the general developments in the industry suggest that third-party patents in particular are likely to be the source of an increasing number of predicaments in the future. Thus, even though more detailed quantitative studies would be needed to illustrate the exact depth of the problems, it could already be concluded that there is a relevant problem at hand. It should be noted, however, that companies participating in standard setting have indicated their willingness to adhere to the standard-setting organization's patent policies, and consider any deviation unethical.

Even if it were possible to solve the submarine-patent problem so that relevant rights could be identified prior to the setting of a standard, it is established in the second publication that licensing dilemmas would persist. Nevertheless, diminishing the submarine-patent risk would make a difference: if these rights were identified ex ante, it would at least be possible to take their existence into account and to agree upon their licensing beforehand. The basic elements of publication 2 are illustrated further in Figure 1. The focal point of the third publication is on specific conflicts, and on the legal framework that is applicable in the solving of these disputes.

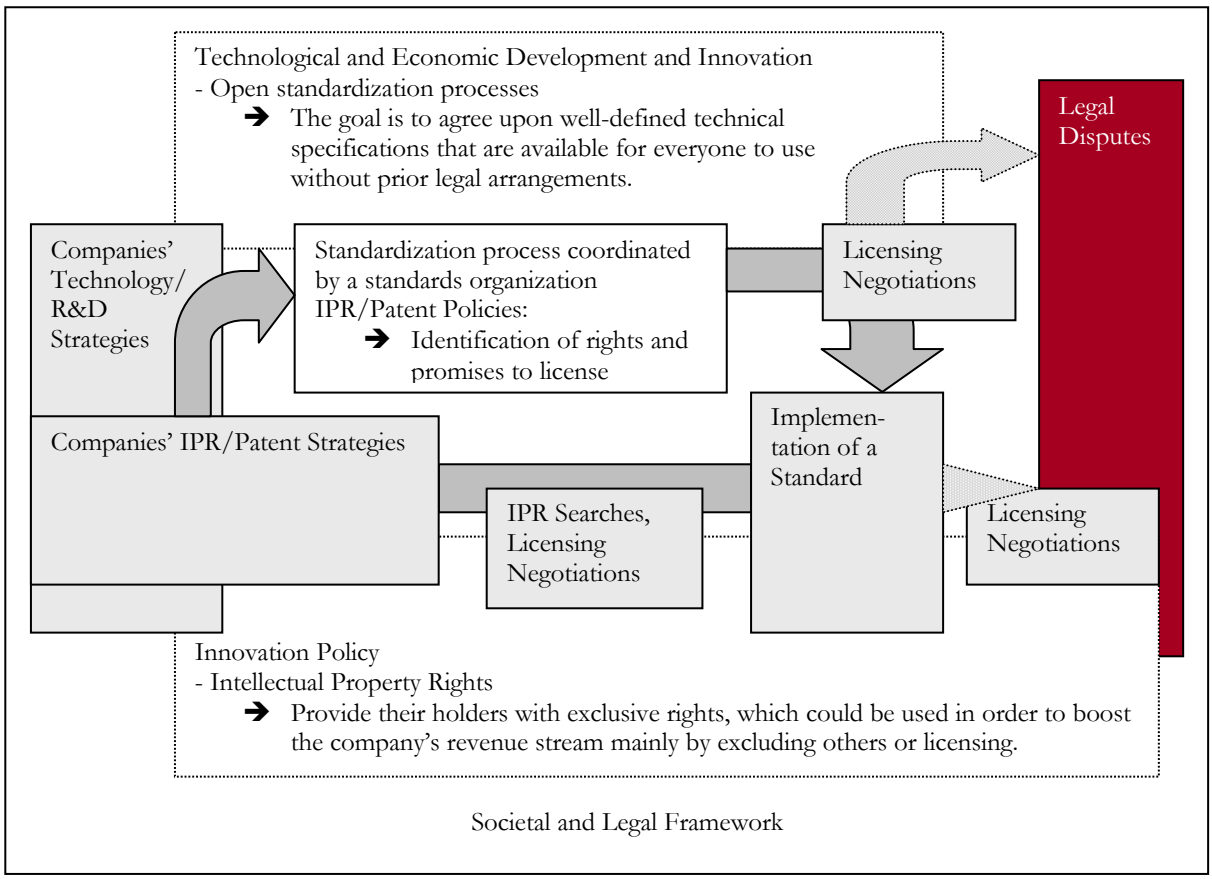



**FIGURE 1.** ELEMENTS OF THE STANDARDIZATION PROCESS AND THE ADOPTION OF STANDARDS

### (iii) The Overall Objectives of Publication 3

The third publication continues where the second one left off, the main objective being to examine whether the legal framework is sufficient for addressing the problems with submarine patents so as to avoid societal losses resulting from the need to abandon a standard due to patents, especially in situations in which interoperability is at stake. These legal means also influence the patent holder's behaviour during and after the standard setting and therefore they also carry weight when the causes of the dilemma are being considered.

It is noted in the paper that the circumstances in which such problems come to light influence the legal means available. In essence, a distinction could be made between the rights of third parties and those of standard setters who have purposefully, negligently or inadvertently failed to disclose their essential rights, the assessment being tied to the patent policies and practices of the standards bodies. Basically, the means of alleviating the problems with submarine patents could include the annulment of patent rights, the finding of non-infringement or unenforceability, and the issuance of a compulsory license. Damages and other negative ramifications could also affect companies' willingness to enforce their rights against the users of standards. Indeed, in this publication the applicability of the following legal regimes is considered in addition to contract-based remedies: U.S. antitrust laws, European competition laws, legislation regarding unfair and deceptive business practices, fraud regulation and patent laws (*e.g.*, the laches doctrine, equitable estoppel, implied-licence and patent-misuse doctrines and compulsory licensing).

Once the applicability of the above means has been determined the next step is to assess whether or not they are effective, and whether there is a need for legislative change. In assessing the need to begin such a slow and cumbersome process, the question of whether it is possible to diminish these perplexities in practice is raised, and the ability of companies to settle issues amicably among themselves is also considered.

### (iv) The Main Contributions of Publication 3

One of the contributions of the third publication lies in the analysis of the legal framework, which also incorporates recent developments and discussions that have been aired with respect to patents, copyrights and antitrust/competition laws, and interoperability. Furthermore, practicalities surrounding the enforcement of patents and the practical means of defending oneself are considered. In fact, although such an approach is mundane from the business perspective, academically speaking this combination includes novel features, and albeit American writers have reviewed the applicability of various legal means in the context of standard setting and submarine patents in the U.S., with the exception of competition laws I have not been able to find any prior literature that ponders upon the same issues in Europe.

It is established in the third publication that the legal means for encountering the submarine-patent dilemma are limited, particularly when the patent holder is a third party or when the non-disclosure has taken place by accident. On the other hand, if the standard setter has operated in bad faith there are many ways of counteracting such behaviour provided that the patent policies are concise and clear, which is unfortunately not often the case. In fact, in many situations the regular route of patent invalidation and non-infringement declaration is the best one to take. Even though it is often assumed that antitrust (U.S.) and competition (Europe) laws will help in

alleviating the problems patents may pose related to standardization, in reality the application of these laws is limited. They may, of course, provide some help in specific situations.

As far as legal amendments are concerned, it is concluded that general improvements in the patent system might be enough to help to overcome some of the difficulties with respect to finding out about relevant patents in advance. Furthermore, limiting the issuance of preliminary and permanent injunctions in cases in which the patent holder is a patent-trolling company might be helpful because these are the companies that are most likely to create problems. Putting weight on the issue that a patent reads on a standard could also weaken the strength of patent holder's rights when it comes to the availability of preliminary as well as permanent injunctions. In the latter case, the issue before the court would mainly concern the determination of reasonable compensation and potential damages. Moreover, with proper interpretation of the prevailing statutes and the inclusion of the equitable estoppel doctrine into the European patent laws it would be possible to effectively discourage the abuse of the standard-setting procedure provided that the standard-setting organizations took better care of implementing clearer policies, and developing better contract structures. Nevertheless, in order to avoid societal losses in cases in which the standard has been widely in use and when it is not technically or commercially possible to change the specifications, some further options could be considered. One of these is the implementation of a patent-law-based compulsory license, applicable in situations that concern interoperability and in which the issuance of a license is in the public interest. This could be the case in the event of an IPR policy breach or in situations is which the companies have already become locked-in to the standard and it is not possible for them to switch to use another technology without suffering significant economic losses and causing harm to consumers. In these situations the court would be the one to determine the reasonable licensing fee. On the other hand, whether such a provision would be effective in practice is open to question.

# III. DISCUSSION AND CONCLUSIONS

It has been pointed out in the above that this dissertation was written with three objectives in mind: 1) to improve understanding of the evolution and controversies of the patent system and the ways in which patents are utilized, with a particular focus on the ICT sector and standardization; 2) to study the patent strategies employed by Finnish ICT companies, and to introduce some new perspectives into the discussion; and 3) to examine whether submarine patents are a serious concern with respect to standardization, to point out the causes of the controversies, and to assess whether it would be possible to alleviate the problems.

Since the findings related to the above objectives were, for the most part, presented in the previous chapter in which the core objectives and contributions of the publications were summarized, in order to avoid repetition, the emphasis in this chapter is on the theoretical and practical implications. Moreover, the limitations of the study are considered and avenues for future research are identified.

## A. THEORETICAL AND PRACTICAL IMPLICATIONS

This dissertation encompasses various theoretical and practical implications. Perhaps one of the most significant findings is that the basic idea behind the patent system of enhancing disclosure, and thus the diffusion of the technology, is not exactly working in the ICT sector. Patents are not generally utilized as sources of information due to the complex language and the difficulty of finding relevant publications, among other things. Furthermore, while knowledge of a patent may lead to the finding of willful infringement and thus treble damages in the U.S., there is a risk associated with the reading of patent publications. One of the practical consequences associated with the unwillingness to examine the patents of others as well as the difficulty of being aware of patents granted and applied in relation to certain technological areas is the submarine-patent dilemma. As far as finding a solution to that problem in the context of standard setting is concerned, it is concluded that antitrust and competition laws are not adequate, and in many situations they do not even offer the most appropriate tool. These problems result from a dysfunctional patent system, and therefore it is the very system that needs renovation.

When it comes to the patentability of software and business-methods and the associated problems, it should be noted that the practice of the patent offices has outdated the wording of the laws. Therefore, although it may be academically and even politically interesting to discuss the technical nature of computer-related inventions, and to attempt to draw the line between patentable and unpatentable inventions on this basis, in reality the patentability requirement applied in Europe has only minimal importance. Indeed, it has been realized in practice that it is easier to move directly to the assessment of novelty and inventive step when determining whether an invention of this sort is patentable. Of course, this is not to say that patents should be granted when it does not serve the underlying principles of the patent system, but due to the complexity of patent economics this may not be something that is possible to determine. In fact, even though academic research on the economics of the patent system is certainly needed, the limitations of these studies need to be recognized. Hence, even if it were found that innovation would be best encouraged if the patent term were limited to ten years if certain technological characteristics applied, for instance, putting these findings into practice may be challenging: in many cases the economics-oriented studies are limited and the findings are based only on certain

indicators such as the link between R&D expenditure and patents. Furthermore, some theoretical dilemmas may not be relevant in practice, and as a consequence a certain amount of caution is in order when conclusions are drawn on the basis of these studies. Patent economics is inherently complex and multi-dimensional, and with the possibility to patent pure business-method inventions in the U.S. it has become even more complicated. It is no longer only technological innovations that matter when the functioning of the patent system is assessed. Then again, on the practical level, one of the implications resulting from the patentability of business methods is that patents are no longer relevant only to companies that base their competitive advantage on technological leadership: they may also concern companies that centre their businesses on services, and thus may influence their business logic.

As mentioned above, theoretical dilemmas are sometimes not as severe in practice. In fact, one relevant implication with both theoretical and practical significance is that in a networked economy companies are often able to alleviate hold-up problems by making licensing arrangements, and to settle conflicts amicably, as they are dependent on one another. However, patent-trolling companies operating particularly in the U.S. have upset this harmony and caused a lot of uproar. At the same time, they have levelled the playing field for small and large companies because small companies seldom have the privilege of reducing the patent-infringement risk through cross-licensing, and even though the interviews did not reveal any entry barriers, other sources have confirmed their existence particularly in certain patent-intensive technological areas. In any case, the patent system does incorporate various mechanisms that could be used to reduce the lure of patent trolling, one of these being the ability of these companies to enforce their rights and to be granted a preliminary or permanent injunction and awarded damages. Similarly, in those situations in which the patent that is subject to litigation reads on a standard, specific features of the case, such as the potential failure to disclose the patent, patent holder's promise to license, and societal effects following the enforcement of the rights, could be taken into account.

In fact, it is highlighted in this dissertation that the patent system is inherently flexible. Therefore, it is possible to apply the statutes so as to promote the proper functioning of the system even without the issuance of field-specific legislation that would take the characteristics of that particular industry into account. For instance, when assessing patent scope the courts have typically allowed broader protection for ground-breaking inventions than for minor improvements. Also, with respect to inventive step analysis it matters whether or not the field is very innovative. Other dilemmas associated with field-specific legislation include the difficulty in defining proper boundaries, as mentioned above. Furthermore, there are variations not only between industries but also among them, in addition to which these technological fields develop all the time meaning that rules that may be optimal at a certain point of time may not be so at another. In conclusion, it is possible to direct the patent system to a more technology neutral end by the means of proper interpretation of the statutes allowing both the open and the proprietary business model to flourish.

There is not only variation in the characteristics of different fields and in the different technologies within these fields, which mediates the effects of patent protection, there is also dissimilarity in the ways in which patents are employed in different business areas and countries. For instance, patent thickets are not a concern in many business areas in the ICT sector, and ICT and particularly software companies in Finland do not necessarily consider patents to belong to their core assets. Nevertheless, with the internationalization of businesses the patent strategies employed by U.S.-based companies also shape trade in Europe, for instance. One of

the well-known examples of this concerns the dilemmas faced in the course of GSM standardization. What basically has been claimed to have happened was that a U.S. company, Motorola, for which patenting was a natural and integral part of doing business, entered the European scene and employed the aggressive patent strategy it was used to. While other standard setters operated in accordance with a "gentleman's agreement", shared their ideas and specifications during the standardization process in an open atmosphere, and refrained from patenting once the basic technical decisions had been made, Motorola pursued patent protection and refused to make any general licensing statements. In fact, this particular licensing dilemma has been said to have contributed to the change in patent culture that took place in the European telecommunications sector, in which patenting had until that time been regarded as a secondary issue. One further practical implication concerns the role and influence of an anti-patent movement in the ICT sector. In fact, the heavy criticism that is likely to result if a company attempts to enforce its rights over those who employ an open standard, for instance, may cause damage to its reputation and brand. Furthermore, "the community" may be able to track down some valuable prior art for the purposes of invalidating a patent, or then some of these organizations may initiate a re-examination process.

## B. LIMITATIONS AND FUTURE RESEARCH

The all-encompassing title of this dissertation, "Patents in the Information and Communications Technology (ICT) Sector - Development Trends, Problem Areas and Pressures for Change", is misleading is the sense that it has, of course, been possible only to scratch the surface of the topic, and the focus has been on software and business-method patents and the problem with submarine patents in the context of standard setting in Europe and the U.S. Moreover, the empirical analysis of ICT companies' patent strategies is limited by the amount of data, even though a rather high saturation degree was achieved. The problem with reporting the findings of the interviews turned out to be the need to present the results so that the companies could not easily be identified. Therefore, in some situations it was only possible to state that certain practices were applied in some companies without further specification, and thus it could be questioned whether some of the findings are informative. Avoidance of these problems would have required a broader sample. Moreover, there is a need for further quantitative and qualitative studies in relation to the submarine-patent dilemma.

Further limitations stem from the interdisiplinary nature of this dissertation and the combination of various legal fields in the third article. Due to the adopted approach, it has not been possible to conduct a very profound analysis of any of these areas. For instance, in the first publication in which legal changes concerning software and business-method patents are discussed among other things, developments that have taken place on the national levels in Europe have largely been left beyond its scope. This is because, notwithstanding the international, European and EU-level harmonization, all national patent regimes have their own legislative history and specific characteristics mirroring the innovation policy of the particular country. For instance the Finnish patent system has been strongly influenced by Nordic cooperation as well as the Swiss and German patent systems[89], and as a general observation, it could be said that the Helsinki Court of Appeals has been rather keen on invalidating patents and establishing non-infringement. Furthermore, the amount of reasonable royalty and damages awarded in case of a

[89] *See e.g.,* Betenkning angående Nordisk patentlovgivning (NU 1963:6).

patent infringement have been rather low.[90] It has traditionally also been rather difficult to obtain a preliminary/interim injunction in patent matters[91]. The number of preliminary injunction matters has increased substantially in the recent years, however, and on the basis of the very recent rulings issued by the Helsinki district court there appears to be some hope for patent holders in the future.

In the course of this dissertation a number of other significant and intriguing research areas concerning patents in the ICT sector have come to light. One of these is open-source licensing and patents. Furthermore, there is a need for research in the context of law and economics to analyze the efficacy of the European patent system. Then again, with respect to standardization and patents, dilemmas with licensing issues represent another area that deserves further attention. In fact, this is currently one of the rather heavily litigated areas as disputes have arisen between Nokia and Qualcomm as well as Broadcom and Qualcomm[92]. Hopefully, the judgements of the courts will ultimately help in alleviating the problems and creating viable markets for the licensing of essential patents. Moreover, studies having to do with patent protection, patent strategies and standardization in developing countries would be most useful.

There are also many important juridical, patent law related research topics such as the novelty and inventive step assessment in respect to software and business-method inventions, and the interpretations of the patent scope. Furthermore, for instance the application of the patent exhaustion doctrine in the ICT sector and particularly in respect to software patents could turn out to be an interesting research topic. The patent exhaustion doctrine limits the patent holders' possibilities to control the downstream uses of the patented products he, or someone with his consent, has introduced to the market. Therefore the patent holder is not able to price its patented products differently to different markets and to prevent the buyers from selling these items on a cheaper price by relying on his patent rights. However, the exhaustion doctrine does not apply to the manufacturing of new artefacts containing the patented invention. Furthermore, process inventions have typically remained beyond its scope. Here lies the core for potential difficulties in applying the exhaustion doctrine to computer-implemented inventions, and in respect to software patents, relevant questions would be, what constitutes the first sale/marketing of the product under patent law, whether it is possible to argue that the fact that

---

[90] *See* the decisions of the Helsinki Court of Appeals which have been reported in Keijo Heinonen, *Innovaatio-oikeus* (Edita 1999) and supplements thereof, <http://www.edilex.fi/lakikirjasto/kirjat/innovaatio-oikeus> (last visited 3/1/07), and the decisions that are available at the IPR University Center's case law database, <https://www.asiakas.org/iprinfo2005/page.php?page_id=85> (last visited 3/1/07). *See also* Tapio Rantala, *Kohtuullisen käyttökorvauksen määrittäminen patentinloukkaustilanteessa* (Defensor Legis, Number 2, 2005, 284-302).

[91] *See e.g.,* Marcus Norrgård, *Väliaikaiset kiellot patenttioikeudessa* (Defensor Legis, Number 6, 2004, 1063-1079).

[92] *See e.g.,* Broadcom Corp., *Jury Finds Broadcom Does Not Infringe Two Qualcomm Patents, Recommends Findings That Qualcomm Engaged in Inequitable Conduct and Abused Industry Standards* (Press release, 26 January 2007), <http://www.broadcom.com/press/release.php?id=954862> (last visited 3/2/07); Broadcom Corp., *Broadcom Charges Qualcomm With Violating U.S. Antitrust Laws. Federal Lawsuit Claims Qualcomm's Licensing and Other Practices in Cellular Technology and Products Violate the Antitrust Laws, Stifle Competition* (Press release, 5 July 2005), <http://www.broadcom.com/press/release.php?id=726224&source=home> (last visited 3/2/07); Qualcomm, Inc. *Qualcomm Annual Report 2005, Notes to Consolidated Financial Statements,* <http://www.qualcomm.com/ir/annualreport/ar2005/financials/rep_c_note_9.html> (last visited 3/2/07); Qualcomm, Inc. *Qualcomm Annual Report 2006*, *Notes to Consolidated Financial Statements,* at 73-74, <http://files.shareholder.com/downloads/QCOM/91363939x0x70174/e7d78031-5de4-42aa-98b6-e2327876987a/06QUAL01_AnnualReport_Singles.pdf> (last visited 3/2/07); Anni Lassila, *Lyödäänpä patentilla kilpailijaa päähän*, at E3 (Helsingin Sanomat, 29 October 2006).

computer-implemented inventions are usually protected by process claims excludes the products that utilize the claimed methods from becoming exhausted, and whether the making of copies of a computer program while running it could be deemed as the kind of making of a product that is no longer allowed under the exhaustion principle, but constitutes a patent infringement. In fact, drawing these lines could turn out have a lot of economic significant depending on the developments in the copyright area. On the other hand, however, it may be possible to avoid such dilemmas altogether in practice by employing the software as a service model, for instance.

## References

Aulis Aarnio, *Oikeussäännösten systematisointi ja tulkinta* (in Juha Häyhä (ed.), Minun Metodini, WSLT, 1997, 35-56).

An Open Letter to the European Parliament Concerning the Proposed Directive on the Patentability of Computer-implemented Inventions (2003), <http://www.dauphine.fr/imri/Foray/Economists/An%20Open%20Letter%20to%20the%20Europ.pdf> (last visited 9/11/06).

Rieko Aoki & Yossi Spiegel, *Public Disclosure of Patent Applications, R&D, and Welfare* (Berglas School of Economics Working Paper, 1998, 30-98).

Ashish Arora & Andrea Fosfuri, *The Market for Technology in the Chemical Industry: Causes and Consequences* (Revue d'Economie Industrielle, Number 92, 2000, 317-334).

Ashish Arora & Robert Merges, *Property Rights, Firm Boundaries and R&D Inputs* (Carnegie Mellon Working Paper 2000).

James Bessen, *Patent Thickets: Strategic Patenting of Complex Technologies* (Research on Innovation, Working Paper 2003).

James Bessen & Robert E. Hunt, *An Empirical Look at Software Patents* (Federal Reserve Bank of Philadelphia Working Papers, Working Paper Number 03-17/R, March 2004), <http://www.researchoninnovation.org/swpat.pdf> (last visited 9/11/06).

Betenkning angående Nordisk patentlovgivning (NU 1963:6).

Flemming Birk (ECON Analysis), *The Use of Intellectual Property Rights among Nordic Service Companies,* <www.nordicinnovation.net/_img/05010_ipr_in_nordic_service_companies_final_report_english.pdf> (last visited 9/5/6).

Knut Blind, *The Economics of Standards. Theory, Evidence, Policy* (Edward Elgar 2004).

Knut Blind, Rainer Bierhals, Nikolaus Thumm, Kamal Hossain, John Sillwood, Eric Iverser, Rik von Reikum & Bruno Roxius, *Study on the Interaction between Standardization and Intellectual Property Rights* (EC Contract No G6MA-CT-2000-02001, 2002).

Knut Blind, Jakob Edler, Ralph Nack & Joseph Straus, *Mikro- und makroökonomische Implikationen der Patentierbarkeit von Softwareinnovationen: Geistige Eigentumsrechte in derIinformatinstechnologie im Spannungsfeld von Wettbewerb und Innovation* (Forschungsprojekt im Auftrag des Bundesministeriums für Wirtschaft und Technologie, Forcshungsauftrag 36/00, 2001), <http://www.computerundrecht.de/docs/computerprogrammen.pdf> (last visited 9/6/06).

Jeffrey L. Brandt, *Capturing Innovation. Turning Intellectual Assets into Business Assets* (in Bruce Berman (Ed) From Ideas to Assets. Investing Wisely in Intellectual Property (John Wiley & Sons, Inc, 2002, 65-81)).

Broadcom Corp., *Broadcom Charges Qualcomm With Violating U.S. Antitrust Laws. Federal Lawsuit Claims Qualcomm's Licensing and Other Practices in Cellular Technology and Products Violate the Antitrust Laws, Stifle Competition* (Press release, 5 July 2005), <http://www.broadcom.com/press/release.php?id=726224&source=home> (last visited 3/2/07),

Broadcom Corp., *Jury Finds Broadcom Does Not Infringe Two Qualcomm Patents, Recommends Findings That Qualcomm Engaged in Inequitable Conduct and Abused Industry Standards* (Press release, 26 January 2007), <http://www.broadcom.com/press/release.php?id=954862> (last visited 3/2/07).

CERM Foundation, *Study on Evaluating the Knowledge Economy. What are Patents Actually Worth? The Value of Patents for Today's Economy and Society* (Tender n° MARKT/2004/09/E, Lot 2, Final Report, 23 July 2006), <http://ec.europa.eu/internal_market/indprop/docs/patent/studies/final_report_lot2_en.pdf> (last visited 3/1/07).

Pankaj Chemawat, *Xerox in 1973* (HBS Case Services, 1986, 259-271).

Henry Chesbrough, *Open Innovation. The New Imperative for Creating and Profiting from Technology* (Harvard Business School 2003).

Henry Chesbrough & Jim Spohrer, *A Research Manifesto for Services Science* (Communications of the ACM, Vol 49, Number 7, July 2006, 35-40).

Julie E. Cohen & Mark A. Lemley, *Patent Scope and Innovation* (California Law Review, Vol 89, 2001).

Wesley M. Cohen, Richard R. Nelson & John P. Walsh, *Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (Or Not)* (NBER Working Paper Number 7552, 2000).

Alan Cunningham, *Telecommunications, Intellectual Property, and Standards* (in Ian Walden & John Angel (ed.) *Telecommunications Law and Regulation* (Oxford University Press, 2005, 341-375)).

Julie L. Davis & Suzanne S. Harrison, *Edison in the Boardroom, How Leading Companies Realize Value from Their Intellectual Assets* (John Wiley & Sons, Inc 2001).

DLA, *European Intellectual Property Survey* (2004), <http://www.dlanordic.com/files/DLA%20-%20European%20Wide%20IP%20survey.pdf> (last visited 9/5/6).

Jari Eskola & Juha Suoranta, *Johdatus laadulliseen tutkimukseen* (Vastapaino 2000).

Federal Trade Commission (FTC), *To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy* (2003), <http://www.ftc.gov/os/2003/10/innovationrpt.pdf> (last visited 9/6/06).

Nancy T. Gallini, *The Economics of Patents: Lessons from Recent U.S. Patent Reform* (Journal of Economic Perspectives, Vol 16, Number 2, Spring 2002, 131-154).

Nancy Gallini & Suzanne Scotchmer, *Intellectual Property: When Is It the Best Incentive System?* (UC Berkeley Working Papers, Number E01-303, August 2001).

Ove Granstrand, *The Economics and Management of Intellectual Property. Towards Intellectual Capitalism* (Edward Elgar 1999).

Robert M. Grant, *Contemporary Strategy Analysis* (Blackwell Publishing, 5th edition, 2005).

Peter Grindley, *Standards, Strategy and Policy. Cases and Stories* (Oxford University Press 1995, reprinted 2002).

Pirkko-Liisa Haarmann, *Immateriaalioikeus* (Talentum 2006).

Robert W. Hahn, *The Economics of Patent Protection. Policy Implications from the Literature* (2003).

Bronwyn H. Hall & Rosemarie Ham Ziedonis, *The Patent Paradox Revisited: An Empirical Study of Patenting in the US Semiconductor Industry, 1979-95* (Rand Journal of Economics, Vol 32, Number 1, 2001, 101-128).

Gary Hamel, *Leading the Revolution* (Harvard Business School Press 2000).

Keijo Heinonen, *Innovaatio-oikeus* (Edita 1999), <http://www.edilex.fi/lakikirjasto/kirjat/innovaatio-oikeus> (last visited 3/1/07).

Andrew W. Horwitz & Edwin L. Lai, *Patent Length and the Rate of Innovation* (International Economic Review, Issue 37, Number 4, 1996, 785-801).

Pia Hurmelinna & Aura Soininen, *Appropriability and Licensing in Closed versus Open Innovation Models* (EURAM, Munich, 4-7 May 2005).

Pia Hurmelinna-Laukkanen, *Dynamics of Appropriability – Finding a Balance between Efficiency and Strength in the Appropriability Regime* (Lappeenranta University of Technology, Academic Dissertation 2005).

Juha Häyhä, *Minun Metodini* (WSLT 1997).

IPR University Center's case law database, <https://www.asiakas.org/iprinfo2005/page.php?page_id=85> (last visited 3/1/07).

Robin Jacob, Daniel Alexander & Lindsay Lane, *A Guidebook to Intellectual Property* (Sweet & Maxwell 2004).

Adam B. Jaffe & Josh Lerner, *Innovation and Its Discontents. How Our Broken Patent System is Endangering Innovation and Progress, and What to Do about It* (Princeton University Press 2004).

H. Jackson Knight, *Intellectual Property "101". What Executives and Inventors Need to Know About Patent Rights and Strategy* (in Bruce Berman (Ed) *From Ideas to Assets. Investing Wisely in Intellectual Property* (John Wiley & Sons, Inc, 2002, 3-25))

Morgens Koktvedgaard & Marianne Levin, *Lärobok i Immaterialrätt* (Norstedts Juridik AB, 6th edition, 2000).

Samuel Kortum & Josh Lerner, *What is behind the recent surge in patenting?* (Research Policy 28, 1999, 1-22).

Heli Koski, Petri Rouvinen & Pekka Ylä-Anttila, *Mitä "uudesta taloudesta" jäi?* (Edita 2002).

Anni Lassila, *Lyödäänpä patentilla kilpailijaa päähän*, at E3 (Helsingin Sanomat, 29 October 2006).

Mark A. Lemley, *Intellectual Property Rights and Standard Setting Organizations* (UC Berkeley Public Law and Legal Theory Research Paper Series, Research Paper Number 84, 2002).

Mark A. Lemley, Peter S. Menell, Robert P. Merges & Pamela Samuelson, *Software and Internet Law* (Aspen Law & Business 2000).

Josh Lerner, *Patent Protection and Innovation Over 150 Years* (NBER Working Paper Number 8977, 2002).

Richard C. Levin, Alvin K. Klevorick, Richard R. Nelson & Sidney G. Winter. *Appropriating the Returns from Industrial Research and Development* (Cowles Foundation Paper 714, 1987).

Marja-Leena Mansala, *Teollisoikeudet osana yrityksen strategiaa yhdentyvillä markkinoilla* (Helsingin yliopiston Kansainvälisen talousoikeuden instituutin julkaisuja 15, Hakapaino Oy 1994).

Robert Merges, *As Many as Six impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform* (Berkeley Technology Law Journal, Electronic Commerce Symposium, Vol 14, 1999, 577-615).

Robert P. Merges, Peter S. Menell, Mark A. Lemley, *Intellectual Property in the New Technological Age* (Aspen Publishers 2003).

David G. Messerschmitt & Clemens Szyperski, *Software Ecosystem. Understanding an Indispensable Technology and Industry* (The MIT Press 2003).

Janice M. Mueller, *Patenting Industry Standards* (John Marshall Law Review, Issue 34, Number 897, 2001).

Kalle Määttä, *Oikeustaloustieteen aakkoset* (Helsingin yliopiston oikeustieteellisen tiedekunnan julkaisut 1999).

National Academy of Sciences (NAS), *A Patent System for the 21st Century* (April 2004), <http://www.nap.edu/books/0309089107/html/> (last visited 9/11/06).

Marcus Norrgård, *Väliaikaiset kiellot patenttioikeudessa* (Defensor Legis, Number 6, 2004, 1063-1079).

Ted O'Donoghue, Suzanne Scotchmer & Jacques-Francois Thisse, *Patent Breath, Patent Life, and the Pace of Technological Development* (Journal of Economics & Management Strategy, Vol 7, Number 1, Spring 1998, 1-32).

OECD, *Key ICT Indicators,* <http://www.oecd.org/dataoecd/20/7/34083298.xls> (last visited 9/5/06).

OECD, *Measuring the Information Economy 2002, Annex 1. The OECD Definition of the ICT Sector,* <http://www.oecd.org/dataoecd/34/37/2771153.pdf> (last visited 9/6/06).

OECD, *Patents and Innovation: Trends and Policy Challenges* (2004).

OECD, *Science, Technology and Industry Scoreboard –Towards a Knowledge-based Economy* (2005), <http://oberon.sourceoecd.org/vl=12667702/cl=14/nw=1/rpsv/scoreboard/> (last visited 9/5/06).

Rainer Oesch & Heli Pihlajamaa, *Patenttioikeus* (Talentum 2003).

Michael E. Porter, *Competitive Advantage. Creating and Sustaining Superior Performance* (Free Press 1998).

Qualcomm, Inc. *Qualcomm Annual Report 2005, Notes to Consolidated Financial Statements,* <http://www.qualcomm.com/ir/annualreport/ar2005/financials/rep_c_note_9.html> (last visited 3/2/07).

Qualcomm, Inc. *Qualcomm Annual Report 2006*, *Notes to Consolidated Financial Statements,* <http://files.shareholder.com/downloads/QCOM/91363939x0x70174/e7d78031-5de4-42aa-98b6-e2327876987a/06QUAL01_AnnualReport_Singles.pdf> (last visited 3/2/07).

Tapio Rantala, *Kohtuullisen käyttökorvauksen määrittäminen patentinloukkaustilanteessa* (Defensor Legis, Number 2, 2005, 284-302).

Ilkka Rahnasto*, Intellectual Property Rights, External Effects, and Anti-trust Law. Leveraging IPRs in the Communications Industry* (Oxford University Press 2003).

Ben Rapinoja & Aura Soininen, *University-Industry Collaboration and Technology Transfer* (European Biopharmaceutical Review, Autumn 2005, 20-24).

Kevin G. Rivette & David Kline, *Rembrandts in the Attic. Unlocking the Hidden Value of Patents* (Harvard Business School Press 2000).

Lawrence Rosen, *Open Source Licensing. Software Freedom and Intellectual Property Law* (Prentice Hall Ptr 2005)

Suzanne Scotchmer, *Innovation and Incentives* (The MIT Press 2004).

Suzanne Scotchmer, *Standing on the Shoulders of Giants: Cumulative Research and the Patent Law* (The Journal of Economic Perspectives, Vol 5, Issue 1, Winter 1991, 29-41).

Karl Shapiro & Hal R. Varian, *Information Rules. A Strategic Guide to the Network Economy* (Harvard Business School Press 1999).

Jerry Sheenan, *Understanding Service Sector Innovation* (Communications of the ACM, Vol 49, Number 7, July 2006, 43-47).

Raimo Siltala, *Oikeustieteen tieteenteoria* (Suomalaisen lakimiesyhdistyksen julkaisuja A-Sarja N:o 234, 2002).

Aura Soininen & Pia Hurmelinna, *Patent Strategies and Licensing Practices in Closed versus Open Innovation Models* (R&D Management, Pisa, 6-8 July 2005).

Dan Steinbock, *Finland's Wireless Valley: Domestic Policies, Globalizing Industry* (TEKES, Technology Review 138/2003, 2002).

Patrick H. Sullivan, *Value-Driven Intellectual Capital. How to convert intangible corporate assets into market value* (John Wiley & Sons, Inc 2000).

David J. Teece. *Managing Intellectual Capital* (Oxford University Press 2000).

TEKES, *The Future is in Knowledge and Competence, Technology Strategy -a review of choices* (June 2002), <http://www.tekes.fi/julkaisut/Tekes_Teknstrat_eng.pdf> (last visited 9/6/06).

Guy Tritton, Richard Davis, Michael Edenborough, James Graham, Simon Malynicz & Ashley Roughton, *Intellectual Property in Europe* (Sweet & Maxwell, 2nd edition, 2002).

Mikko Välimäki, *The Rise of Open Source Licensing. A Challenge to the Use of Intellectual Property in the Software Industry* (Turre Publishing 2005).

Dr J.J.S. Watts & Dr D R Baigent, *Intellectual Property, Standards and Competition Law: Navigating a Minefield* (IEEE, 2002, 837-842).

Steven Weber, *The Success of Open Source* (Harvard University Press 2004).

Wikipedia, *Scientific Method,* <http://en.wikipedia.org/wiki/Scientific_method> (last visited 9/14/06).

Marjo Ylhäinen, *Oikeussosiologia lainopin tutkimuksessa* (OPTL:n tutkimustiedonantoja 64, Empiirinen tutkimus oikeustieteessä seminaari, 2004).

# PART II: GENERAL PART

# PUBLICATION 1

Aura Soininen

**The Software and Business Method Patent Ecosystem: Academic, Political, Legal and Business Developments in the U.S. and Europe**

IPR University Center Publications, IPR Series B, 1/2005
Peer reviewed

Minor (grammatical) modifications have been made to the original publication, table of case law has been added and it has been formatted to fit the style of this dissertation.

# THE SOFTWARE AND BUSINESS-METHOD PATENT ECOSYSTEM

ACADEMIC, POLITICAL, LEGAL AND BUSINESS DEVELOPMENTS IN THE U.S. AND EUROPE

Aura Soininen*

**Abstract**

*Ever since software and hardware were unbundled, and the commercial value of software was realized, there has been increasing focus on software patents as a means for appropriating returns on R&D investments and leveraging. Business-method patents have also been attracting research interest from the time when the Internet's commercial potential was recognized. Nonetheless, there are lapses, gaps, and numerous contradictions in these studies. In fact, the debate concerning the recently rejected EU software-patent directive proposal was a good illustration of the lack of knowledge and consequent miscommunication. There is a need for interdisciplinary research on software and business-method patents in the context of the entire patent ecosystem.*

*The objective of this paper is to provide the necessary common ground by examining four interconnected and partially overlapping trends—academic, political, legal and business developments—and pointing out problems and misunderstandings related to software and business-method patents. This paper also contributes to the related discussion by providing empirical data on ICT companies' patent strategies and thus combining theoretical views and practice. On this basis it aims to give a well-reasoned glimpse into the future: as markets for technology advance, it is probable that firms become even more interested in patents and their strategic potential. In the long run, however, the industry matures. As various technologies become commoditized, technological development slows down, and firms move towards service-oriented business models, the availability and relevance of ICT-patents is likely to decrease and that of pure business-method patents to increase. On a policy level, we appear to be heading towards more limited patent protection.*

---

 Aura Soininen (LL.M.) is a Ph.D. candidate at the University of Lappeenranta (LUT), Dept. of Business Administration, and a trainee at Attorneys at Law Borenius & Kemppinen, Ltd. This essay has for the most part been written while she worked as a researcher at the Helsinki Institute for Information Technology (HIIT), Finland, and was a visiting scholar at UC Berkeley, USA (2003 - 2004). I am grateful to Professor Jukka Kemppinen, and my colleagues Olli Pitkänen (HIIT), Pia Hurmelinna (LUT) and Hannu Järvinen (B&K) as well as the reviewers for their valuable comments and suggestions. The views and opinions expressed in this paper are mine alone.

# CONTENTS

# I. INTRODUCTION

## A. BACKGROUND: ACADEMIC, POLITICAL, LEGAL AND BUSINESS TRENDS IN A NUTSHELL

Two decades ago patents were neither a popular research topic nor a media attention-getter. Certainly companies had patents, but, with the exception of pharmaceutical firms[1], they basically saw them as legal instruments and exploited them cautiously in business. Patents were regarded as defensive tools and used mainly for protecting key products and manufacturing processes from imitation. Today, however, these legal rights to exclude others are seen more and more as bargaining chips. Since patents provide the leverage needed they are essential for doing business, especially in areas such as various parts of the information and communications technology (ICT) sector that are characterized by technological complexity.[2] Patents have also been a subject of controversy lately, and have therefore aroused the interest of companies, scholars and the media. They have been in the headlines of magazines such as Forbes[3], the Economist[4], and the New York Times[5]. Nevertheless, and contrary to general assumptions, patents have not always been underutilized as business tools. In the 19th and early 20th centuries, before the era of far-reaching antitrust scrutiny, dominant market players exploited them vigorously with a view to keeping new entrants at arm's length and maintaining their dominant position.[6] In many cases patent wars between the most influential competitors escalated into cartelization in the form of cross-licensing and the formation of patent pools[7]. A strategic view of patents is nothing new.

In addition to changes in the ways in which companies utilize patents in their businesses, there have been some major developments in the patent regime. The availability, scope and strength of patent protection have varied over time[8] and throughout industries' life cycles. The early days of information and communications technology, the focal point of this research, did not abound

---

[2] Pharmaceutical companies have traditionally relied on patent protection and used them offensively in order to gain market advantage (Kevin Rivette & David Kline, *Unlocking the Hidden Value of Patents, Rembrandts in the Attic*, at 38 (Harvard Business School Press 2000)).

[2] Rivette & Kline, at 37-45 (2000); Henry W. Chesbrough, *Open Innovation, The New Imperative for Creating and Profiting from Technology*, at 158-159 (Harvard Business School Press 2003).

[3] *See e.g.,* Dorothy Pomerantz, *Get Katz. Telecom patent king Ronald Katz has extracted $750 million from companies in licensing fees. They want him stopped* (Forbes Magazine, 28 March 2005); Gary L. Reback, *Patently Absurd* (Forbes.com, 24 June 2002); Rob Wherry, *Patent Peril, If you thought inventing was hard, just wait till you try to protect the invention in markets across the globe* (Forbes Global, 24 June 2002); Michael S. Malone, *The Smother of Invention. The world's most important patent office is 200 years old and showing its age* (Forbes Global, 24 June 2002); Quentin Hardy, *In the Path of an Avalanche. An examiner at the U.S. patent office explains how he manages the never-ending flow of applications* (Forbes Global, 24 June 2002); Eric W. Pfeiffer, *Managing Your Knowledge. Companies are coining intellectual property* (Forbes Global, 24 June 2002); David Raymond, *How to Find True Value in Companies. Look for patent relevance to pay off* (Forbes Global, 24 June 2002).

[4] *See e.g., Monopolies of the Mind* (Economist.com, 11 November 2004); *The Broken Patent System* (Economist.com, 11 November 2004); *Europe's Patent Mess* (Economist.com, 20 May 2004); *Patent Wars* (Economist.com, 6 April 2000).

[5] *See e.g.,* Steve Lohr**,** *Sharing the Wealth at I.B.M.* (The New York Times, 11 April 2005); Teresa Riordan, *Patents; A patent owner claims to be owed royalties on much of the Internet's media content* (The New York Times, 16 August 2004); Hal R. Varian, *Patent Protection Gone Awry* (The New York Times, 21 October 2004).

[6] Rivette & Kline, at 37 (2000).

[7] *See e.g.,* Peter Drahos & John Braithwaite, *Information Feudalism. Who Owns the Knowledge Economy?* at 53-54 (Earthscan 2002). On the evolution of the consumer electronics and computer industries, *see e.g.* Alfred D. Chandler Jr, *Inventing the Electronic Century. The Epic Story of the Consumer Electronics and Computer Industries* (The Free Press 2001).

[8] *See e.g.,* Adam B. Jaffe & Josh Lerner, *Innovation and Its Discontents, How Our Broken Patent System is Endangering Innovation and Progress, and What to Do about It*, at 90-91 (Princeton University Press 2004).

with patents, and while they were typically employed in electronics, semiconductors and computer hardware[9], unlike today, patent protection was not available for software inventions.

Currently, patent density in the ICT sector compared with the total number of patents is relatively high. Indeed, of all OECD patent applications, around one third are ICT-related, and the proportion appears to be constantly on the increase.[10] Of course, this increased volume is not only the result of changes in the patentability regime, and the expansion of the role of patents in business, but it also stems from the growing importance of information and communications technology. ICT has become one of the largest and most influential industries in the world. It spans manufacturing and service industries involved in information acquisition, processing and transfer, as well as communications, and touches on the electronics and electrical industries, telecommunication services, information technology and, depending on the definition, also on content businesses.[11] Naturally, all these fields have developed at their individual paces and they all have diverging characteristics. ICT is a multifaceted business sector.

What are the reasons behind the broadening of the scope of patentable subject matter? Has there been a need for better protection? As far as the information-technology side of the ICT sector is concerned, despite the assumption that patents are essential for encouraging innovation, their absence has not prevented the software business from developing, growing and blooming as an autonomous industry. Once technological developments had made it possible to write general-purpose rather than machine-specific software, and particularly after software and hardware had been unbundled, independent software suppliers began to appear[12]. However, other forms of intellectual property rights (IPRs) were applied to software rather early in its life cycle: computer software could be considered a trade secret, and it was officially regarded as a subject of copyright protection in the early 1980s, both in the U.S. and in Europe. Even before, the U.S. copyright office had issued registration certificates to software source code, and also to object code under its "rule of doubt"[13]. Nonetheless, the need for more efficient protection was recognized in the mid-80s when microcomputers became popular, mass-markets for software developed, and the scope of copyright protection reached its limits[14]. Consequently, due to technological, commercial and copyright law developments, and also because of ineffectual limits

---

[9] Mark A. Lemley, Peter S. Menell, Robert P. Merges & Pamela Samuelson, *Software and Internet Law*, at 259 (Aspen Law & Business 2000).

[10] *See e.g., OECD Science, Technology and Industry Scoreboard 2003, Towards a Knowledge-Based Economy* (2003) <http://www1.oecd.org/publications/e-book/92-2003-04-1-7294/A.4.3.htm> (last visited 5/25/05); OECD, *ICT patents as a percentage of national total (EPO) in selected countries, According to the residence of the inventors, by priority year 1991, 2000* <http://www.oecd.org/dataoecd/20/8/34083325.xls> (last visited 5/25/05) .

[11] TEKES, *The Future is in Knowledge and Competence, Technology Strategy -a review of choices,* at 12 (June 2002) <http://www.tekes.fi/julkaisut/Tekes_Teknstrat_eng.pdf> (last visited 5/25/05). *See also* OECD, *Measuring the Information Economy 2002, Annex 1. The OECD Definition of the ICT Sector*, at 81 <http://www.oecd.org/dataoecd/34/37/2771153.pdf> (last visited 5/25/05).

[12] Chandler, at 121 (2001); Stuart J. H. Graham & David C. Mowery, *Intellectual Property Protection in the U.S. Software Industry*, at 221 (in Wesley M. Cohen and Steven Merrill (eds.) *Patents in the Knowledge-Based Economy*, National Academy Press, Washington, D.C. 2003, 219-258).

[13] Lemley, Menell, Merges & Samuelson, at 97 (2000).

[14] *See e.g.,* Denis T. Rice, *Building a Strategic Internet IP Portfolio in a "Down" Economy* (Practising Law Institute, Patents, Copyrights, Trademarks, and Literary Property Course Handbook Series, PLI Order Number G0-018F, 7th Annual Internet Law Institute, July 2003). The sweeping interpretation of copyright protection adopted in Apple Computer, Inc. v. Franklin Computer Corp was narrowed and weakened considerably in a series of copyright infringement cases—particularly the *Borland* decision—brought by Lotus Development. (Graham & Mowery, at 225 (2003)).

of patentable subject matter, software-implemented inventions have gradually come into the sphere of patentable subject matter in the U.S. and Europe. Lately, patents for business methods, such as novel and non-obvious methods for pricing, distributing and/or marketing on the Internet, have been accepted in the U.S[15]. Not all software developers and companies have unanimously welcomed these developments[16].

At the time software and business methods gradually entered the patent sphere biotechnological inventions were also making their entrance, and the political atmosphere favored a broad patent scope. Concerns about industrial stagnation and the lack of technological innovation had resulted in the U.S. Congress and the courts strengthening patent rights during the 1980s and 1990s.[17] For instance, before the specialized patent court, the Court of Appeals for the Federal Circuit (CAFC), was established in 1982, around one in three patent holders won their cases. After that, around two in three won.[18] The U.S. antitrust analysis framework was also updated at that time. This change was driven in part by academic rethinking, which was based on the Chicago School of Economics, and related to antitrust law and its approach to patents.[19] In the meantime, Europe had taken a step towards more harmonized patent regulation, and the European Patent Office (EPO) was stabilizing its role alongside national patent offices[20].

Academic, political and legal evolution concerning copyrights, patents and antitrust analysis have played a role in modifying the ways companies exploit patents today[21], but these are certainly not the only factors. The competitive environment has become more knowledge-based, and as technological complexity and convergence have increased, companies' innovation processes have become more decentralized. Firms lean heavily on cooperation and networks.[22] In this context, large ICT companies in particular acquire and use patents in order to get access to technologies developed by others[23]. At the same time, it has become necessary to secure one's freedom to

---

[15] As explained later in this paper these inventions can be patented also in Europe if the invention resides in the technical implementation, not in the business method itself.

[16] Lawrence Lessig, *The Future of Ideas, The Fate of the Commons in a Connected World*, at 208 (Random House 2001).

[17] Federal Trade Commission (FTC), *To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy*, at Chapter 1, 18 (2003), <http://www.ftc.gov/os/2003/10/innovationrpt.pdf> (last visited 5/25/05); Jaffe & Lerner, at 97 (2004).

[18] The Economist, *Patent Wars, Better Get Yourself Armed, Everyone Else Is* (Economist.com, 6 April 2000).

[19] FTC, at Chapter 1, 18 (2003).

[20] Hon. Sir Robin Jacob, *The Onward March of Intellectual Property Rights and Remedies*, at 416 (in Rochelle Dreyfuss, Diane L Zimmerman & Harry Fist (ed.), *Expanding the Boundaries of Intellectual Property Innovation Policy for the Knowledge Society*, Oxford University Press 2001, 415-419).

[21] For instance Graham and Mowery have suggested that Borland decision which weakened the software copyright protection may have, along with decisions affirming the strength of software patents, contributed to the increased reliance by some U.S. software firms on patents in the 1990s. (Graham & Mowery, at 225-226 (2003)).

[22] OECD, *Patents and Innovation: Trends and Policy Challenges*, at 7, 16 (2004), <http://www.oecd.org/dataoecd/48/12/24508541.pdf> (last visited 5/25/05). *See also* Henry Chesbrough, *The Logic of Open Innovation: Managing Intellectual Property* (California Management Review, Volume 45, number 3, 2003, 33-58).

[23] For instance IBM has expressed its strategy as follows: "The IBM patent portfolio gains us freedom to do what we need to do through cross-licensing—it gives us access to the inventions of others that are key to rapid innovation. Access is far more valuable to IBM than the fees it receives from its 9000 active patents." This description dates back to 1990. Nowadays IBM is very active in generating patent licensing revenues. (James Bessen, *Patent Thickets: Strategic*

operate and to employ a defensive patent strategy especially in markets flooded with patents and in an environment in which infringement is common[24]. Moreover, many U.S.-based ICT and other firms have begun to enforce their patent rights aggressively, and companies are exploring strategies to profit from licensing and selling patents[25]. Conversely, European ICT companies are only beginning to realize how patents can be used strategically to support their businesses[26].

Nonetheless, preventing the findings of companies' research and development (R&D) activities from leaking to competitors is one significant function of patents[27]. In fact, this use has become prominent in the knowledge-based economy, and the right to exclude others naturally also forms the basis of all their other functions. Another factor that has contributed to their attractiveness as a protection measure is the declining usability of other intellectual property rights. In many cases these other forms have turned out to be inefficient, or their use no longer complies with the market needs.[28] Nowadays, in the software industry, for instance, customers often demand access to the source code because they want to be able to update and fix the program even if the software vendor goes bankrupt. Therefore, providing the customer only with the object code version is not necessarily a viable strategy, particularly if the software is tailor-made[29]. As an alternative to the strictly proprietary model according to which a firm keeps the source code a secret, a company may choose to employ a more open strategy and simply allow its customers to access the source code, learn from it and potentially fix and modify it. Of course, non-disclosure

---

*Patenting of Complex Technologies,* at 2 (ROI Working Paper 2003) <http://www.researchoninnovation.org/thicket.pdf> (last visited 6/21/05)).

[24] *See e.g.,* Bronwyn H. Hall & Rosemarie Ham Ziedonis, *The Patent Paradox Revisited: An Empirical Study of Patenting in the U.S. Semiconductor Industry, 1979-1995*, at 12-13 (RAND Journal of Economics, Vol 32, No 1, Spring 2001, 101-128); Bessen, at 1 (2003); Interview data U.S. (2004).

[25] Russell L. Parr, *IP Leverage, Facilitating Corporate Value Creation*, at 283 (in Bruce M. Berman (ed.) *From Ideas in Assets, Investing Wisely in Intellectual Property*, Wiley & Sons, Inc. 2002, 271-291): Jaffe & Lerner, at 59 (2004).

[26] Derived from the Interview data Finland (2003). *See also* DLA, *European Intellectual Property Survey* (2004), <http://www.dlapiper.com/files/tbl_s47Details/FileUpload265/98/EuropeanIPSurvey.PDF> (last visited 8/32/05); Knut Blind, Jakob Edler, Ralph Nack & Joseph Straus, *Mikro- und makroökonomische Implikationen der Patentierbarkeit von Softwareinnovationen: Geistige Eigentumsrechte in der Iinformatinstechnologie im Spannungsfeld von Wettbewerb und Innovation* (Forschungsprojekt im Auftrag des Bundesministeriums für Wirtschaft und Technologie, Forcshungsauftrag 36/00, 2001), <http://www.computerundrecht.de/docs/computerprogrammen.pdf> (last visited 6/21/05); Nicholas S. Vonortas, *Technology Licensing,* at 33 (Final report, 10 October 2003), <http://www2.gwu.edu/~cistp/PAGES/licensing.pdf> (last visited 9/8/05).

[27] *See e.g.,* Wesley M. Cohen, Richard R. Nelson & John P. Walsh, *Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (Or Not),* at 17 (NBER Working Paper Series, Working Paper 7552, 2000).

[28] Production of today's cutting-edge technical know-how differs from that generated during industrial revolution due to the chronic inability of those who invest in its commercial exploitation to keep it secret. (Jerome H. Reichman, *On Green Tulips and Legal Kudzu: Repacking Rights in Subpatentable Innovation*, at 26 (in Rochelle Dreyfuss, Diane L Zimmerman & Harry Fist (ed.), *Expanding the Boundaries of Intellectual Property Innovation Policy for the Knowledge Society* (Oxford University Press 2001)); OECD, at 15 (2004). *See also* supra notes 15 and 22.

[29] One option is to use escrow agreements that allow the licensee to obtain access to the software source code under certain circumstances, such as bankruptcy or failure to make required modifications.

agreements may be used to restrict the flow of information.[30] Nevertheless, the recent success of open-source software[31] has verified that there may be benefits even with a more open approach[32].

As explained previously, patents are now obtainable in new technological areas and the protection is stronger than it was twenty years ago. The business environment has changed and so has their role in it. What, then, are the consequences from society's perspective? Is the U.S. and European patent system working the way it is supposed to? It is a political challenge to maintain a supportive policy framework and to balance the interests of society and the rights-holder at all times. If the system is not working optimally, adjustments are needed.

---

[30] The ultimate "openness" depends on the buyers bargaining power. A proprietary software company does not usually want to share the source code, and if it does it typically places tight constraints regarding its use. (Steven Weber, *The Success of Open Source,* at 191-192 (Harvard University Press 2004)).

[31] The Open Source Initiative defines open source as follows: "Introduction: Open source doesn't just mean access to the source code. The distribution terms of open-source software must comply with the following criteria:

1. Free Redistribution: The license shall not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The license shall not require a royalty or other fee for such sale.

2. Source Code: The program must include source code, and must allow distribution in source code as well as compiled form. Where some form of a product is not distributed with source code, there must be a well-publicized means of obtaining the source code for no more than a reasonable reproduction cost preferably, downloading via the Internet without charge. The source code must be the preferred form in which a programmer would modify the program. Deliberately obfuscated source code is not allowed. Intermediate forms such as the output of a preprocessor or translator are not allowed.

3. Derived Works: The license must allow modifications and derived works, and must allow them to be distributed under the same terms as the license of the original software.

4. Integrity of The Author's Source Code: The license may restrict source-code from being distributed in modified form *only* if the license allows the distribution of "patch files" with the source code for the purpose of modifying the program at build time. The license must explicitly permit distribution of software built from modified source code. The license may require derived works to carry a different name or version number from the original software.

5. No Discrimination Against Persons or Groups: The license must not discriminate against any person or group of persons.

6. No Discrimination Against Fields of Endeavor: The license must not restrict anyone from making use of the program in a specific field of endeavor. For example, it may not restrict the program from being used in a business, or from being used for genetic research.

7. Distribution of License: The rights attached to the program must apply to all to whom the program is redistributed without the need for execution of an additional license by those parties.

8. License Must Not Be Specific to a Product: The rights attached to the program must not depend on the program's being part of a particular software distribution. If the program is extracted from that distribution and used or distributed within the terms of the program's license, all parties to whom the program is redistributed should have the same rights as those that are granted in conjunction with the original software distribution.

9. License Must Not Restrict Other Software: The license must not place restrictions on other software that is distributed along with the licensed software. For example, the license must not insist that all other programs distributed on the same medium must be open-source software.

*10. License Must Be Technology-Neutral: No provision of the license may be predicated on any individual technology or style of interface." (Open Source Initiative <http://www.opensource.org/docs/definition_plain.php> (last visited 6/14/05)).

[32] *See e.g.,* Weber, at 197-207 (2004).

There has been an ongoing, and often heated, academic and public debate on whether the patent system enhances innovation, and whether it even should be applicable to the new generations of technologies, particularly information technology and life-sciences[33]. The problem is that it is almost impossible to say anything definite about the economic efficiency of the system. Patent economics is complex and has multiple dimensions. It has been recently recognized, for instance, that besides enhancing innovation through inducing more R&D investments and promoting technology diffusion, patents that are legal, limited monopolies may increase competition[34]. Hence, it is not given that the more a patent-holder gets, the less competition and the less benefit there is to consumers. In addition, the effects of patent protection are different in different fields[35], and in many cases the theoretical problems are not as severe in practice[36].

Although it is difficult to assess whether and when patent protection is beneficial for society, some flaws, such as the granting of software and business-method patents that do not fulfill novelty or non-obviousness requirements, have become apparent. Indeed, multiple amendments to the U.S. patent system have been suggested.[37] Even the companies utilizing the patent system the most at the moment understand that the expansive patent game eats away resources they could otherwise spend on R&D[38]. It is likely that the U.S. patent system is about to experience some turbulence. This requires, of course, that public discussion, various research papers, books and specifically recently published recommendations not only reach the eyes of political decision makers and the courts but also become enacted. In the meantime, Europe is still arguing whether and in what form software and business-method patents should be granted. Individual software developers and open-source software supporters in particular have raised their voices in their fight against software patents[39]. In fact, the European parliament eventually rejected the proposed directive on computer-implemented inventions[40]. The time was not mature for its adoption. At the same time, the European Patent Office (EPO) grants patents to software-related inventions without much objection based on computer programs' character as a non-patentable subject

---

[33] Commission on Intellectual Property Rights (CIPR), *Integrating Intellectual Property Rights and Development Policy*, at 111 (September 2002), <http://www.iprcommission.org/graphic/documents/final_report.htm> (last visited 9/5/05).

[34] *See e.g.,* OECD, at 9 (2004); FTC (2003).

[35] *See e.g.,* CIPR, at 112 (2002); Jaffe & Lerner, at 198 (2004); OECD, at 9 (2004); Dan L. Burk & Mark A. Lemley, *Designing Optimal Software Patents,* at 89 (Stanford Law School, Public Law & Legal Theory Working Paper series, Research Paper No. 108 and University of Minnesota law School, Legal Studies Research Paper series, Research Paper No. 05-11, March 2005).

[36] The means to mitigate patent-related problems involve licensing, inventing around, moving research offshore, or simply infringing (CIPR, at 127 (2002)).

[37] *See e.g.,* FTC (2003); National Academy of Sciences, *A Patent System for the 21st Century* (April 2004), <http://www.nap.edu/books/0309089107/html/> (last visited 5/25/05); Jaffe & Lerner (2004).

[38] *See e.g.,* Federal Trade Commission (FTC), *Patent Reform Workshop, Industry/institutional issues panel* (Ideas into Action, Implementing Reform of the Patent System Conference, UC Berkeley 15-16 April 2004). Transcript available at: <http://www.law.berkeley.edu/institutes/bclt/patentreform/transcripts/BCLT_Patent_Industry.pdf> (last visited 9/2/05).

[39] *See e.g.,* Jeremie Zimmermann, *Europe Struggles over Software Patents* (IEEE Spectrum, September 2004, 61-63).

[40] Michel Rocard, *No Directive on Software Patents* (European Parliament, *Report on the Council common position for adopting a directive of the European Parliament and of the Council on the patentability of computer-implemented inventions (11979/1/2004 – C6 0058/2005 - 2002/0047(COD)*, 6 July 2005), <http://www2.europarl.eu.int/omk/sipade2?PUBREF=-//EP//TEXT+PRESS+DN-20050706-1+0+DOC+XML+V0//EN&L=EN&LEVEL=2&NAV=X&LSTDOC=N#SECTION1> (last visited 9/3/05).

matter: according to one estimate more than 20,000 software patents had already been granted by 2002[41].

The identified shifts have shaped the status of software and business-method patents, and will continue to affect them in the future. In fact, it appears that the developments in the patent arena have followed a sine wave, fluctuating from strong to weak and from weak to strong protection, and from the strategic to the non-strategic and back to strategic view of patents. Are we confronting another chasm? Is the era of strong and easily obtainable patent protection over? Are patents becoming less paramount to ICT firms?

This paper examines the various trends in the software and business-method patent ecosystem[42] with a view to determining whether we are heading towards a weaker patent regime and their diminishing role in business. A further purpose is to provide a holistic view in order to promote knowledge of the software and business-method patent framework.

The software and business-method patent ecosystem is illustrated in Figure 1. Technological developments and academic, political and legal systems that overlap are depicted here as forming part of the company's business/competitive environment.

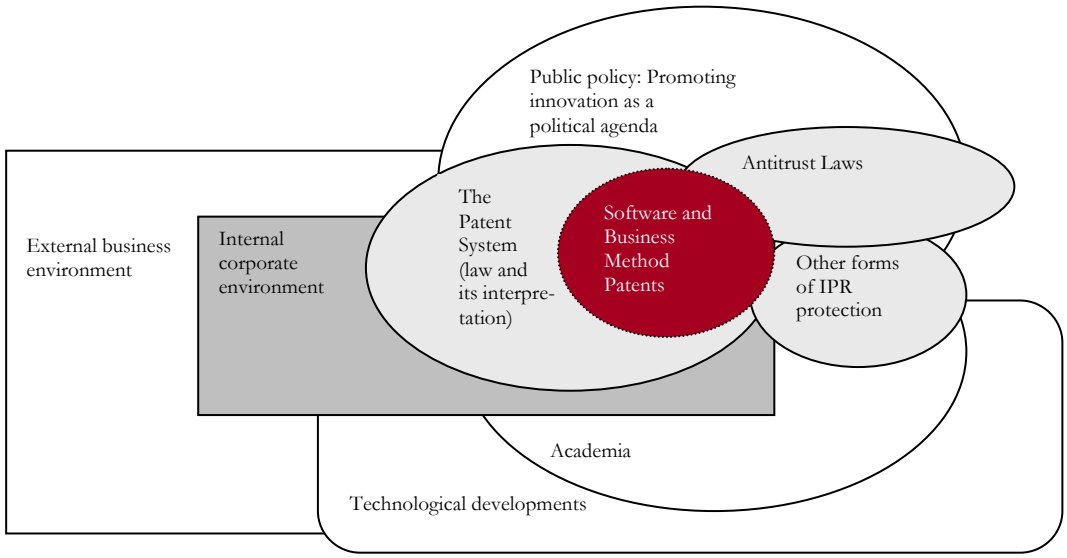



**FIGURE 1.** THE SOFTWARE AND BUSINESS METHOD PATENT ECOSYSTEM

[41] Kim G. Hansen, *Software Patents in Europe,* at 176 (in Peter Wahlgren (ed), *IT Law*, Scandinavian Studies in Law, Vol 47, Stockholm Institute for Scandinavian Law, 2004).

[42] The term ecosystem originates from biology and refers to self-sustaining, dynamic systems whose members benefit from each other's participation via symbiotic relationships. Ecosystem can be an area of many sizes, and it contains organisms (e.g., plants, animals, bacteria) interacting with one another and their non-living environment. In business context, an ecosystem can be viewed as a system in which the relationships established across different industries become mutually beneficial, self-sustaining and somewhat closed. *See e.g.* Learnthat.com, <http://www.learnthat.com/define/view.asp?id=302> (last visited 9/1/05); Biology-online.org, <http://www.biology-online.org/dictionary/ecosystem> (last visited 9/1/05). In this paper the term is used flexibly and it refers, as the title indicates, to the interconnections between academic, political, legal and business developments having to do with software and business method patents. Technological developments are also included but as they are not highlighted they are largely viewed as part of the business environment.

## B. THE RESEARCH OBJECTIVE

Although the fast-evolving area of software and business-method patents has been a relevant research theme for over a decade, there is a lot to be done before we are able to declare the case closed. For example, the big picture comprising both the ideology and the implementation of the patent system, and software and business-method patents in this context, is clearly deficient. It is my observation that legal scholars and practitioners often take the law and the legal practice as it is, and thus concentrate on interpreting a specific wording of the patent law, or a certain court case without paying much attention to the economic reasoning behind the rules. It seems also to be common, particularly for economists, to oversimplify the connection between innovation and patents. Economists typically look at the macro level and attempt to determine whether innovation is promoted in a certain field, but ignore the associated practicalities and the system's underlying complexity. Furthermore, the (software) engineers' perspective appears often as idealistic and highlights the importance of being able to innovate freely, while ICT companies promote the interpretation that contributes to their prevailing business interests. The unfortunate result is that this type of academic discussion may have little or no real-world value. It could be misleading at worst, while the practical perspective often lacks the societal aspect. A combination of academic interest, practitioners' point of view and business reality is needed.[43]

With a view to filling the research gap and offering a glimpse into the future, I aim in this paper to provide a comprehensive picture of software and business-method patents. My approach is interdisciplinary, and the developments are considered from various perspectives. Four interrelated and partially overlapping trends are combined, three of which are societal, and the fourth is business-oriented. These are: 1) trends in academic/public discussion 2) trends in political views, 3) trends in the law and its interpretation, and 4) trends in the business climate. I examine the driving forces and point out problems and common misunderstandings, but make no attempt to make policy recommendations. The purpose is to provide basic information and to help academics, legislators, judges, and companies to see the forest for the trees. My objective is to offer a reasonable starting point for future research and decision-making in an area that has a notable impact on industrial development even beyond the U.S. and Europe. Despite the potential spillover effect, this study is largely limited to the above-mentioned areas.

## C. RESEARCH METHODOLOGY

The originality of this research resides in the combination of various perspectives. It contributes to the discussion on software and business-method patents in particular by bringing the theoretical and practical aspects together. In addition, it identifies and clarifies some problem areas, introduces new perceptions such as the "no patents strategy", and presents a vision of the future.

The paper is based on research conducted by others. Multiple research papers and reports published in the U.S., such as the Federal Trade Commission's study "To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy" (2003) and Wesley M. Cohen and Steven Merrill's (eds.) "Patents in the Knowledge-Based Economy" (2003), have explored

[43] *See also* Frank H. Easterbrook, *Who Decides the Extent of Rights in Intellectual Property?*, at 405-413 (in Rochelle Dreyfuss, Diane L Zimmerman & Harry Fist (ed.), *Expanding the Boundaries of Intellectual Property Innovation Policy for the Knowledge Society*, Oxford University Press 2001, 405-413).

patent and antitrust developments. Software and business-method patents have been studied from legal, technological and economic perspectives, and companies' patent strategies have been a popular topic. To mention a few sources, legal developments consisting of a stream of court cases are described in books such as Merges and Duffy, "Patent Law and Policy: Cases and Materials" (2002) and Merges, Menell, and Lemley, "Intellectual Property in the New Technological Age" (2003). Cohen and Lemley reviewed the scope of software patents in their article "Patent Scope and Innovation in the Software Industry" (2001), and patent system's efficiency has been addressed by Jaffe, Gallini, Ziedonis, Shapiro, Hall, Kortum, Lerner, Levin, Merges, Lessig, Bessen, J Cohen, and W. Cohen, among others. Business literature includes books such as Rivette and Kline's "Rembrants in the Attic" (2000), Davis and Harrison's "Edison in the Boardroom" (2001), and Berman (ed.) "From Ideas to Assets" (2002). Furthermore, software engineers' views on software and business-method patents are aired in Internet discussions and magazines published by the IEEE, for example. On the whole, there is comparatively more patent-oriented research in the U.S. than previously. In addition, research is becoming more interdisciplinary, and there is a strong trend towards empirical studies that rely upon statistical and econometric analysis of collected data on the acquisition and enforcement of patents.[44]

In Europe, the legalistic and patent engineers' view of software as a patentable subject matter has been well represented. For example, Beresford's book "Patenting Software Under The European Patent Convention" (2000) provides a good starting point for finding out the status of software patents in Europe. Less attention has been devoted to the other patentability criteria, patent scope, the economic efficacy of the European patent system, and European ICT companies' patent strategies. In fact, more interdisciplinary and empirically oriented research on the European patent system and how it functions would be most beneficial. Nevertheless, some business-oriented studies have been conducted in Europe, such as Granstrand's "The Economics and Management of Intellectual Property" (1999) and Rahnasto's "Intellectual Property Rights, External Effects and Anti-Trust Law" (2003).

Information from the prevailing academic and business literature is complemented by empirical research data from 27 ICT companies. I conducted interviews in 11, and my and my co-instructor Olli Pitkänen's students[45] in eight, Finnish ICT firms. These patent strategy studies were completed in 2003 and they were exploratory in nature. I also interviewed representatives (General council, VP of licensing, or VP of IP) of eight ICT companies in the Bay Area, CA, U.S. These interviews were conducted in cooperation with Pia Hurmelinna in 2004[46]. The companies were asked to fill out a short questionnaire regarding their innovation model before the interview, and their patent strategies and licensing practices were then discussed in more detail. Most questions asked of the representatives were open-ended: quantitative results were not a desired goal.

---

[44] John R. Thomas, *The Status of Intellectual Property Research in the U.S.,* at 6 - 10 (IIP, Institute of Intellectual Property, March 2003) <http://www.iip.or.jp/summary/pdf/thomas2.PDF> (last visited 5/25/05).

[45] Helsinki University of Technology, IT Law Course, Spring 2003. The interviews were conducted as student assignments (group assignment, a group consisting of 4-5 students). The students were instructed to independently select ICT companies that had no patents. Interview questions were provided, but students were encouraged to deepen the interview when appropriate. The purpose was to provide the students with a practical perspective to the subject-matter studied, and also to explore whether companies have implemented a "no patents" strategy in practice.

[46] We were both present at six interviews from which one was conducted via teleconferencing. I interviewed two of the companies alone. Seven companies allowed the discussion to be recorded, and we were both present at the one that did not permit it.

The Finnish companies I interviewed personally differed in size as well as in the particular ICT field in which they were competing. In general, they offered software products and related services, equipment, and/or communications and logistic services to a wide range of clients. The number of patents and pending patent applications varied. The characteristics of the selected companies are illustrated in Tables 1 to 4 in Appendix 1. The objective was to interview representatives of a variety of ICT firms. The in-depth interview incorporated questions regarding patenting, utilization of patents in business, patent infringement and IPR management.

The basic data on the firms in which the students did the interviewing is given in Tables 5 and 6 in Appendix 2. These companies had no patents and they were mainly small information technology (IT) organizations operating primarily in Finland, but also in Sweden, Norway, Great Britain, Germany, Italy and the Benelux countries.

Five of the U.S. firms interviewed were different-sized, global ICT companies providing software and hardware products as well as services to a variety of clients in order to make communication and networking easier. Two of them supplied digital entertainment products, and one delivered secure-access and managed-network solutions to its clients. Unlike the other seven companies, this one had no patents and did not operate globally—its main area of operations being North America. All the other firms had large or medium-sized patent portfolios their size varying between 200 and 2000 patents. The average number of personnel varied from a little over 200 to over 36 000. In the following the U.S. research material is referred as interview data U.S (2004), and the data collected from Finnish companies as interview data Finland (2003)[47].

## D. DEFINITIONS

The business context of this paper is the ICT sector. The justification for this is that, although it might be expected that software-related patents are most important to firms operating in the software industry, most are issued to manufacturing firms operating especially at the electronics and machinery industries. Relatively few are assigned to software-publishing and software-service organizations.[48] Companies such as Microsoft, Hewlett-Packard, Sony, Fujitsu, Matsushita Electric Ind., Samsung, Siemens, Sun and Nokia have been reported as the top software patentees.[49] Moreover, companies operating in the ICT sector apply for a lot of business-method patents many of which are computer-implemented: according to the U.S. Patent and Trademark Office (USPTO), Pitney-Bowes, Fujitsu, IBM, NCR, Hitachi, Citibank, EDS, Microsoft, Neopost

[47] The interview data Finland (2003) has been partially published under the title "*Yhteenveto Suomen ICT-sektorin yritysten patenttistrategioita koskevista haastatteluista*" (in Aura Soininen (ed), Jukka Kemppinen, Perttu Virtanen, Risto Sarvas, Herkko Hietanen & Tommo Reti, *Digital Economy Core Project (DE CORE): Structures of Mobile Digital Economy* (Final Report, Helsinki Institute for Information Technology HIIT, 18 January 2005)). This publication does not include material collected by students. The interview data (U.S.) has so far been analyzed in two conference publications: Pia Hurmelinna & Aura Soininen, *Appropriability and Licensing in Closed versus Open Innovation Models* (EURAM, Munich, 4-7 May 2005) and Aura Soininen & Pia Hurmelinna, *Patent Strategies and Licensing Practices in Closed versus Open Innovation Models* (R&D Management, Pisa, 6-8 July 2005).

[48] James Bessen & Robert E. Hunt, *An Empirical Look at Software Patents*, at 15 (Federal Reserve Bank of Philadelphia Working Papers, Working Paper No.03-17/R, March 2004), <http://www.researchoninnovation.org/swpat.pdf> (last visited 6/21/05).

[49] Although the reliability of the source can be questioned, data regarding software patentees in Europe can be found *e.g.* from FFII's website. *Top EPO Software Patent Applicants 1978-2003,* <http://swpat.ffii.org/patents/stats/index.en.html#jarappl> (last visited 5/25/05).

and Matsushita Electric Industrial were the top 10 assignees in patent class 705 (Data processing: financial, business practice, management, or cost/price determination) in 1995-1999[50].

It is obvious that ICT companies are not restricted to software and business-method patents. In fact, due to definition problems, it is difficult to know exactly which of their patents could be regarded as belonging to these categories, which could be defined in many ways. Software patents could be thought of as patents related to inventions containing a software element, those implemented with software, but solving an external problem, or those in which the problem solved actually resides in the software. Similarly, business-method patents could be understood as patents relating to inventions residing in the technical application of a business-method or in the business-method itself. Indeed, I do not typically make any distinction between the different categories, and have not sought to determine exactly how software and business-method patents are utilized in the business, but have taken the view that, despite the characteristics resulting from problems such as inefficient prior art search and consequent lack of novelty and non-obviousness[51], these patents are utilized in the same way as ICT companies' other patents. It should also be kept in mind that, irrespective of the definition, it is not merely the ICT industry to which software and business-method patents are of interest. Software is pervasive: it is currently used in products and processes in all technological fields. Business-method patents are clearly not industry-specific either.

Another concern over definitions relates to the terms software, computer programs, and algorithms, which are used interchangeably and thus inaccurately in this paper. In fact, software is a wider concept than computer programs and algorithms[52], and patent claims are not typically directed to software as a whole but relate to specific function generating computer programs and applied algorithms described in combination with the computer or computer networks executing the program. Nonetheless, since the term is in common use, I have chosen to apply it. I use also other terms such as computer-implemented, software-implemented and software inventions inconsistently.

## E. THE STRUCTURE OF THE PAPER

The paper is structured as follows: Chapter II, "Four Intertwined Patent-related Developments at Large", describes four identified trends and explains how they are connected. It also introduces recent changes in the business environment and the patent regime, and considers the interface between patent law and antitrust/competition regulation. The focus is therefore on the areas marked in white and light gray in Figure 1. Chapter III, "Developments in Software and Business-method Patents in Europe and the U.S.", concentrates on the legal, political and academic evolution related particularly to software and business-method patents, *i.e.* the area

---

[50] USPTO, *White Paper, Automated Financial or Management Data Processing Methods (Business Methods)* (2000), <http://www.uspto.gov/web/menu/busmethp/index.html> (last visited 5/25/05).

[51] *See e.g.,* Jaffe & Lerner, at 145 (2004).

[52] For example, software is defined as follows in the IEEE Standard Glossary of Software Engineering Terminology (1990): "Computer programs, procedures, and possibly associated documentation and data pertaining to the operation of the computer system." Computer programs are defined as: "A combination of computer instructions and data definitions that enable computer hardware to perform computational or control functions", and algorithms as: "(1) A finite set of well-defined rules for the solution of a problem in a finite number of steps; for example, a complete specification of a sequence of arithmetic operations for evaluating sine x to a given precision. (2) Any sequence of operations for performing a specific task".

marked in red in Figure 1. Chapter IV, "Patent Strategies Reflecting Business Trends in the Information and Communications Technology Sector", focuses on ICT companies' patent strategies that fall into the dark gray area in Figure 1. Potential problems caused by patents in the ICT sector are also addressed, and the discussion is thus drawn together with that in Chapters II and III. Chapter V concludes the paper by distinguishing the identified trends, key misunderstandings and problem areas.

## II. FOUR INTERTWINED PATENT-RELATED DEVELOPMENTS AT LARGE

The software and business-method patent ecosystem discussed in this paper encompasses technological, commercial as well as academic, political and legal frameworks, all of which interconnect and have evolved over time. Indeed, as will be further explained in this chapter, noteworthy shifts that have already taken place in the business arena include the transition from an industrial to an information economy, the era of intellectual property and the notion of intellectual property rights (IPRs)[53]. Furthermore, although maximum dominance has traditionally been a high preference for companies, and IPRs such as patents provide the means for achieving that position, the value of patents is not restricted to preventing all others from utilizing an invention: they also facilitate technology transactions and help a company to position itself favorably in the markets through licensing[54]. In fact, technology management of the future has been claimed to center on leveraging technology that is owned to gain access to technology that is needed[55].

As far as licensing practices are concerned, a distinction will be drawn between closed and more open licensing models, the difference residing mainly in the essence of control[56]. Firms have typically been reluctant to give up their hegemony particularly in relation to their core technologies[57], but due to network effects and the importance of interoperability, they have been opening up their licensing practices and have even occasionally allowed a large, unlimited number of companies to access some of their technologies at no or low cost[58]. It has also become more important to be able to complement companies' internal R&D with external technologies[59]. Although, the ideology of open-source licensing goes even further than most commercial licenses, it has also penetrated the business world[60]. In fact, if openness in licensing starts to prevail in the sense that subsequent inventors are able to access all kinds of third-party technologies easily and at low cost, develop them further and license the entire package to others, it is about to reduce the value of patents to the extent that the right to exclude others loses some of its relevance. Furthermore, along the ideological continuum from "not invented here" to "nothing invented here", patents' importance to a firm is likely to increase at first as leveraging

---

[53] *See e.g.,* Margaret M. Blair, Gary M. Hoffman & Salvatore P. Tamburo, *Clarifying Intellectual Property for the New Economy*, at 84 (in Bruce M. Berman (ed.) *From Ideas in Assets, Investing Wisely in Intellectual Property* (Wiley & Sons, Inc., 2002, 83-108).

[54] Robert C. Megantz, *Technology Management, Developing and Implementing Effective Licensing Programs,* at 80 (John Wiley & Sons, Inc 2002); Vonortas, at 32 (2003).

[55] Parr, at 275 (2002).

[56] Chesbrough, at 155 (2003).

[57] Interview data U.S. (2004); Vortonas, at 33 (2003).

[58] Licensing on liberal terms, widely and on minimal royalties takes typically place when a firm is attempting to establish a standard (David J. Teece, *Managing Intellectual Capital. Organizational, Strategic and Policy Dimensions,* at 143 (Oxford University Press 2000)). Penetration pricing is also one of the reasons why firms give away their technologies for free or for low cost. One of the most famous examples of modern times is the fight over Internet browsers, Microsoft Internet Explorer versus Netscape (Carl Shapiro & Hal R. Varian, *Information Rules. A Strategic Guide to the Network Economy*, at 292-294 (Harvard Business School Press 1999)).

[59] Chesbrough, at 182-184 (2003).

[60] *See e.g.,* Weber, at 197-207 (2004).

becomes more important, but decrease as the business model of a firm reaches the latter end[61]. Exclusivity is a hollow right that has value only in connection with competition[62]. Third-party patents may nonetheless continue to cause problems even to companies operating in the latter end. At the same time, the more commoditized the technology and service-oriented the firms become, the more interested they may become in protecting their services and other types of business methods by patents.

Moreover, it will be established in this chapter that in academic circles, and to some extent in political and legal realms, it is no longer assumed that strong patent protection is necessary for the promotion of innovation in all fields of technology: it has been established that the negative and positive effects vary between industries[63]. A critical view of patent protection has become widespread particularly in the context of biotechnology, software and business methods, but it is also taking hold more generally. By way of a conclusion, it is suggested that the strength of patent protection will be reassessed and will most likely be downgraded.

## A. THE CONNECTION BETWEEN ACADEMIC, POLITICAL, LEGAL AND BUSINESS TRENDS

The patent system is a tool for guiding technological development and promoting innovation. Patents provide their holders with exclusive rights to novel and non-obvious inventions. The limits of these rights are determined by national patent laws and international treaties. These limits should be in line with the goals of the patent system, and with its utility and effects in practice. A dysfunctional system may harm society by causing unnecessary restraints on trade[64].

Patent laws, in their current form, date back to the era of industrialism[65], but have been modified since. It is aspiratory to maintain a supportive policy framework and infrastructure that allows creative thinkers to innovate, and entrepreneurs to create jobs, start new companies and ultimately generate perpetual wealth. For example, due to the internationalizing business environment, harmonizing national patent laws and setting the same protection standards globally have been seen as a major improvement, and as inevitable[66]. Treaties such as The Paris Convention (1883), The Patent Cooperation Treaty (PCT, 1970), The European Patent Convention (EPC, 1973) and the WTO-governed Trade-related Aspects of Intellectual Property Rights Agreement (TRIPS, 1995) have had their role in this respect. Moreover, The Patent Law Treaty (PLT, 2000) has entered into force on 28 April 2005[67]. Nevertheless, national legislations have maintained some divergent characteristics, and although similar terms and phrases might be

---

[61] *See also* Soininen & Hurmelinna (2005).

[62] Hans Ullrich, *Intellectual Property, Access to Information, and Antitrust: Harmony, Disharmony, and International Harmonization*, at 373 (in Rochelle Dreyfuss, Diane L Zimmerman & Harry Fist (ed.), *Expanding the Boundaries of Intellectual Property Innovation Policy for the Knowledge Society*, Oxford University Press 2001, 365-402).

[63] *See e.g.,* CIPR, at 112 (2002); Jaffe & Lerner, at 198 (2004); OECD, at 9 (2004); Burk & Lemley, at 89 (2005).

[64] FTC, at Executive Summary, 3 (2003).

[65] *See e.g.,* Pirkko-Liisa Haarmann, *Immateriaalioikeuden oppikirja*, at 99-100 (Kauppakaari 2001); Ove Granstrand, *The Economics and Management of Intellectual Property, Towards Intellectual Capitalism*, at 27-38 (Edward Elgar 1999); Morgens Koktvedgaard & Marianne Levin, *Lärobok i immaterialrätt*, at 26 (Norstedts Juridik AB 2000).

[66] *See e.g.,* Drahos & Braithwaite, at 10-11 (2002).

[67] WIPO, *Patent Law Treaty (PLT),* <http://www.wipo.int/patent/law/en/plt.htm> (last visited 9/2/05).

used, their interpretation may vary. Despite their deficiencies, new international agreements are constantly called for[68].

Changes to the rationale and language of current legislation are made through political decision-making. The urgency of issuing new legislation in certain areas and the form that legislation takes depend on matters highlighted in academic discussion and other forums, and on the constraints set by previous legislation and international agreements. The lobbying efforts of interest groups are included and given emphasis in the materials that legislators and those who participate in the preparation processes consider. In practice, decisions are not necessarily based on independent economic research in which the interests of the general public are taken into account. For example, Boldrin and Levine (2003) mention the recent Sonny Bono copyright extension law, in which the U.S. Congress unanimously extended copyright protection by 20 years although there was no economic argument whatsoever in favor of such an extension.[69] This Act has been claimed to be the practical effect of the urge of keeping proprietary such notable old works as Mickey Mouse and the songs of George and Ira Gershwin[70].

Minor legal changes come to pass via the interpretation of laws in courts and other forums. How much weight these interpretive modifications carry and how political these adjustments are depend on the legal culture: common-law and civil-law systems differ in this respect. Nevertheless, in both regimes, prevailing academic literature is one source that can be taken into account when decisions are made in individual cases. In doing so judges are, however, compelled to follow and apply the statutes. Unlike academics they do not have the privilege of thinking what the statutes ought to provide.[71]

Legislation and its interpretation set limits on company behavior, but the business environment in terms of how competitors behave and what the culture is like in that particular country or market has a huge impact on how companies exploit available rights. Hence, the business climate, and the ways in which companies exploit patents are somewhat different in Europe compared to the U.S., and there are also variations across industries and company sizes[72]. It should also be remembered that the firm's function is to survive competition and generate as much profit as possible for its shareholders, not to balance the interests of business and society. Basically, everybody would like to be in a monopoly position, and this naturally has an impact on companies' lobbying agendas. Of course, the interests of business and the general public may not be that different in the end. There are always some, usually small and medium-sized, companies that are in opposition to strong entry barriers, but unfortunately these firms are not always the

---

[68] *See e.g.,* WIPO, *Substantive Patent Law Harmonization*, <http://www.wipo.int/patent/law/en/harmonization.htm> (last visited 9/2/05).

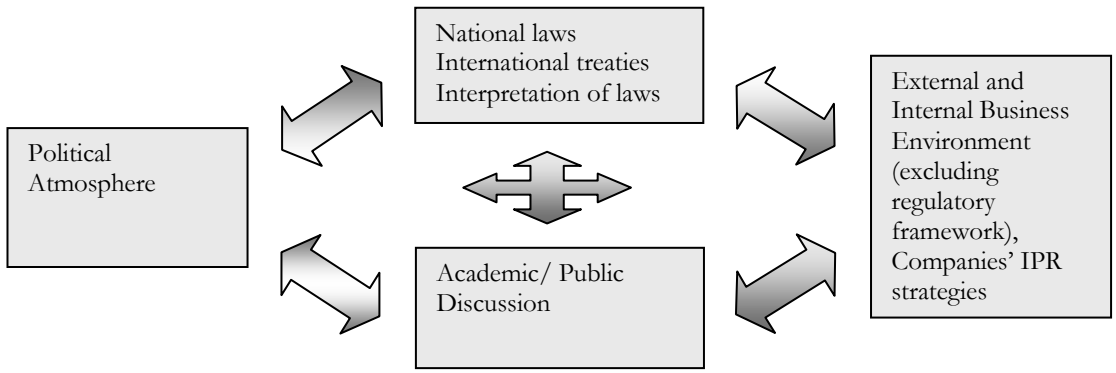
[69] Michele Boldrin & David K. Levine, *Rent-seeking and Innovation*, at 2 (Working paper, 13 July 2003), <http://levine.sscnet.ucla.edu/papers/cr35.pdf> (last visited 6/21/2005).

[70] Robert P. Merges, Peter S. Menell, Mark A. Lemley, *Intellectual Property in the New Technological Age,* at 396 (Aspen Publishers 2003).

[71] Hon. Jon O. Newman*, Academia and the Bench: Toward a More Productive Dialogue*, at 422 (in Rochelle Dreyfuss, Diane L Zimmerman & Harry Fist (ed.), *Expanding the Boundaries of Intellectual Property Innovation Policy for the Knowledge Society*, Oxford University Press 2001, 421-430).

[72] There are differences in licensing practices, for instance. Chemical and pharmaceutical companies license typically on an exclusive basis, while electronics companies have the highest share of non-exclusive and cross-licenses. Also, with an exception to large corporations, unlike their U.S. counterparts, European companies are largely unaware of the value of intellectual property asset management. (Vortonas, at 20, 33 (2003)).

most active lobbyists. Balancing is typically left to academics and interest groups. Figure 2 sums up these factors, illustrating the connections between four patent-related trends.




Academic/public discussion combined with changes in the business environment signaled by companies' lobbying affect what politicians consider important, the type of laws drafted and how existing laws are interpreted. In the context of political decision-making, existing laws and international treaties may have a restricting function; it is not usually necessary to change the system entirely. Moreover, legislation adopted in other countries acts as a guideline in many cases.

Academic/public responses to decisions are made via political legislative process and in the courts. There are also reactions to the way companies and society function. Companies' IPR and patent strategies should also allow for response to potential and actual changes in the social, legal and business framework. The process is continuous and multifaceted.

**FIGURE 2.** FOUR INTERTWINED PATENT TRENDS

Some recent changes in the external and internal business climate, which have created a need for better-suited legislation in the field of patent rights and antitrust (U.S) and competition regulation (Europe) are presented in the following. The focus moves from the increased importance of intellectual property rights in the knowledge-based economy to the current trend towards more openness in licensing as well as more service-oriented business models. A discussion of the main changes in academic, political and legal thinking follows, and although the approach is more general than in the other chapters in this paper, the emphasis is on the ICT sector.

## B. CHANGES IN THE BUSINESS CLIMATE

### (i) The Rise of ICT: from an Industrial to an Information Economy

The information and communications technology sector, as we know it today, consists of manufacturing and service industries involved in information acquisition, processing and transfer, and communications. In fact, ICT is a combination of various industries, including the electronics and electrical industries, telecommunication services, and information technology.[73] All these fields have naturally developed at their individual paces and every one of them has its own special features. For instance, the software industry is fairly young, and its progress owes a great deal not only to companies' research laboratories but also to the U.S. government, military in particular, universities, and groups of users, all of which have contributed to its development

[73] TEKES, at 12 (2002). *See also* OECD, *Measuring the Information Economy 2002, Annex 1. The OECD Definition of the ICT Sector*, at 81.

since the 1950s[74]. Indeed, the ideology of publishing source code, sharing, adding on components created by others and improving others' contributions has characterized software engineering over the years. Although business interests, including capturing the source of competitive advantage and protecting software by trade secrets, copyright and/or patents, entered into the sphere of software development in the late 1960s as software firms started to appear[75], the ideology still holds.[76] It is to be hoped that software engineers developing software just for fun, pride and peer-recognition will continue doing so as they contribute significantly to the technological development.

Whether or not it is a result of the freedom to innovate and compete in certain areas, the ICT sector has developed into one of the most influential industries in the world today. Software is pervasive. It is embedded[77] in products and manufacturing, guiding and information systems in all fields of technology and business, and as a separate commodity it comprises a diverse business sector. There are many types of software that can be distinguished from the supporting hardware: infrastructural software such as operating systems, applications software, which builds on its capabilities, and component software, which is software that can be incorporated into applications and infrastructure software. It does not constitute a complete application in itself, but it is a ready-to-use element that provides certain functionality. The idea in software development is to build new capabilities on previous layers without modifying them, and to build systems by re-using existing components.[78] Indeed, it is the re-usable components providing certain functionalities that many software companies consider worth patenting[79].

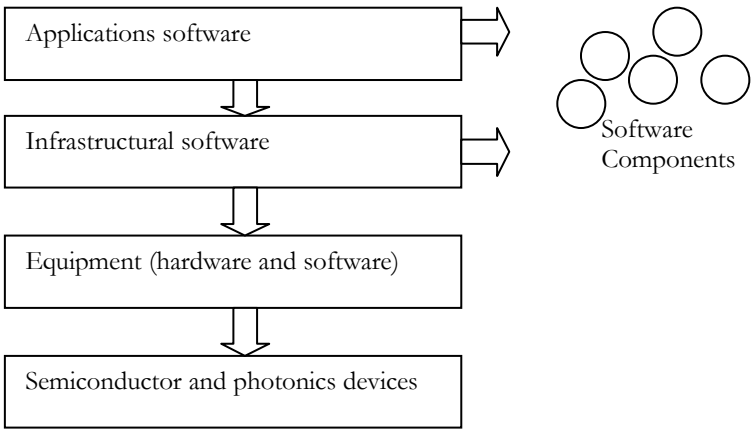



**FIGURE 3.** LAYERS OF COMPLEMENTARY SUPPORTING SOFTWARE[80]

---

[74] *See e.g.,* Paul E. Ceruzzi, *A History of Modern Computing* (The MIT Press 1998); Chandler, at 121 (2001).

[75] Ceruzzi (1998).

[76] *See e.g.,* Pekka Himanen*, The Hacker Ethic and the Spirit of the Information Age* (Random House 2001).

[77] Embedded system can be defined as "a specialized computer system that is part of a larger system or machine. Typically, an embedded system is housed on a single microprocessor board with the programs stored in ROM. Virtually all appliances that have a digital interface -- watches, microwaves, VCRs, cars -- utilize embedded systems. Some embedded systems include an operating system, but many are so specialized that the entire logic can be implemented as a single program." (Webopedia, <http://www.webopedia.com/TERM/E/embedded_system.html> (last visited 6/7/05))

[78] David G. Messerschmitt & Clemens Szyperski, *Software Ecosystem, Understanding an Indispensable Technology and Industry,* at 24 (The MIT Press 2003).

[79] Interview data Finland (2003).

[80] Messerschmitt & Szyperski at 24 (2003).

The hardware and software providers, as well as service providers, content providers and end-users (organizations and individuals), form part of the complex software ecosystem[81], and thus also of the software and business-method patent framework comprising a constantly increasing number of applied-for and granted patents. However, the effects of information technology extend even further. In fact, in conjunction with the development of communications technology, information technology has affected all of society. It has changed the way information is acquired and transferred, improving productivity at home and in the workplace. It has also created new ways of reaching a larger customer base than was previously accessible. In particular, the expansion and vast utilization of the Internet have facilitated the flow of information[82]. The development of the ICT sector has led the way towards a new, information economy.

**(ii) Intangible Assets Become Vital**

The information economy is more knowledge-based than the old industrial economy that was, to a large extent, driven by economies of scale[83]. The importance of intangible assets such as knowledge, competence and intellectual property (IP) weighed against tangible assets such as factories and manufacturing capabilities has increased.[84] As a consequence, strategies for preventing others from stealing and imitating these companies' key assets have become more important. Contracts and intellectual property rights (IRRs), including patents, copyrights, models, trademarks and trade secrets, combined with various technical means such as access control, can be utilized in this connection. In fact, IPRs establish competitive markets for information and knowledge goods[85].

Because the importance of intellectual property in relation to companies' other resources has increased, the IP markets have also become more vibrant. As understood in this paper, intellectual property incorporates inventions, discoveries, know-how, processes, methods, copyrightable works, original data, and other creative or artistic products that can somehow be legally protected. It also includes the physical embodiment of intellectual effort, such as models, machines, devices, designs, apparatus, circuits, computer programs and records of research.[86] However, the practical dilemma with most intangibles is that they do not fit well into tangible world concepts and business structures. This has created uncertainty in business, one reason being that the mechanisms for IP valuation are still undeveloped and companies have not had a credible way of determining the value of these intangibles to themselves, to buyers and to investors. Unlike tangible property, intellectual property has value only in context and has not only one but multiple value chains. Patents for instance can have value derived from excluding competitors, licensing, and access to use external technologies at the same time.[87] This stems

---

[81] Messerschmitt & Szyperski (2003).

[82] OECD, at 15 (2004).

[83] Shapiro & Varian, at 173 (1999).

[84] Teece, at 3 (2000).

[85] Ullrich, at 375 (2001).

[86] Southern Illinois University Carbondale, Office of Research Development and Administration (ORDA), *Glossary of Research terms* <http://www.siu.edu/orda/general/glossary.html> (last visited 5/25/05).

[87] Patrick H. Sullivan (ICMG), *The Valuation Paradox* (IP Society, *Advanced Topics in IP Valuation Seminar*, Palo Alto, 13 July 2004).

from their nature as knowledge goods: if someone learns about an invention, he or she is able to apply that knowledge, and this use does not diminish the ability of others to utilize the same invention. Its use is non-rival just as the use of information goods such as software and entertainment products stored in digital form.[88] In particular, the software industry, in which returns on R&D investments and in many cases the entire market structure are influenced by the ownership of intellectual property rather than tangible property,[89] is therefore seeking its place among "traditional" industries. Another special characteristic of software is that its replication, storage, and distribution are very inexpensive compared to its creation costs[90].

IPRs enhance IP tradability by giving it a form, a defined right that can be transferred. Indeed, patents have emerged as a very important intellectual asset management tool utilized in the pursuit of profit enhancement through IP sales[91]. Trading function has recently been highlighted even more strongly due to the changes in the internationalizing innovation environment. The production of tangible goods is increasingly moved to the developing countries while their IPR components are produced in the developed world[92]. Moreover, many companies no longer rely only on their own resources and capabilities in producing new innovations, and have moved towards a more open approach. Nowadays, a firm has to be able to take advantage of useful ideas that are produced outside in order to be successful.[93] In-house R&D is not enough to bring competitive advantage in today's dynamic business environment. Collaboration between various companies has become increasingly essential as a result of the technological complexity of products and processes, rapid technological change, more intense competition, and higher costs and risks associated with innovation. In addition, companies have become more specialized, and therefore, given the typically systemic nature of innovations in the ICT industry, are often forced to acquire complementary technologies from other firms. The interoperability of products and processes is also of essence. In fact, developments in innovation processes have enhanced technology and patent licensing.[94] However, as collaboration between potential or actual competitors increases, in the form of standardization for example, antitrust and competition law problems may emerge.

### (iii) The Digital Marketplace Challenges Operational Models

The Internet became the dominant design of networking in the late 1990s changing the competitive environment within the ICT sector[95]. For instance, a shift from product to process innovation, *i.e.* improvement, differentiation and development of applications of the dominant technology, has taken place in certain fields: Internet protocol is used today as a basis for most

---

[88] Suzanne Scotchmer, *Innovation and Incentives*, at 31 (MIT Press 2004); FTC, at Chapter 1, 5 (2003).

[89] Graham & Mowery, at 219 (2003).

[90] Messerschmitt & Szyperski, at 20 (2003).

[91] Vortonas, at 32 (2003).

[92] GRAIN, *One Global Patent System? WIPO's Substantive Patent Law Treaty* (October 2003), <http://www.grain.org/briefings_files/wipo-splt-2003-en.pdf> (last visited 9/3/05).

[93] Chesbrough, at 155 (2003).

[94] OECD, at 15-16 (2004).

[95] Olli Martikainen, *All-IP Trends in Telecommunications*, at 1 (International Workshop NGNT, 2002), <http://saturn.acad.bg/bis/pdfs/01_doklad.pdf> (last visited 5/25/05).

applications in telecommunications[96], and operators in particular are facing challenges due to the evolution from circuit-switched service delivery infrastructure to packet-switched all-IP[97] infrastructure that is low-cost and available for everyone. This has diminished operators' role and forced them to search for new earnings capabilities from mobile and content services built on the open infrastructure.[98] The Internet has affected also the ways in which software is designed, architected, delivered and consumed service-orientation being the prevailing trend at many levels. For instance software distribution is converting, as the web-based "software as a service" -model is getting more attractive. Alongside perpetual licenses software can increasingly be subscribed.[99]

The expansion of the Internet has posed further challenges to ICT and other companies in their business strategies including the ways in which they exploit patents in this new environment. Just like the software industry in its early days, the Internet used to be a patent-free zone. By now, patents have become an essential part of e-commerce. Service sectors, such as banking, retailing, insurance, and telecom services are nowadays more active in applying for patent protection.[100]

Presumptions aired some years ago about the digital economy and the Internet as a marketplace suggest some reasons why patents have assumed importance in this environment. For example, Porter (2001) claimed that the Internet diminishes many traditional sources of competitive advantage: it makes it possible for buyers to have easy access to information about products and suppliers, which bolsters their bargaining power and intensifies price competition. In addition, the need for sales forces and for access to established distribution channels is not as critical on the Internet as it is in the conventional world, thus the Internet reduces barriers to entry. Then again, rivalry is intensified because the Internet is a wide, international marketplace and it brings more companies into competition.[101] In fact, based on price data collected on CDs and books sold through the Internet versus conventional retail outlets, Brynjolfsson and Smith (2003) found that Internet prices are 9% to 16% lower than prices in conventional outlets. However, adjustments in the prices of Internet retailers are more incremental than those of comparable conventional retailers.[102]

According to Porter (2001), new sources of competitive advantage, such as strong network effects[103] benefiting the first firm to capture the largest market share, and potentially high

---

[96] Martikainen, at 2-3 (2002).

[97] IP refers here to Internet protocol, not to intellectual property.

[98] Ericsson AB, *Evolution towards All-IP: the Service Layer* (White Paper 2005), <http://www.ericsson.com/products/white_papers_pdf/evolution.pdf> (last visited 5/25/05).

[99] Gavin Clarke, *IBM Pushes 'Software as a Service' on Partners* (The Register, 27 May 2005), <http://www.theregister.co.uk/2005/05/27/ibm_saas_pw/> (last visited 6/7/05); Eric Knorr, Leon Erlanger & James R. Borck, *A Field Guide to Software as a Service* (InfoWorld, 18 April 2005), <http://www.infoworld.com/article/05/04/18/16FEsasdirect_1.html> (last visited 6/7/05).

[100] Stephen C. Glazier, *e-Patent Strategies: e-Commerce, the Internet, Telecom Services, and Business Methods (with Case Studies and Forecasts),* at 24 (LBI Law & Business Institute, Inc, 3rd edition, 2000).

[101] Michael E. Porter, *Strategy and the Internet,* at 66 (Harvard Business Review, March 2001, 63-68).

[102] Erik Brynjolfsson & Michael D. Smith, *Frictionless Commerce? A Comparison of Internet and Conventional Retailers,* at 563 (Management Science, Vol. 46, No. 4, April 2000, 563-585).

[103] Network effects arise when the value one user places on a product or service depends on how many other people are using it. Then again, if network effects are present and a system has attracted a lot of users, it is difficult for a user to switch to another system. It could be said that switching costs are high and that customers have been locked into a system. (Shapiro & Varian (1999)). Generally speaking, network effects, and thus also standards that allow

switching costs, did not prove valuable despite all predictions. This is not to say that network effects are not of relevance, but it is easier to switch from one supplier to another on the Internet, and its openness makes it difficult for one company to enjoy their benefits.[104]

As certain traditional ways of achieving competitive advantage have not been applicable on the Internet, it has been necessary for companies to adjust their business strategies. To supplement new ways of gaining and maintaining competitive advantage, companies have become more interested in other applicable ways that make them stand out from their competitors. Combined with the ease of replicating business models in cyberspace, this explains the urge for patenting not just inventions relating to the underlying infrastructure and applications that allow the Internet to function, software, networks, designs, chips, routers, switches, user-interface and so on[105], or features of software products and software-implemented services, but also new ways of doing business on a more abstract level[106]. Same level of secrecy available in the conventional market place is not on hand on the Internet[107]. There have also been defensive reasons for filing more Internet-related patents as bricks-and-mortar companies have been going through their portfolios to see whether some of their patents are broad enough to cover Internet applications, thus allowing them to capture a share of the increase in e-commerce[108].

### (iv) Open Licensing Models Attract ICT Firms' Interest

Although patents have become paramount for protection, trade, co-operation and leverage purposes, firms may need to further amend their patent (and copyright) strategies in order to maintain their competitive advantage. Although many are keen on controlling the rights related to their products, processes and services, a proprietary model in which access to such innovations is restricted is not always viable or practical. The benefits of product compatibility and interoperability, and therefore also of open standards, are considerable, but companies should also be aware of the special characteristics and opportunities the Internet offers. The Internet is a highly interactive environment of sequential innovation: allowing a large number of subsequent creators and inventors to make improvements to an original work or technology instead of limiting access to it may add to its value.[109] Indeed, von Hippel has demonstrated in his recently published book "Democratizing Innovation" (2005) that due to continuing advances in computer and communication capabilities an increasing number of inventions is born among users of products and services including both individual consumers and companies. According to von Hippel neither companies nor legislators should ignore the potential of such, typically freely-revealed inventions and the societal welfare they produce[110]. Nowadays, user-networks and

---

others to add interoperable products and services to a system, are essential in the ICT sector. Standardization is discussed more comprehensively in the section on patent strategy.

[104] Porter, at 68 (2001).

[105] Rice (2003).

[106] Stephen C. Durant & Thomas C. Chuang, *E-Commerce Patents and Shifting Balances in Patent Law,* at 109 (IEEE Communications Magazine, July 2000, 106-110).

[107] OECD, at 15 (2004).

[108] Robert R. Kimball (RealNetworks Inc.), *General Counsel Roundtable – How Do E-Commerce Best Practices Evolve?* (Stanford Ecommerce Best Practices Conference, 25 June 2004).

[109] James Bessen, & Eric Maskin, *Intellectual Property on the Internet: What's Wrong with Conventional Wisdom* (Working Paper 2004), <www.researchoninnovation.org/iippap2.pdf> (last visited 6/21/05); *See also* Shy & Thisse (1999).

[110] Eric von Hippel, *Democratizing Innovation*, at 1-2 (The MIT Press 2005)

(virtual) communities provide useful structures and tools for developing, distributing and testing innovations much faster and more effectively than manufacturers[111].

Innovation communities and individual users have played a central role in the area of software development from the start: before IBM's unbundling decision in the 1970s and the birth of the software industry, software, aside from that written by the computer companies themselves, was produced by the buyers of computers or by individuals for hire[112]. At the present day, the success of open-source software, the development of which no longer takes place only on the grassroots level but has penetrated the commercial world, has well-demonstrated that a proprietary model where software cannot be copied, modified, or distributed, source code is not available, and reverse engineering is forbidden, is not the only viable solution[113]. Indeed, this model has already affected commercial software licensing as various licensees disfavour the licensor keeping the source code secret, and for instance different types of shared and public source licenses have emerged[114]. A range of open-source licensing models, although based primarily on copyright protection but increasingly including patent clauses, support "freedom" of software by allowing licensees to run it for any purpose, to study how it works and to adapt it, to redistribute copies and to improve it and distribute the improved version both commercially and non-commercially.[115] Therefore, although the IP protection may be similar, the licensing terms in a variety of open-source licenses differ from those used in typical commercial software licenses. Because anyone can become an open source distributor and compete on price, business models based on open source software circle often around services, such as support and installation, and selling warranties. Of course dual licensing meaning that software is licensed under both open source and commercial license is an option.[116] Openness in licensing, the resulting access to various external technologies and particularly their commoditization tends to go hand in hand with service-oriented business models in which the technology itself is no longer the primary source of differentiation.

In addition to allowing free distribution and modification of software or other technologies, for that matter, there are strategic reasons why companies should not always react if their products are being used without authorization. When the network effects are potentially strong, the larger number of users, whether they are authorized or not, increases the utility of the particular product or service[117]. In any case, software inventions tend to have quick, cheap and fairly

---

[111] von Hippel, at 11 (2005).

[112] Chandler, at 121 (2001).

[113] *See e.g.,* Lessig (2001).

[114] For instance Microsoft has created a shared-source program, which allows its customers to read and examine parts of the source code but does not allow the use of the code or its derivatives for commercial purposes. This way engineers are able to use the information to do practical things and design interfaces to Microsoft's products and to create programs that read and write Microsoft's data format, but they are not given the right to design competing products that would infringe Microsoft's copyrights or patents. Public source licenses go further allowing licensees to make copies, create derivative works, and distribute them as well as examine and interface. Royalties are, however, typically required if licensees wish to utilize the software for commercial purposes. (Lawrence Rosen, *Open Source Licensing, Software Freedom and Intellectual Property Law,* at 226-264 (Prentice Hall PTR 2004)).

[115] Rosen*,* at 2 (2004).

[116] Rosen, at 231-232 (2004). *See also* Weber, at 195-196 (2004).

[117] Shy & Thisse, at 186 (1999). *See also* Davis Lee, *Profiting from Innovations in Digital Information Goods* (in Dundar F. Kocaoglu & Timothy R. Anderson, *The Role of Intellectual Property Rights. Technology Management in the New Technology Era*, 2001, 471-480).

straightforward post invention development cycle[118]. Furthermore, returns on investments in already established software products are oftentimes realized early on in the product/version lifecycle, making infringement at a later stage less detrimental. In sum, an even more open approach to innovation and technology diffusion than most companies are currently used to may turn out to be the winning strategy.

In general, most business developments are dictated by the markets and have little to do with the legal framework. However, the legal framework does encourage companies to adopt a certain model. Thus, by adapting patent and antitrust/competition regimes governments may be able to guide society's development in a desired direction. Given the widespread impact of ICT, it is essential that policy decisions do not deter further development of the industry. The ICT sector currently invests heavily in R&D and is highly innovative. In fact, ICT manufacturing industries accounted for more than a quarter of total R&D expenditure in manufacturing in most OECD countries in the year 2000.[119] It is to be expected, though, that technological development not only shifts within the industry but also slows down as the industry matures. Indeed, over the 1990s, average annual growth rates for R&D were already higher in services than in manufacturing[120]. The next phase following a service and content -based information economy has been claimed to be its industrialization meaning the automatization of software development and information production, for example[121]. In the meantime technological breakthroughs based on the enhanced product and system interoperability (wireless networks) are driving the industry evolution[122]. The following section addresses the question of the assumed efficacy of the patent system at different times.

## C. CHANGES IN ACADEMIC, POLITICAL AND LEGAL THINKING

The patent regime should be able to adapt to developments in the technological and commercial sectors and to provide incentives to finance the development and commercialization of new products and processes at all times. Efficient protection is one element that is needed in order to do this[123] as patents have traditionally been considered as one of the main incentives for R&D[124]. Adapting what is eligible to be patented, patentability requirements, and patent term and breadth are prerequisites for balancing patent strength so that the optimal protection level can be achieved. Being able to issue preliminary and permanent injunctions, the amount of damages

---

118 Burk & Lemley, at 90 (2005).

119 *OECD Science, Technology and Industry Scoreboard 2003, Towards a Knowledge-Based Economy,* at A.4.3 (2003).

120 *Ibid.*

121 Olli Martikainen, *Innovaatioiden kolmas aalto* (TeliaSonera Finland Research Foundation, Award event, 4 April 2005).

122 Olli Martikainen, *Innovaatioiden kolmas aalto lisää yhteentoimivuutta* (Tiedosta-lehti 2/2005), <http://www.tieke.fi/tiedosta-lehti/?ARTICLE_NUM=14275> (last visited 9/7/05).

123 *See e.g.,* European Commission, *Innovation Policy in Europe 2001*, at 22 (European Trend Chart on Innovation, Innovation Papers No. 17), <http://trendchart.cordis.lu/annualreports/innovation%20policy%20europe%202001%20en.pdf> (last visited 9/19/05); Richard C. Levin, Alvin K. Klevorick, Richard R. Nelson & Sidney G. Winter, *Appropriating the Returns from Industrial Research and Development,* at 783 (Cowles Foundation Paper 714, 1987, 783-820).

124 OECD*, Patents and Innovation in the International Context*, at 6 (OCDE/GD(97)210, Paris 1997).

potentially issued, and exemptions to patent-holders' rights also contribute to their strength.[125] Antitrust laws (U.S) and competition regulation (Europe) may also limit the possibilities of rights holders to benefit from their patent rights although the ultimate goals of both regulations are not contradictory: patents that have value mainly in the context of competition can be used as entry barriers, and as such their purpose is partially at odds with that of antitrust/competition laws. The U.S. antitrust regulation is based on the idea of ensuring that competition is free from cartels and the acquisition or maintenance of monopoly power by unacceptable means[126]. Similarly, European, both national and EU, competition regulations aim at encouraging competition and well-functioning market economy[127].

The following describes the trends in relation to the availability and strength of patents and their effects on innovation. These trends flow from the anti-patent to the pro-patent era, and then move again towards a more skeptical view of the benefits of patent protection both generally and particularly in the contexts of software and business methods. It should be noted, that the term "strong patent protection" refers here to the combination of statutory requirements, patent office and court practices and thus to the overall intensity of the legal protection. It does not refer so much to the legal strength of a patent in an individual case. In court, for instance, a narrow patent is typically stronger than a broad patent, and those patents that have gone through a thorough prior art search or have been previously tested are stronger than those which have not. The term does not equal commercially valuable patents, either as this depends on the value of the protected subject matter and patent holder's resources. As the saying goes a weak patent[128] in strong hands is more powerful than a strong patent in weak hands. Furthermore, it does not refer to a strong, high quality patent system.

### (i) The Pro-Patent Era: the Stronger the Better in All Fields of Technology and Business

In the 19th and the early 20th century the U.S. patent holders were able to engage in almost any activity regarding their patent rights without facing problems with the antitrust regime. These activities included patent pooling for the purpose of collectively restricting output and controlling prices, for instance. Indeed, in 1902 the Supreme Court laid out the general rule that there should be an absolute freedom to use or sale patent rights under the U.S. patent laws the object of which was monopoly. However, the pro-patent era was followed by an anti-patent era during which series of court decisions eroded the permissive attitude towards restrictive practices.[129]

The change from the anti-patent era back towards the pro-patent era took place in the U.S. in the mid-80s due to concerns about industrial stagnation and the lack of technological innovation[130]. It was assumed that stronger patents would encourage more innovation in all fields of technology (and apparently even business): a patent grants the inventor the right to exclude others from

---

[125] OECD, at 10 (2004).

[126] Robert Pitofsky, *Challenges of the New Economy: Issues at the Intersection of Antitrust and Intellectual Property* (American Antitrust Institute Conference: An Agenda for Antitrust in the 21st Century, National Press Club, Washington, D.C. 15 June 2000).

[127] Mikko Alkio & Christian Wik, *Kilpailuoikeus*, at 7 (Talentum 2004).

[128] Weak patent refers here to a patent that is likely to be unenforceable in court.

[129] Jaffe & Lerner, at 96-97 (2004).

[130] FTC, at Chapter 1, 18 (2003). *See also* Robert Hunt, *Patent Reform: A Mixed Blessing For the U.S. Economy?,* at 16 (Federal Reserve Bank of Philadelphia, Business Review, November/December 1999, 15-22).

utilizing the invention for a certain period of time, thus allowing him or her to recoup the initial R&D investments and to gain a reasonable return.[131] This may happen if the inventor commercializes the invention personally, or transfers the patent rights to someone who is in a better position to introduce the invention onto the market[132]. On this basis, it could be argued that the stronger the patent, the better the possibilities of recovering investments, and the more stimulus there is to invest in R&D.

What happened at the hands-on level in the U.S. was that the Court of Appeal for the Federal Circuit (CAFC) was established in 1982, which unified and strengthened patent rights also at the District Court levels.[133] The CAFC resorted to a great extent to the doctrine of equivalents and expanded the average patent scope. Furthermore, it was, and still is, willing to sustain large damage awards and to grant preliminary injunctive relief to patentees.[134] It has become also easier to fulfill the non-obviousness requirement due to the weight given to secondary considerations such as commercial success[135], and common-law exceptions to patent-holders' rights have been interpreted narrowly. In the recent Madey v. Duke University case (2002), the Federal Circuit came to the conclusion that research projects advance institutions' legitimate business objectives, including educating and enlightening the students and the faculty participating in these projects. Consequently, experimental use doctrine, which is limited to actions performed "for amusement, to satisfy idle curiosity, or for strict philosophical inquiry", could not be used in defense of patent infringement.[136]

Although the attitude in Europe never was quite as anti-patentee as in the U.S, Europe has experienced a shift towards pro-patent atmosphere too. According to Justice Jacob (2001) IPRs seemed like a good thing in his early days as a barrister, and the more and stronger they were the better.[137] For the most part, strengthening has, however, taken place via harmonization of national laws and the establishment of centralized examination systems[138]. The Council Regulation (EEC) on the creation of a supplementary protection certificate for medical products (1768/92) could be mentioned as one clear example. TRIPS, which is the most significant agreement on IPRs in the 20th century, has also played a role in this respect, although its effects have been most visible in the developing countries. Furthermore, attention has recently been devoted to patent holders' insufficient possibilities to enforce their rights within Europe. Indeed, the European Union has introduced an enforcement-directive (2004/48/EC) aimed at harmonizing the IPR sanction system within the common market[139]. Moreover, it has put the question of community patents on the table again. The purpose is to make it cheaper and easier

---

[131] Nancy T. Gallini, *The Economics of Patents: Lessons from Recent U.S. Patent Reform*, at 131 (Journal of Economic Perspectives, Vol 16, number 2, Spring 2002, 131-154).

[132] Granstrand, at 83 (1999).

[133] Hall & Ham Ziedonis, at 101 (2001).

[134] Samuel Kortum & Josh Lerner, *What is Behind the recent Surge in Patenting?,* at 6 (Research Policy 28, 1999, 1-22); Robert P. Merges & John F. Duffy, *Patent Law and Policy: Cases and Materials*, at 11 (LexisNexis, 3rd edition, 2002).

[135] Jaffe & Lerner, at 119-123 (2004); Hunt, at 20 (1999).

[136] Madey v. Duke University, 307 F.3d 1351, 170 Ed. Law Rep. 164, 64 U.S.P.Q.2d 1737 (Fed. Cir. 2002).

[137] Jacob, at 416 (2001).

[138] OECD, at 17-18 (2004).

[139] More about the enforcement directive, *see e.g.* Marcus Norrgård, *Immaterialrättens sanktionssystem och Enforcement-directivet* (NIR, Number 5, Edition 73, 2004, 444-468).

to protect new inventions in all EU member states, and to avoid the expense, inconvenience and confusion that can occur when judgments in several different national courts are required. According to the proposal, the European Patent Office would have the authority to grant community patents, and it would be possible to enforce these patents in a single Community Patent Court.[140] Despite the efforts, consensus on the Community Patent Act, the claim translation and its binding effect in particular, has yet to be reached.[141] Another litigation centric agreement that has been under discussion in Europe is the European Patent Litigation Agreement (EPLA). The agreement suggests that a European Patent Court should be established. This Court would have jurisdiction to deal with infringement and revocation actions regarding "European"[142] patents.[143]

In connection with the general pro-patent shift, the scope of patentable subject matter has become wider within the last 20 years. This has taken place in both the U.S. and Europe, and it has been a consequence rather than a prerequisite, of both bio-industrial[144] and information technology revolutions.

In the field of biotechnology, once the breakthroughs in molecular biology had taken place, multinational companies started to seek new commercialization opportunities, and wanted the patent system to deliver them the kind of returns it had in chemical technology[145]. Ultimately, the U.S. Supreme Court confirmed in its Diamond v. Chakrabarty (1980) ruling that living things do not fall to the category of non-patentable subject-matter, *i.e.* laws of nature, physical phenomena and abstract ideas, and so they can be patented[146]. Furthermore, the Harvard OncoMouse patent (1988) extended the patentable life-forms from bacteria to higher level organisms, and in the 1980s gene fragments, markers and a range of intermediate techniques and other inputs relevant to drug discovery and commercialization became patentable[147]. In Europe the patentability of biotechnological inventions such as plants, animals, micro-organisms, genes and tools and processes for their production has involved three hurdles all of which the European Patent Office has interpreted narrowly: 1) mere discoveries (EPC Art. 52), 2) inventions whose publishing or exploitation is contrary to "ordre public" or morality (EPC, Art. 53), and 3) plant or animal varieties or essentially biological, but not microbiological, processes for their production

---

140 Commission of the European Communities (EC), *Proposal for a Council Regulation on Community Patents* (COM(2000) 412 final, 2000/017 (CNS), Brussels, 1 August 2000).

141 *See e.g.,* European Commission Press Releases, *Industrial Property: Commission Proposes Establishing Community Patent Court,* IP/04/137, (Brussels, 2 February 2004), <http://europa.eu.int/rapid/pressReleasesAction.do?reference=IP/04/137&format=HTML&aged=0&language=EN&guiLanguage=en> (last visited 6/21/05); Winfried Tilmann, *Community Patent and European Patent Litigation Agreement* (EIPR, Vol 27, Issue 2, February 2005, 65-67).

142 Patents granted by the EPO.

143 European Patent Office (EPO), *Legislative Initiatives in European Patent Law, EPLA – European Patent Litigation Agreement,* <http://patlaw-reform.european-patent-office.org/epla/> (last visited 9/3/05).

144 Drahos & Braithwaite, at 155 (2002).

145 Drahos & Braithwaite, at 155 (2002).

146 CIPR, at 111 (2002).

147 John P. Walsh, Ashish Arora & Wesley M. Cohen, *Effects of Research Tool Patents and Licensing on Biomedical Innovation* at 290 (in Wesley M. Cohen and Steven Merrill (eds.) *Patents in the Knowledge-Based Economy* (National Academy Press, Washington, D.C. 2003, 285-340).

(EPC Art. 53) are excluded from patentability[148]. Also the EU has taken action in this highly controversial, but at the same time one of the most promising business sectors. After ten years of discussions, it introduced the Directive on the legal protection of biotechnological inventions (98/44/EC) in 1998.[149] The directive was largely based on the EPO practice[150].

Even though EPO practice has diluted the scope of the previously mentioned exclusions little by little[151], Europe has maintained a stricter policy than that adopted in the U.S. While it is possible to patent all kinds of transgenetic animals in the U.S., for instance, it is required in Europe that the technical feasibility of the invention is not confined to a particular animal variety[152]. The line between patentable and non-patentable subject-matter is difficult to draw, though, and this area is dynamic and both economically and ethically problematic. Patenting "life" has caused considerable anxiety among the general public, environmental and animal organizations. Also scholars are concerned over these patents' effects on further innovation.[153]

In regard to the other new types of patentable inventions, especially in the U.S., the possibility of granting both software and pure business-method patents has led to difficulties in assessing their patentability. The non-obviousness standard in particular has created practical problems resulting in a huge number of patents that are likely to be judged invalid if challenged.[154] Widespread critique from academia, practitioners and firms has resulted[155]. The general claim is that patent protection, especially in its current form, deters rather than accelerates innovation in fields such as the software industry.[156] Actually, it has become easier to be awarded with a patent also more generally as the patent examiners' workload has unreasonably increased as more and more patent applications are filed. Indeed, although Congress changed the structure of fees and financing of the patent office turning it into a revenue-based agency in the early 1990s, the revenues earned are not spend for the benefit of the patent office. Congress pulls out a large share from the patent office revenue and diverts it to the general fund of the government. Over the eight year period from 1994 to 2002 this amount totaled one billion dollars.[157]

---

[148] Guy Tritton, Richard Davis, Michael Edenborough, James Graham, Simon Malynicz & Ashley Roughton, *Intellectual Property in Europe,* at 109 (Sweet & Maxwell, 2nd edition, 2002).

[149] Commission of the European Communities (EC), *Report from the Commission to the European Parliament and the Council, Development and Implications of Patent Law in the Field of Biotechnology and Genetic Engineering,* at 4 (COM(2002) 545 final, Brussels, 7 October 2002).

[150] Tritton, Davis, Edenborough, Graham, Malynicz & Roughton, at 109 (2002).

[151] CIPR, at 115 (2002).

[152] European Patent Office (EPO), *Guidelines for Examination*, at Part C, Chapter IV, 2a.2 (June 2005).

[153] CIPR, at 112, 115 (2002); Tritton, Davis, Edenborough, Graham, Malynicz & Roughton, at 108 (2002). For further information on biotechnology patent developments *see e.g.* Drahos & Braithwaite, at 155-162 (2002).

[154] Gregory Aharonian, *Does the Patent Office Respect the Software Community?* (IEEE Software July/August 1999, 87-89).

[155] *See e.g.,* Robert P. Merges, *As Many as Six Impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform* (Berkeley Technology Law Journal, Volume 14, 1999); Lawrence Lessig, *The Problem With Patents* (The Standard, 23 April 1999). A list of articles criticizing software and business-method patents is to be found, for example, at www.bustpatents.com.

[156] *See e.g.,* Bessen & Hunt (2004); Cohen & Lemley (2001); Bronwyn H. Hall, *Business Method Patents, Innovation, and Policy* (NBER Working Paper Series, No 9717, May 2003), <http://papers.nber.org/papers/w9717.pdf> (last visited 6/21/05); Sylvain Perchaud, *Software Patents and Innovation* (JILT (1) 2003), <http://elj.warwick.ac.uk/jilt/03-1/perchaud.html> (last visited 6/21/05).

[157] Jaffe & Lerner, at 2 (2004); Malone, at 25 (2002).

Although, also the European Patent Office and other national patent offices have been granting patents on software-related inventions for over a decade, the question whether software and business methods should be patentable at all is still a somewhat controversial subject in Europe, where the EU software patent directive proposal was under discussion for several years until the parliament rejected it on 6 July 2005[158]. In this context the U.S. experience and the critique of software and business-method patents created interesting twists. The anti-patent discussion has not seized, however, and although it may not have much influence, it is likely to continue as long as the *status quo* persists. One of the arguments favoring the current EPO practice and even broader interpretation is the claim that Europe would violate the TRIPS agreement if it placed constraints on the patentability of computer programs or business methods[159]. The argument that all fields of technology should be treated equally when it comes to the availability of patent protection is based on the TRIPS agreement, and in particular on Article 27. Although it is relatively easy to argue that if the business method forms the core of an invention it does not fall into any field of technology, the distinction can sometimes be difficult to make. The Substantive Patent Law Treaty (SPLT) that is currently prepared by the WIPO may also add pressure to settling the question over patentable subject-matter in the near future.

### (ii) Academic Unease: the Stronger Is Not Always the Better, and the Effects of Protection Vary

Although political and legal trends have been towards internationally strong patent protection in all fields of technology, there are serious doubts about the benefits in academia and among the general public. It may be true that strong protection is required in fields in which research and development costs and risks are high and end results are easy to imitate. However, in areas in which early investments are low, the industry develops rapidly, and product cycles are short, preventing others from manufacturing the same or comparable products or using a process without investing the same amount of money in R&D is not that critical. For example, lead-time, secrecy, copyright protection, advance on the learning curve, technological complexity and/or control of complementary assets may very well be enough in terms of making a profit. In fact, according to the results of Cohen, Nelson and Walsh's (2000) empirical research, patents have fairly minimal significance as protection measures, especially in complex industries such as semiconductors. They were nevertheless found to be more important in industries such as pharmaceuticals, chemicals, medical equipment and to some extent in machinery, auto parts and computers. There is a difference between industries in which one patent covers one product and those in which one product involves multiple patented inventions.[160]

Both product and process types, those covered by only one patent and those that may incorporate multiple patented inventions, exist in the ICT industry, but software typically belongs to the latter category. Then again, although firms invest heavily in software development, and software is easy to copy, the manufacturers also benefit from manufacturing costs that are close

---

[158] Rocard (2005).

[159] *See e.g.,* Merges & Duffy, at 174 (2002); Daniele Schiuma, *TRIPS and Exclusion of Software "as Such" from Patentability* (IIC Vol 31, No 1/2000).

[160] Cohen, Nelson & Walsh, at 9 (2000); *See also*, Levin, Klevorick, Nelson & Winter (1987); Edwin Mansfield, *Intellectual Property Rights, Technological Change, and Economic Growth* (in Charles Walker & Mark A. Bloomfield, *Intellectual Property Rights and Capital Formation in the Next Decade,* New York, University Press of America, 1988, 221-244).

to zero. Indeed, the costs of writing and manufacturing computer programs are low in relation to the fixed development costs in many other industries[161]. Moreover, if the Internet is utilized as a distribution channel, the distribution costs are minimal too. Thus, patents may not be necessary for protecting profits that may accrue from the commercialization or sale of software-related innovations. However, it is not only a question of protection: patents often serve other essential purposes, the weight of which varies between industries.[162]

Regardless of whether patents are essential for protecting the revenues that accrue from commercializing new technologies in a certain field, ICT companies certainly utilize the system, and the strength of patents should be fine-tuned so as to encourage innovation. In order to achieve the best results, all the factors affecting patent strength, including patentability criteria, scope, and duration, should be balanced correctly. The first step is to determine whether the current system works or not. Here attention has traditionally been focused on R&D investments as if more would automatically mean the generation and commercialization of more inventions, in other words the production of innovations. The emphasis has been also on licensing and the role of patent disclosures. Encouraging innovation while at the same time potentially reducing competition are not by all means the only effects patents may or may not have on the economy, however. On an international level, the OECD's report, "Patents and Innovation: Trends and Policy Challenges" (2004), is an example of research that recognizes the complexity surrounding their positive and negative effects. The report points out that the traditional view of patents as a trade-off between the positive effects on innovation and the negative effects on competition and technology diffusion, in the sense that others are not free to utilize patented inventions, is incorrect. Patents can either encourage or deter innovation, technology diffusion and competition depending on certain conditions and particular features of the patent regime.[163]

If we focus on the relation between patents and R&D investments, and the patent-protection model is applied to a single, isolated invention, it is true that stronger patents will most likely bring about more R&D investments. Indeed, the patent system fits best to a model where the developed and potentially commercialized product is the discrete outcome of a linear research process[164]. However, according to the prevailing economic literature, particularly in fields of technology in which innovation is cumulative, occurs rapidly, and technology is complex, strong rights may do more harm than good[165]. Cumulativeness in the innovation context means that new innovations build upon previous ones. Thus, the most important benefit of the innovation may be the boost it gives to later innovators.[166] Software, for example, typically consists of previously coded software, which is then modified and to which new code is added the larger system composing then of various components. It is rare to write programs entirely from scratch.[167]

---

[161] Burk & Lemley, at 90 (2005).

[162] Cohen, Nelson & Walsh, at 4, 30 (2000).

[163] OECD, at 9-10 (2004).

[164] CIPR, at 112 (2002).

[165] Adam J. Jaffe, *The U.S. Patent System in Transition: Policy Innovation and the Innovation Process*, at 24-25 (NBER Working Paper No. W7280, August 1999); *See also* Hunt (1999); Suzanne Scotchmer, *Standing on the Shoulders of Giants: Cumulative Research and the Patent Law* (Journal of Economic Perspectives 5(1), 1991, 29-41); Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope* (Columbia Law Review 90(4), 1990, 839-916).

[166] Scotchmer, at 127 (2004).

[167] *See e.g.,* Cohen & Lemley, at 41 (2001).

Research tool patenting has raised similar concerns[168]. The challenge in designing the optimal patent policy for industries with high degree of cumulativeness is to make sure that earlier innovators are compensated for their contributors, while ensuring that later innovators also have an incentive to invest[169].

There is empirical evidence suggesting that patents may, in fact, reduce R&D investments in certain fields. For example, Bessen and Hunt (2004) found that software patents have substituted R&D rather than complemented it. They argue that large manufacturing firms, in particular, have started to employ aggressive patent-portfolio strategies, which have resulted in patent thickets. Since multiple patented inventions may be involved in one innovation, companies willing to manufacture a product are often forced to license or cross-license patents from other companies. Consequently more money is directed to strategic patenting.[170] In this environment, as Bessen (2003) pointed out, patents may also function as a way of gaining access to other companies' R&D pools. This, in turn, may diminish their and other companies' willingness to invest in R&D.[171] Similarly, Hall and Ham Ziedonis (2001) found that, although the strengthening of patent rights did partly result in enhanced patenting activity in semiconductors, it did not bring about more R&D investments. The increase in patenting was rather a consequence of managerial improvements: companies were harvesting more patents out of their R&D activities and building large patent portfolios in order to reduce hold-up problems caused by external patent holders. Strategic patenting can thus redirect resources away from productive research.[172] Hold-up problem, also called anticommons, means that a third party patent covering a certain feature, a single routine in a computer program, for example, may hold-up the production of the entire program[173]. In the worst case the fact that many companies and/or individuals may have the right to block others from using a resource results in a reluctance to innovate[174].

The goal of the patent system to promote innovation also includes the facilitation of technology diffusion. This can take place in two ways: through invention disclosure, and technology and patent licensing. Both means are integrated into the patent system. Disclosing inventions is the underlying goal, and this comes automatically with the bargain. Patents are public documents, and the claimed invention must be disclosed in a detailed manner. The idea is that anyone can potentially learn from a patented invention, develop it further or utilize it after the patent expires.[175] A further hope is that disclosure will direct technological development to fields not crowded with patents, and thus reduce research duplication[176]. However, doubts have been raised not only about the system's ability to induce more R&D investments, but also about its ability to fulfill the mission of enhancing public knowledge. If it is to work as it is supposed to, it should be

---

[168] Walsh, Arora & Cohen, at 290 (2003).

[169] Scotchmer, at 127 (2004).

[170] Bessen & Hunt (2004)

[171] Bessen (2003).

[172] Hall & Ham Ziedonis, at 122, 125 (2001).

[173] FTC, at Chapter 3, 53 (2003).

[174] Michael A. Heller, *The Tragedy of Anticommons: Property in the Transition from Marx to Markets* (Harvard Law Review 111, 1998, 621-688).

[175] OECD, at 7 (1997); Koktvedgaard & Levin, at 197 (2002); Gallini, at 139 (2002).

[176] Haarmann, at 98 (2001); Gallini, at 139 (2002); William M. Landes & Richard A. Posner, *The Economic Structure of Intellectual Property Law*, at 295 (The Belknap Press, Harvard University Press 2003).

able to provide valuable and up-to-date information and encourage people to read the documents. This does not happen if the technology described in them is already outdated when the information is published, or when prior knowledge of a patent leads to the risk of treble damages in patent-infringement litigation, as is currently the case in the U.S.[177]

The scope of the patent determines the pioneer inventor's bargaining power in terms of further development[178]. Hence, overly broad patents may unnecessarily hamper further innovation. On the other hand, strong legal rights to exclude others may provide economic incentives to license these rights and thus facilitate technology transfer. This can occur in the form of technology and patent licensing, cross-licensing and patent pools.[179] Hence, although strong patents may reduce R&D investments, they may promote innovativeness by making technology transfer easier. The above claim that software patents diminish companies' willingness to invest in R&D by facilitating access to other companies' resource pools may, in fact, benefit society. As mentioned earlier, a company's ability to acquire external IP resources has become vital in today's dynamic, fast-evolving and international business environment. Firms that do not have any internal R&D but rely entirely on external technologies have also appeared. Nevertheless, the extent to which licensing and cross-licensing are actually beneficial and advance the commercialization of new products and processes, and how far they serve defensive purposes in terms of paying innovation tax, which has nothing to do with technology transfer, remains open to question.

As mentioned above patents that are means for competition may sometimes even advance it. They may be pro-competitive because they may direct technological development to new areas that are not crowded with patents[180], and have a positive effect on market entry and firm creation in facilitating the raising of capital.[181] Moreover, licensing is generally regarded as pro-competitive, and it has been suggested that even defensive licensing could be pro-competitive as it removes obstacles to the development and exploitation of the licensee's own technology[182], and thus eases the problem of anticommons typical in areas such as semiconductors, biotechnology, computer software and the Internet[183]. On the other hand, it has been claimed that if powerful incumbents insist on trading like-for-like in licensing arrangements, firms with modest or negligible patent holdings may be barred from entry[184]. Furthermore, if firms become confident that they have the access to a wide pool of technology from many cross-licensing partners, they may not feel as intense pressure to develop new technologies themselves, which may result in less competition[185].

---

[177] Gallini, at 139-140 (2002).

[178] *See e.g.,* James Bessen & Eric Maskin, *Sequential Innovation, Patents, and Imitation* (2002); OECD, at 10 (2004); Scotchmer, at 127 (2004).

[179] Gallini, at 141-142 (2002).

[180] Haarmann, at 92 (2001).

[181] OECD, at 9 (2004).

[182] Commission notice: *Guidelines on the Application of Article 81 of the EC Treaty to Technology Transfer Agreements* (Official Journal C 101 of 27 April 2004), <http://europa.eu.int/eur-lex/pri/en/oj/dat/2004/c_101/c_10120040427en00020042.pdf> (last visited 6/21/05).

[183] Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard-Setting,* at 28 (March 2001), <http://faculty.haas.berkeley.edu/shapiro/thicket.pdf> (last visited 6/21/05).

[184] Washington CORE, *Patent Strategies for Venture Firms: Experiences from the Uniter States,* at 12 (March 2003), <http://www.iip.or.jp/e/index.html> (last visited 6/21/05); Shapiro, at 16 (2001).

[185] Jaffe & Lerner, at 61 (2004).

In sum, patent economics has turned out to be extremely complex. In the end, it is often impossible to determine whether patents in general, or in some technological fields such as ICT, are for the better or for the worse from the societal perspective. Although it is possible to identify some problems, more research is needed before fundamental changes to the patent system become a necessity. Moreover, there is a need to broaden the scope of research. Although business-method inventions can be patented in the U.S. with or without technological application, as the previously cited discussion demonstrates even U.S. economists seem to be restricted in their assessments to the traditional relationship between patents and *technological* innovation, although they should also be looking beyond, at patents' effects on *business innovations,* such as services, marketing and accounting methods. Although these inventions do not yet constitute a big number, this follows also a need to reassess the methodology many economics use: the investments made in marketing do not necessarily show up in R&D category.

On the whole, we are currently in a situation in which it is no longer assumed that stronger patents will automatically increase innovation. Academics have also taken notice of the increase in social welfare generated by user innovations, which are typically not patented due to practical reasons, such as high costs, but contributed to the commons of knowledge. Because these inventions are of growing importance, policy makers should ensure that legislation and regulations do not favor manufacturers at the expense of user-innovators.[186]

Another rising concern relates to patent protection in the developing countries. As the production of tangible goods is increasingly outsourced to the poor countries, strong patent protection has become essential for the rich[187]. While the WTO-governed TRIPS agreement already established certain standards for intellectual property protection throughout the world, discussions on the further harmonization of substantive patent law (SPLT) are in progress within WIPO. Although the developed countries would benefit if the developing countries representing the majority of WIPO countries aligned their laws with the provisions of the minority, this might obviously not be in their best interest[188]. One of the widely broadcasted issues has been the importation of patented AIDS medicines to South Africa, and the allegation that by allowing it South Africa breached the TRIPS agreement: The South African Medicines Act was argued to discriminate against pharmaceutical patents. Unfortunately, had the patent protection been recognized, the medicine prices would have been way too high for the people living in developing countries to afford. The accusations of TRIPS violation were dropped, but the problems in South Africa aroused a much broader discussion on access to medicines, and the link between R&D costs, patents and drug prices, and the argumentation reached even beyond—to the unequal distribution of control over intellectual property rights between the rich and the poor countries as well as the large and the small companies.[189] As regards to further developments regarding a truly international patent system, it has been hoped that the developing countries will be able to gather their lines and maintain their freedom to design appropriate IP policies[190]. For instance, the Commission on Intellectual Property Rights suggested in its report "Integrating Intellectual Property Rights and Development Policy" (2002) that developing countries should adopt much

---

[186] Von Hippel, at 11-12 (2005).

[187] GRAIN (2003).

[188] CIPR, at 132 (2002).

[189] Drahos & Braithwaite, at 5-9 (2002).

[190] CIPR, at 133 (2002).

higher patentability standards and broader limitations of patent holder's rights than those currently provided in many developed countries[191].

### (iii) Towards More Limited Patent Protection: the Patent System Under Construction

The fact that patents may be used to limit access to essential drugs in developing countries is a highly ethical issue and as such something that developed countries can no longer turn their backs on[192]. Furthermore, the efficiency of the U.S. and European patent systems is under scrutiny also outside academia. By now, concerns about the real effects of patents on R&D expenditure, the diffusion of technology and competition in different technological fields have reached official forums and policymakers in both the U.S. and Europe.

The U.S. Federal Trade Commission (FTC) and the National Academy of Sciences (NAS) have both conducted research about the functioning of the U.S. patent system. The FTC report, "To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy", was published in October 2003, and the NAS published a more general report, "A Patent System for the 21st Century", in April 2004.

Both the FTC and the NAS reports were based on hearings at which business representatives from small and large companies, patent and antitrust organizations, practitioners and economists, as well as antitrust and patent law scholars, presented their views about the efficacy of the patent system. The business representatives were mainly from high-tech industries: pharmaceuticals, biotechnology, computer hardware and software, and the Internet.[193]

It is affirmed in the reports that, although there is not enough evidence to declare that the patent system does not fulfill its underlying goal, especially due to the so-called questionable patents that are typical in new technological fields, the U.S. patent system is not working as it is supposed to: questionable patents increase the hold-up problem and may therefore unduly deter market entry and follow-on innovation. They also increase the cost to businesses in the form of unjustified licensing fees and royalties and potentially high litigation costs. Taken as a whole, dealing with large numbers of patents that do not fulfill the patentability requirements wastes everyone's resources and ultimately harms consumers. Furthermore, advance knowledge about patents that may be granted in the future is needed in order to improve predictability in business. The willingness to read patents should also be encouraged so that the system could work as it is supposed to, and the legal uncertainty in patent disputes should be reduced.[194]

The two reports call for certain modifications to the U.S. patent system. The suggested changes include: 1) introducing a new administrative procedure, which would allow post-grant review and opposition to patents, thus making it easier to dispute the granting of a patent without going to

---

[191] It is suggested for instance that developing countries should exclude diagnostic, therapeutic and surgical methods for the treatment of humans and animals from patentability altogether. They should also exclude from patentability plants and animals, computer programs and business methods, avoid from patenting new uses of known products, plant varieties and genetic material, provide international exhaustion of rights, an effective compulsory licensing system, and broadest possible exceptions to patent rights, apply strict standards of novelty, inventive step and industrial application, and implement a low cost opposition or re-examination procedure. (CIPR, at 122 (2002)).

[192] Drahos & Braithwaite, at 8 (2002).

[193] FTC, at Executive Summary, 3-4 (2003); NAS, at 8 (2004).

[194] FTC (2003); NAS (2004).

court; 2) implementing a more considered application of the obviousness standard to allow for implicit knowledge to be taken into account in decisions regarding non-obviousness; 3) providing adequate funding for the Patent and Trademark Office and changing some of its procedures so that it would be better able to determine whether a patent should be granted or not; 4) publishing all patent applications within 18 months in order to improve predictability in business, and increase incentives to read patents; 5) making it easier to show that a patent is invalid so that there would only be a need for a "preponderance of evidence" rather than "clear and convincing evidence"; and 6) giving up treble damages altogether, or adjusting the standard so that it would require written notice of infringement from the patentee or deliberate copying of the invention.[195]

It has been difficult for legislators to ignore official organization such as the FTC in conjunction with the NAS and academics calling for patent reform. Indeed, multiple bills proposing patent law amendments have been introduced to the Congress during the last five years. The latest proposition, the Patent Reform Act of 2005 (HR2795), is currently pending in Congress. The suggested changes reflect the urge to make the U.S. system more efficient and to bring it closer to patent standards adopted in the rest of the industrialized world. The most fundamental changes include the adoption of a first-to-file system, and the implementation of a post-grant opposition period. Moreover, raising the burden of proof and limiting the grounds of finding willfulness in patent infringement cases, including limits on the rules for calculating damages, removing the presumption of irreparable harm making it more difficult to obtain an injunction against an accused infringer, and shifting the responsibility for handling allegations concerning improper conduct before the USPTO from the Courts to the Patent Office have been suggested.[196]

It is hard to say, whether the proposed amendments will ultimately make it through Congress and become law. In fact, I believe that the factual implementation of the propositions presented in the Patent Reform Act of 2005, other bills introduced over the years, the reports and studies such as Jaffe and Lerner's book "Innovation and Its Discontents" (2004) will most likely require some more thought and research. The most severe criticism of the suggestions seems to be that they were driven by problems in certain fields such as information technology, business methods and biotechnology: if implemented, all patents would turn out to be much weaker. As a result, the balance would also change in fields in which patents work well in their current form. Then again, although economists have come to the conclusion that one size does not fit all[197], alternative field-specific legislation would create new problems, including defining so-called software patents. As has been noticed in Europe, where computer programs "as such" are not patentable, creating limits is not an easy task. Software is pervasive and an essential part of most industrial processes. Moreover, as industries develop further, the business environment changes, as do the importance and effects of patents. Field-specific legislation might therefore quickly become outdated. In fact, even without field-specific legislation it is possible to apply patent law so that it supports the economic functioning of the patent system. Standards such as the "person skilled in the art" used when assessing novelty, non-obviousness and patent scope are flexible and have been designed with a view to balancing and acknowledging the rationale of the patent system[198].

---

[195] FTC (2003); NAS (2004).

[196] *See e.g.,* Roland H. Schwillinski & Benjamin Hershkowitz, *Are Major Changes in Store for the U.S. Patent System?* (IPFrontline.com, 4 November 2005), <http://www.ipfrontline.com/depts/article.asp?id=6969&deptid=8> (last visited 11/12/05).

[197] *See e.g.,* Scotchmer, at 117 (2004).

[198] It has been stated for instance in the preparatory works of Nordic patent legislation that the inventive step assessment should correspond to the pace of technological development in a certain field so that innovation would

Nevertheless, as doubts about the efficacy of the system have been officially recognized, and not just among scholars, the trend towards stronger and stronger patent rights appears to be slowly changing its course. The U.S. Congress has already taken some concrete steps in this direction. It has reformed the patent law regarding prior-user rights of business-method inventions, and under the American Inventors Protection Act most patents become now public after only 18 months from filing. Applicants are granted an exception, however, if they declare that they have no intention of filing the application in a foreign jurisdiction that would require 18-month publication. Moreover, the Federal Circuit has commenced favoring the literal claim interpretation instead of applying the doctrine of equivalents in the context of patent-scope assessment,[199] although in the recent Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co. case, which ended up before the Supreme Court, the Supreme Court did not accept the Federal Circuit's strict interpretation that there would be an absolute bar on invocation of the doctrine of equivalents if a patent had been amended in any manner during its prosecution (file wrapper estoppel). Even so, the Supreme Court did confirm certain limits to the application of the doctrine.[200] Then again, at the USPTO level, new guidelines that raise the utility barrier for gene patents have been issued, for example[201].

Although some amendments to U.S. patent law have already been made and more are under discussion, the reality still is that U.S. courts are patent-minded and there is a very strong presumption that a patent that has been granted by the patent office is valid[202]. The notion of correlation between a product and a patent seem also to be prevailing and affecting the reasoning in courts, although the economics in these cases differ fundamentally from the situation in which one product involves multiple patented inventions that may be used in various products.

In Europe, the atmosphere was never as anti-patentee as it was in the U.S., and the strengthening of the patent system has certainly been about broadening the scope of patentable subject matter, but not so much about widening patent-holders' rights, raising the damage level or granting more preliminary or permanent injunctions although some of that has taken place on national levels. In Finland, for instance, courts appear to be granting more preliminary injunctions than previously. Considered as a whole, the change in Europe has rather focused on simplifying application and enforcement procedures. Moreover, many of the adjustments that the Patent Reform Act of 2005 contains and FTC and the NAS recommended for the U.S., including post-grant review and publishing patent applications within 18 months, are already rooted in the European patent system. Compared to the U.S. patent office (USPTO) the European patent office (EPO) has also

---

indeed be stimulated. This means that the standard should be higher in a field that develops fast than in a field developing slowly. (*Betenkning angående nordisk patentlovutgivning,* NU 1963:6, at 126-127) Some elements, such as the time-factor (time needed for coming up with the solution to a certain problem), that can be taken into consideration when assessing inventiveness incorporate this idea in practice. (Lennart Törnroth, *Datorprogram och patentskydd – utvecklingen av svensk rättspraxis i belysning av främst EPO-praxis,* at 97 (NIR, Vol. 68, No. 1, 1999, 86-98)).

199 Durant & Chuang, at 109-110 (2000).

200 *See e.g.,* Karly Stoehr, *Patent Pending…Pending…Pending, The Evolution of Equivalents: Festo Corp. v. Shoketsu Kinzoku Kabushiki Co.* (Computer Law Review and Technology Journal, Vol VII, 2003, 321-329); Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd. 535 U.S. 722, 122 S.Ct. 1831 (Supreme Court, 2002); Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd. 344 F.3d 1359, 68 U.S.P.Q.2d 1321 (Fed.Cir. 2003).

201 CIPR, at 127 (2002).

202 For instance, Jaffe and Lerner argue that the number of jury verdicts on patent cases has increased, and juries tend to be excessively sympathetic to patent holders, as it is psychologically difficult for them to overrule a decision made by the patent office. (Jaffe & Lerner, at 124 (2004)).

nearly twice the manpower to examine each patent application[203]. Furthermore, patent-holders' rights, as well as potential compensations for patent infringements, are much more limited in Europe than they are in the U.S. and consequently many of the problems the U.S. patent system is currently facing are not regarded as serious in Europe[204]. Nonetheless, there is certainly a need for research about the efficacy of the European patent system along the lines of that conducted by the FTC and the NAS.

Although the patent criticism has been largely based on the U.S. experiences, skeptics appear to have influenced European policy makers much more than the U.S. policy makers[205]. Amendments to the European Patent Convention, such as eliminating computer programs from the example list of non-patentable subject matter, have been proposed, but so far the response has been negative.[206] Similarly, the European Parliament rejected the first biotechnology patent directive proposal in 1995 although a Common Position had been adopted on it[207], and the software patent directive faced the same fate this year. In general, the European patent system could be characterized as somewhat conservative as it favors the preservation of established rules. As such, the patent system appears to be fairly stable.

### (iv) Balancing Patent and Antitrust Regimes: Free Competition versus Exclusive Rights

The strength of patents depends not only on the patent regime but also on how antitrust (U.S.) and competition (Europe) laws are applied. As explained earlier, although the purpose of both regulations is to promote innovation, exclusive rights and free competition can sometimes contradict: from a societal perspective it would be beneficial to support as wide a diffusion of knowledge and technology as possible after R&D costs have been expended. Patents sometimes slow down the diffusion, and hence restrict competition, thus preventing a variety of products from entering a market place. Furthermore, a patent holder may be in a position to demand higher prices than would be possible in a competitive market.

Although balancing competition and patent regimes is an ongoing process, and antitrust and competition laws in both the U.S. and Europe are currently under reform due to the challenges posed by the "new economy"[208], some past and current trends can be identified. These

---

[203] Jaffe & Lerner, at 131 (2004). Nevertheless the rejection rate is approximately the same in both patent offices. For instance 342 441 utility patents were filed and 169 028 issued by the USPTO in year 2003, while the EPO received 116 613 applications and granted 59 992 patents from which 2634 were opposed (USPTO, *U.S. Patent Statistics Chart Calendar Years 1963-2003,* <http://www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.htm> (last visited 6/20/05); EPO, *The EPO in figures* (2003), <http://annual-report.european-patent-office.org/2003/statistics/_pdf/epa_jb03_76_splitted.pdf> (last visited 6/20/05).

[204] *See e.g.,* Robert Hart, Peter Holmes & John Reid, *Study Contract ETC/99/B5-3000/E/106: The Economic Impact of Patentability of Computer Programs* (Report to the European Commission, 19 October 2000), <http://europa.eu.int/comm/internal_market/en/indprop/comp/study.pdf> (last visited 6/21/05).

[205] Vortonas, at 33 (2003).

[206] *Basic Proposal for the Revision of the European Patent Convention* (MR/2/00 e, Munich, 13 October 2000), <http://www.european-patent-office.org/epo/dipl_conf/pdf/em00002.pdf> (last visited 6/21/05); *Act Revising the Convention on the Grant of European Patents* (MR/3/00 Rev.1e, Munich, 29 November 2000), <http://www.european-patent-office.org/epo/dipl_conf/pdf/em00003a.pdf> (last visited 6/21/05).

[207] Tritton, Davis, Edenborough, Graham, Malynicz & Roughton, at 168-169 (2002).

[208] *See e.g.,* Landes & Posner, at 390-402; Pitofsky (2000).

developments show the other side of the coin concerning changes in thinking about the variety of potential effects that patents have.

Patents were, for the most part, considered acceptable monopolies in both Europe and the U.S. between the late 19th and early 20th centuries. Hence, patent holders benefited from wide immunity and their actions attracted little antitrust scrutiny.[209] Changes took place little by little, and by the 1930s, patents were largely regarded as anticompetitive in the U.S. These legal rights to exclude others were thought of as very limited exceptions to antitrust laws,[210] and the Department of Justice even promulgated a list of "Nine No-Nos" prohibiting a wide range of seemingly harmless strategic uses of patents[211]. As regards to Europe, cartels were a norm rather than an exception particularly in the early 20th century-Germany, and the early competition regulations in different countries focused on the abuse of economic power positions[212]. Further changes took place after the Second Word War when the European Coal and Steel Community, the European Economic Community and the European Atomic Energy Community were established. The European Community, later the European Union (EU) the purpose of which is to create internal markets through reducing obstacles to free circulation of goods, services, people and capital within that single market, was formed by these three communities. Nowadays, the EU regulates competition within that single market, and has influenced national legislation in its member states concerning competition law as well as intellectual property rights.

It has recently been recognized in both the U.S. and Europe that, despite different ideas of how to achieve this goal, the underlining purpose of competition and patent regulation is to enhance innovation and consumer welfare. Nevertheless, a patent holder may sometimes be in a position in which the utilization of his or her rights is considered harmful from the perspective of "free competition". The fact that someone has a patent, a legal monopoly, no longer in itself confers market power. Even if it did in reality enable the patent holder to exercise market power, as such it would not offend antitrust or competition laws.[213]

The patent holder's right to exclude others forms the core of his or her rights and is in many cases a legitimate business justification for a company's anti-competitive conduct. No one in the U.S. is expected to create competition with their exclusive rights, and if patent holders do not exceed their rights, they can take advantage of their position rather freely[214]. Nevertheless, the general principle is that patents do not confer the privilege to violate U.S. antitrust laws. For example, if patent holders have market power, use their patent/patents to monopolize or to attempt to monopolize the relevant market thus harming competition and ultimately consumers,

---

[209] FTC, at Chapter 1, 15 (2003); Ilkka Rahnasto*, Intellectual Property Rights, External Effects, and Anti-trust Law, Leveraging IPRs in the Communications Industry*, at 36 (Oxford University Press 2003).

[210] FTC, at Chapter 1, 15-16 (2003); Merges & Duffy, at 1349 (2002).

[211] Jaffe & Lerner, at 97 (2004).

[212] Alkio & Wik, at 19-23 (2004).

[213] FTC, at Executive Summary, 2 (2003); U.S. Department of Justice & Federal Trade Commission, *Antitrust Guidelines for the Licensing of Intellectual Property* (April 1995), <http://www.usdoj.gov/atr/public/guidelines/ipguide.htm> (last visited 6/21/05); *Commission Evaluation Report on the Transfer of Technology Block Exemption regulation No 240/96 Technology Transfer Agreements under article 81,* at 10-11 (COM(2001) 786 final, Brussels, 20 December 2001), <http://europa.eu.int/comm/competition/antitrust/technology_transfer/en.pdf> (last visited 6/21/05).

[214] *Commission Evaluation Report on the Transfer of Technology Block Exemption regulation No 240/96 Technology Transfer Agreements under article 81,* at 14 (2001).

and they do this in an unacceptable way by exceeding their legal rights, such conduct may constitute violation of U.S. antitrust laws (Sherman Act § 2).[215]

When do patent holders exceed their rights in the meaning of the Sherman Act § 2? In the CSU v. Xerox (2000) case the Court gave the patent holder rather wide freedom regarding the exploitation of his rights, stating: "In the absence of any illegal tying, fraud in the Patent and Trademark Office, or sham litigation, the patent holder may enforce the statutory right to exclude others from making, using or selling the claimed invention free from liability under the antitrust laws. We therefore will not inquire into his subjective motivation for exerting his statutory rights, even though his refusal to sell or license his patented invention may have an anti-competitive effect, so long as that anti-competitive effect is not illegally extended beyond the statutory patent grant."[216]

The CSU vs. Xerox ruling has been criticized for possibly giving too wide immunity to the patent holder, and it remains to be seen what the balance will be in the future. For example, depending on the extent of freedom patent holders are granted, the obligation to license could potentially be based on the doctrine of essential facilities, which is one way to prove monopolization. This doctrine has been applied in the context of physical products as well as intellectual property[217].

Patent-licensing arrangements, even between competitors, are usually considered pro-competitive in the U.S. If there are restraints such as geographical restrictions, use restrictions or restrictions on manufacturing or sale, it is a question of whether these restraints between competitors or potential competitors are likely to have anticompetitive effects. If so, the reasonableness and necessity of the limitations are evaluated in the light of achieving pro-competitive benefits that outweigh the anticompetitive effects.[218] Consequently, standardization, forming patent pools and/or cross licensing, which are essential in today's economy but may create antitrust problems, are usually allowed. Patent pooling, for example, may very well diminish the problem of negotiating licenses with all patent holders separately.[219] Only naked price-fixing, output restraints, and market division among horizontal competitors, as well as certain group boycotts and resale price maintenance, are thought to violate the Sherman Act § 1 *per se*.[220] In sum, the U.S. approach respects the patent holder's right to fully exploit his or her exclusive rights and to impose restrictions on licensing agreements[221].

---

[215] *See e.g.* David E. Balto & Andrew H. Wolman, *Intellectual Property and Antitrust: General Principles*, at 428-429 (IDEA, Journal of Law and technology, Vol. 43, No 3, 2003, 394-474); U.S. Department of Justice & Federal Trade Commission, *Antitrust Guidelines for the Licensing of Intellectual Property* (April 1995).

[216] In re Independent Service Organizations, 203 F.3d 1322, 2000-1 Trade Cases P 72,795, 2000 Copr.L.Dec. P 28,026, 53 U.S.P.Q.2d 1852 (Fed. Cir., 2000).

[217] Robert Pitofsky, Donna Patterson & Jonathan Hooks, *The Essential Facilities Doctrine under U.S. Antitrust Laws* at 452 (Antitrust Law Journal, Vol 70, No 2, 2002, 443-462).

[218] *See e.g.,* U.S. Department of Justice & Federal Trade Commission, *Antitrust Guidelines for the Licensing of Intellectual Property* (1995).

[219] *See e.g.,* Daniel Lin, *Research versus Development: Patent Pooling, Innovation and Standardization in Software Industry* (John Marshall Review of Intellectual Property Law, Vol. 1, 2002, 274-309), <http://www.jmls.edu/ripl/vol1/issue2/lin.pdf> (last visited 6/21/05).

[220] U.S. Department of Justice & Federal Trade Commission, *Antitrust Guidelines for the Licensing of Intellectual Property* (1995).

[221] *Commission Evaluation Report on the Transfer of Technology Block Exemption regulation No 240/96 Technology Transfer Agreements under article 81*, at 14 (2001).

The situation in Europe is more restrictive, although it is hoped that the recently issued Commission Regulation (EC) No 772/2004 on the application of Article 81(3) (group exemptions) will make the situation more flexible. Basically, it does not matter whether forbidden restraints of trade are based on patent rights or not. However, the special features of patents as government granted rights are taken into consideration when assessing the anti-competitive nature of different arrangements. As a general rule patent holders are given a limited right to take advantage of their patents, including licensing and collecting royalties, but EC competition law, Articles 81[222] and 82[223] of the Treaty of Rome, may regulate the type of licensing terms that can and cannot be used. Competitors may not, for example, use a patent licensing agreement to share out markets between themselves or to exclude competing technologies.[224] Moreover, examples of conduct that may constitute abuse of a dominant position include refusing to license except on restrictive terms, or charging excessive prices for products protected by patents.[225] Quite to the contrary, courts in the U.S. have not so far treated extensive licensing fees as a restraint of trade[226]. As regards to refusal to deal cases, The European Court of Justice has set out the principles for issuing a compulsory license on the basis of violation of Art 82 in cases such as Volvo v. Veng (1988)[227], Magill (1995)[228], and IMS Health (2004)[229].

Antitrust and competition laws can be applied in specified circumstances and therefore they may occasionally impose limits on the ways in which patents are utilized in business. Yet, although antitrust/competition regulation is often called upon when patents are thought to distort competition, the trend is towards more flexible application. The Sherman Act, the Treaty of Rome, and national competition laws are not the only laws applicable to bad business practices or hold-up problems, however. The doctrine of patent misuse may be applicable in individual cases in the U.S., and the FTC can bring actions based on the FTC regulation. For example, Article 5 of the FTC Act addresses unfair or deceptive practices. Similarly, many countries in Europe have regulations covering unfair business practices, and most European countries have incorporated the possibility of compulsory licensing in their patent laws.

---

222 Prohibits agreements, decisions and concerted practices by businesses that prevent, restrict or distort competition unless they meet certain exemption criteria.

223 Prohibits the abuse of a dominant market position.

224 *Commission Evaluation Report on the Transfer of Technology Block Exemption Regulation No 240/96 Technology Transfer Agreements under Article 81*, at 12-14 (2001); Commission notice: *Guidelines on the Application of Article 81 of the EC Treaty to Technology Transfer Agreements* (Official Journal C 101 of 27 April 2004), <http://europa.eu.int/eur-lex/pri/en/oj/dat/2004/c_101/c_10120040427en00020042.pdf> (last visited 6/21/05).

225 The Rt. Hon. Sir Robin Jacob, Daniel Alexander & Lindsay Lane, *A Guidebook to Intellectual Property, Patents, Trade Marks, Copyright and Designs* (5th edition, Sweet & Maxwell 2004). *See also* Rahnasto, at 154-155 (2003).

226 According to Rahnasto there is only one case in the U.S. in which an "exorbitant, oppressive royalty, involving the bulk of industry" has been questioned. However, in this American Photocopy Equipment Co v. Rovico, Inc case (on remand) the district court found no violation on the basis of the royalty rate and the appeals court affirmed this. (American Photocopy Equipment Co v. Rovico, Inc, 384 F.2d 813, 11 Fed.R.Serv.2d 777, 155 U.S.P.Q. 119 (CAIll, 22 August 1967); Rahnasto, at 154 (2003)).

227 Volvo AB v. Erik Veng (U.K.) Ltd, Case 238/87 [1988] ECR. 6211 [1989] 4 CMLR. 122.

228 Radio Telefis Eireann (RTE) and Independent Television Publications Ltd (ITP) v Commission, Joined cases C-241 and 242/91P, [1995] ECR 1-743, [1995] 4 CMLR 718.

229 IMS Health GmbH & Co KG v. NDC Health, Case C-418/01[2004] 4 CMLR1543 (preliminary ruling). IMS Health Case is discussed further in Chapter IV.B.

## D. SUMMARY

Mainstream academic ideas have flown from skepticism to promoting strong patent protection in all fields of technology. The trends have affected political decision-making in connection with technological and commercial developments and associated business interests, such as the vitality of strong IPR protection in the knowledge-based economy. The anti-patent era has been followed by the pro-patent era. Recently, however, scholars and the general public have become doubtful about patent efficacy particularly in relation to biotechnology, software and business methods. Also ethical aspects related to their utilization particularly in the pharmaceuticals, have been fiercely discussed. Furthermore, in the U.S., Congress, the USPTO[230], and organizations such as the FTC and the NAS have taken concerns about novelty and non-obviousness in software and business-method inventions seriously. The discussion is also lively in Europe, and has affected political decision-making. Consequently, we appear to be in the transition phase towards more limited patent protection. Since the pendulum of changes has been more noticeable in the U.S. also the downward phase is likely to be more pronounced there than in Europe, however.

Yet, the weakening trend cannot be perceived in the antitrust and competition law arena where patent holders are provided with rather broad freedom to utilize their exclusive rights. Moreover, in the business world most companies favor a proprietary model according to which capturing as much in the way of rights as possible and thus maintaining control over the company's key innovations is considered essential. However, the highlighted role of network effects, complexity and the systemic nature of innovations, and the importance of compatibility and interoperability in products and services, among other things, have forced ICT companies to open up their licensing models emphasizing the role of patents as negotiation tools. On the other hand, also other, even more open models, such as the open-source, have started to penetrate the commercial markets, and many ICT firms today base their business models on services. Naturally, patents may play a role for these companies, but the more people are able to access, modify and sub-license the technology the less importance is attached to the right to exclude others from using it. However, even if patents are not as important to companies employing very open licensing models as they are to those employing proprietary models, third-party rights are still likely to cause complications, and service-orientation will probably increase interest in software-implemented as well as pure business-method patents.

When the specific focus is on economic research and the role of patents in promoting innovation in the ICT sector, although the industry is very R&D-intensive and software in particular is easy to copy, patents relevancy in inducing more R&D investments is open to question. Innovation is cumulative in many parts of the ICT sector, and technology could be characterized as developing rather rapidly, and as being complex. As a consequence, patents rarely provide their holders with monopoly power. The result is a rather complex web of overlapping patents, which creates potential hold-up problems. Furthermore, software manufacturing and distribution costs may be low, and because returns on investment are often received early on in the life cycle of established products (versions), patents are not necessarily paramount for generating competitive advantage. On the other hand, the same code base may very well be inherited from one product generation to the other[231].

---

[230] *See* Chapter III.B(ii) for more details.

[231] Interview data U.S. (2004).

Although it has been established that patent protection does not necessarily increase investments in R&D, this is not enough to conclude that certain patents do not promote innovation: they may facilitate technology transfer through licensing and therefore add to its commercialization potential. Research in this area is challenging, however. According to Arora et al. (2001), it is difficult to assess the efficiency and social-welfare effects on technology markets in which growth may depend on the allocation and strength of patent rights without data on the incidence and terms of patent licensing and associated fees and royalties.[232] Moreover, investments in R&D do not often times include the development costs of pure business-methods, and their effects on business innovation ought to be researched more in the future.

Patents' role in producing valuable, up-to-date information for society and thus facilitating technological progress is also questionable, particularly in the case of software and Internet patents. The role of patents in expediting competition is also a subject for further study.

[232] Ashish Arora, Andrea Fosfuri, and Alfonso Gambardella, *Markets for Technology and their Implications for Corporate Strategy* (Industrial and Corporate Change, Volume 10, Issue 2, 1 June 2001, 419-451).

# III. DEVELOPMENTS IN SOFTWARE AND BUSINESS-METHOD PATENTS IN EUROPE AND THE U.S.

It is considered vital to have a policy structure that supports the positive development of the ICT industry. Developments that relate to software and business-method patents are part of that framework. Consequently, academic, political and legal trends in this field have relevance to companies, organizations and individuals who operate, or are about to operate, in the ICT sector, and to those affected by developments in the industry.

It was established in the previous chapter that, due to practical flaws in assessing the patentability of software and business methods, and their unknown effects on innovation, this is one of the most problematic areas in the patent system. It was also explained that changes in their patentability took place during the pro-patent era, and that technological and commercial developments promoted this transition. Similar developments occurred in the field of biotechnology. The history of software and business-method patents and their future development are explored more deeply in this chapter.

It will be demonstrated how scholars, legislators, courts and patent offices in the U.S. and Europe have spent the last three decades working out exactly how the concepts of the industrial-age patent system should be applied to the ground-breaking combination of hardware and software, "the virtual machine". In fact, the problem of assessing the patentability of software and business methods culminates in finding appropriate limits, and it is not likely that these limits will be found in the future either. Thus, although the discussion on the usefulness and effects of these patents is relevant, it should not be restricted to their suitability as patentable subject matter per se, and thus detract attention from pressing topics such as the other patentability criteria and patent scope.

## A. THE SITUATION IN EUROPE

The leading development in the area of software and business-method patents so far has been the change in the scope of patentable subject matter. Gradual modifications to the patentability regime have typically taken place first in the U.S., and Europe has followed suit a couple of years later[233]. Europe does not usually directly plagiarize U.S. models, however, but the trends do have a strong influence. There is great concern about Europe's ability to compete in international markets, and sufficient patent protection is regarded as one element in achieving that success. This is evident, for instance, in EU innovation policy and its new legislative initiatives.[234] Moreover, U.S. influence on international treaties can be extremely direct, although recent trends appear to indicate pressure also in the other direction, from Europe to the U.S[235]. Negotiations

---

[233] *See e.g.,* Carl Westling, *Patent på datorprogram och affärsmetoder – tillika en kommentar till EG-kommissionens förslag till direktiv för datorprogramrelaterade uppfinningars patenterbarhet*, at 537 (NIR, Vol 71, No. 6, 2002, 533-544).

[234] *See e.g.*, European Commission, *Green Paper on Innovation* (COM(95) 688, December 1995); European Commission, *Green Paper on the Community Patent and the Patent System in Europe* (COM(97) 314, June 1997); European Commission, *Innovation Policy in Europe 2001* (2001). The developments in the U.S. and Japan as well as the obligations posed by TRIPS were also discussed in the two EPO Board of Appeal's IBM-decisions (T 935/97 and T1173/97).

[235] These considerations include the potential adoption of a first-to-file system, and European type patent opposition procedure, for instance. (*See* the Patent Reform Act of 2005, GRAIN (2003); FTC, at Executive Summary, 8, Chapter 5, 17-18 (2003) and NAS, at 95-103 (2003).

regarding the Substantial Patent Law Treaty (SPLT), provide a good illustration of the arising controversies. It is not so much European versus U.S. interests than that of developed and developing countries that are in the course of collision, though. [236]

Despite various international treaties, patent protection is largely based on national legislation. In fact, Europe does not form a united front in this regard[237]. Although national patent laws are currently quite similar, and are typically in line with the EPC, PCT and TRIPS agreements, there are slight variations in the wording of the laws, and in patent office and court practices[238]. Therefore, the emphasis in the following is mainly on the European Patent Convention (EPC) and European Patent Office (EPO) practice, including the decisions of the Boards of Appeal (BOA). I will also go through the EU-level initiative concerning the patentability of computer-implemented inventions. The directive would have, if passed and implemented, harmonized the national patent laws of EU member states in relation to software patents. It would not have directly affected the practice of the EPO: the European Patent Convention has nothing to do with the European Union, although they do have common member states and the implementation of another initiative, the Community Patent Act, would require the EU to join the EPC. All things considered, it is essential that there are no substantial differences between the national and the EPO levels. Indeed, we have already witnessed a similar type of EPO-EU level coordination in relation to the patentability of biotechnological inventions[239].

### (i) Patentability: the Technicality Requirement

An invention has to be new, inventive and susceptible to industrial application in order to be patentable. In addition, it should be technical in character. For the most part, it is this technical character, or lack of it, that has been the focus of articles written by scholars doing research on

---

[236] GRAIN (2003).

[237] To gain international patent protection, patents must, as a rule, be granted and enforced separately in every country. Of course, the European Patent Convention, which was drafted in order to make it easier to file patents in Europe, has improved the situation: The European Patent Office has the power to grant patents to many EPC member countries at the same time. Afterwards, however, these patents are treated in the same way as those granted by national patent offices. "European patents" must be enforced separately in every country in accordance with that country's legislation. On the other hand, if the Community Patent Act is passed, community patents will be in force within the EU and disputes about their validity and infringement can be solved in a separate Community Patent Court. This means that the European patent system would comprise not two, but three types of patents; national, "European", and community patents.

[238] In this context, however, the wording of national patent laws corresponds to that of the EPC Article 52, and differences in interpretation lie mainly in the form of allowable claims. In fact, evolution concerning the patentability of software and business methods in national patent offices has practically followed the EPO interpretation. For instance, the Finnish Patent Office made a decision on 14 January 2003 that it will follow EPO practice and accept so called product claims (PRH, *Päätös tietokoneella toteutettavia keksintöjä koskeviin patenttihakemuksiin liittyvästä PRH:n patentti- ja innovaatiolinjalla noudatettavasta käytännöstä*, 14 January 2003, <http://www.prh.fi//fi/uutiset/111.html> (last visited 6/17/05). Furthermore, Swedish Regeringsrätten has stated in its Philips ruling (RÅ 1990 ref. 84) that it is not possible for a small country such as Sweden to maintain its own practice: the practice of the EPO should be taken into consideration when interpreting the patent law. Also the German Bundesgerichtshof has recognized the status of EPO case law. (Hansen, at 182 (2004)). Further information regarding the national patent law developments (Sweden, Germany, Norway) can be found for instance in Törnroth (1999); Wolfgang Tauchert, *Patent Protection for Computer Programs – Current Status and New Developments* (IIC, Vol. 31, No. 7-8/2000, 812-824), and Jarle Roar Saebo, *Patent på datamaskinprogrammer – oppfinnelsesbegrepet* (NIR, Vol. 70, No. 3, 2001, 351-380).

[239] Tritton, Davis, Edenborough, Graham, Malynicz & Roughton, at 109 (2002).

software and business-method patents[240]. This is no wonder given the resemblance of computer programs, or algorithms, to mathematical methods, the close relationship between the data that is being processed and the program[241], and the dual character of programs as both text and function-generating instructions[242]. Although the distinction has begun to fade, programs are written in programming languages (source code) resembling English and then transcribed into a machine-readable form (object code), the instructions, which cause a general-purpose computer consisting of a microprocessor and a memory to perform[243]. Nonetheless, it should be kept in mind that, as a patentability requirement, technicality is not nearly as important as novelty and inventive step: in year 1999 less than 1% of patent applications related to software were denied on the grounds of non-technicality[244].

The technicality requirement is not explicitly stated in the European Patent Convention, but it can be construed from EPC rules 27 and 29[245]. Article 52 is also regarded as a reflection of this requirement.[246] The article contains a list of subject matter that is not considered to be an invention in terms of patent law and is not patentable *as such*. Programs for computers, as well as methods of doing business, belong to this category, as do discoveries, scientific theories and mathematical methods, aesthetic creations, schemes, rules and methods for performing mental acts and playing games, and the presentation of information. This means that a mathematical method, for instance, cannot be claimed by itself, but the patent must apply to a practical application based on the mathematical formula.

The list in EPC Article 52 (2) is not meant to be exhaustive: it merely gives some examples of material that was thought to be abstract and non-technical in nature[247] and thus not patentable at the time the EPC was signed in 1973.

There are many reasons why computer programs were originally placed in the category of non-patentable subject matter. According to van den Berg (1996), software seemed to be far away from the real world of engineering[248]. In fact, computer programs were viewed as close relatives

---

[240] Most software and business-method patent related articles that discuss the situation in Europe, and have been published for instance in NIR (Nordisk Immateriellt Rättskydd), IIC (Industrial Review of Industrial Property and Copyright Law), and EIPR (European Intellectual Property Review) concentrate on this issue. These articles include Törnroth (1999); Saebo (2001); Oliver Jan Jüngst, *Novely and Industrial Applicability in Computer Programs in Europe* (NIR, Vol. 71, No. 5, 2002, 490-499); Kim G. Hansen, *Kommentar til EU's forslag til et direktiv om computer-implementerede opfindelsers patenterbarhed* (NIR, Vol. 71, No. 6, 2002, 545-551); Westling (2002); Tauchert (2000); Jonathan Newman, *The Patentability of Computer-related Inventions in Europe* (EIPR, No. 12, 1997, 701-708); Larry Cohen, *The Patenting of Software* (EIPR, Vol. 21, No. 12, December 1999, 607-608).

[241] Keith Beresford, *European Patents for Software, e-Commerce and Business Model Inventions* (World Patent Information, Vol 23, Issue 3, September 2001, 253-263).

[242] Pamela Samuelson, Randall Davis, Mitchell D. Kapor & J.H. Reichman, *A Manifesto Concerning the Legal Protection of Computer Programs*, at 15 (Columbia Law Review, Vol. 94, December 1994).

[243] Ceruzzi, at 80 (1998).

[244] Eva Liesegang, *Software Patents in Europe*, at 48 (Computer and Telecommunications Law Review, Issue 2, 1999, 48-51).

[245] Keith Beresford, *Patenting Software Under The European Patent Convention*, at 22 (Sweet & Maxwell 2000).

[246] EPO, *Guidelines for Examination,* at Part C, Chapter IV, 1 (2005).

[247] EPO, *Guidelines for Examination*, at Part C, Chapter IV, 1 (2005).

[248] Paul van den Berg, *Patentability of Computer-Software-Related Inventions, The Law and Practice of the Enlarged Board of Appeal of the European Patent Office during its first ten years,* at 31 (Köln – Berlin – Bonn – München 1996).

of mathematical methods[249]. In addition, there was a fear that examining software applications would entail going through program listings written in programming languages. Since this would require examiners to have knowledge of these languages, the examination process was anticipated to become time-consuming and uneconomical. Indeed, the Patent Co-operation (PCT) Treaty of 1970 still includes rules 39 and 67, according to which the International Searching Authority and the International Preliminary Examining Authority are not required to search or examine an international application of which the subject matter relates to computer programs to the extent that these authorities are not equipped to search prior art concerning such programs. Although the rationale behind these rules is quite different from the purpose of the list of non-patentable subject matter, it has, in practice, affected the formulation of Article 52(2).[250] One of the most significant aspects of the EPC 52(2) rationale, however, was that it was not generally recognized how technically and economically important software would become[251]. Although independent software vendors had already began to appear, and producers of mainframe computers had unbundled their software product offerings from their hardware products thereby separating the pricing and distribution of software and hardware, software was not generally recognized as a major investment opportunity.[252] At the same time, there was an ongoing discussion on whether computer programs should be allowed copyright protection[253].

Information technology has obviously evolved a lot since 1973. In particular, the development and diffusion of desktop computers has produced explosive growth in the traded-software industry. The number of packaged versus tailor-made software has also increased, and there has been significant growth in networking between desktop computers and other devices. In addition, the Internet has created new, low-cost distribution and marketing channels, and this has facilitated open-source software development, for instance.[254] Furthermore, computerization of things that have traditionally been conducted manually and/or in person, is changing the protection structure of various lines of businesses, the service providers being particularly in a state of flux. Therefore, the interpretation of patentability in terms of computer programs has changed during the last twenty years, and will continue to adapt in the future. It should be noted, however, that although it is often claimed otherwise, the intention was never to exclude computer programs from patentability altogether[255]. In fact, two tendencies can be detected in early discussions: 1) the need to come up with a clear principle on how to threat computer programs in terms of their patentability, and 2) the recognition that the door should be left ajar in respect to patentality of true inventions that happen to contain a software component.[256]

The following sections trace some of the main aspects of the development of software patenting and describe the situation at the moment. Basically, the problem with software patents in Europe is that it is extremely difficult to draw the line between technical and non-technical computer

---

249 Beresford, at 19 (2000).

250 Beresford, at 17-18 (2000); Van den Berg, at 31 (1996).

251 Van den Berg, at 31 (1996).

252 Graham & Mowery, at 221 (2003); Software History Center, *The Software Industry in the 1970s*, <http://www.softwarehistory.org/history/d_70s.html> (last visited 6/17/05).

253 Van den Berg, at 31 (1996); Westling, at 535 (2002).

254 Graham & Mowery, at 221-223 (2003).

255 Beresford, at 20 (2000).

256 Westling, at 536 (2002).

programs, in other words computer programs as such. One reason for the problem is that computer programs are already at a different abstraction level than scientific theories or mathematical methods, for example, which are also mentioned in the EPC Art. 52(2). Consequently, it is not easy to determine when a computer program is "applied" in a way that the invention can be regarded as technical. Many explanations have been presented during the last two decades, and it can be said without hesitation that the issue of technicality is complex.[257]

### (ii) European Patent Office Practice

In its early years the European Patent Office (EPO) developed its first interpretation regarding computer-implemented inventions, defined by the EPO to mean inventions that involve computers, computer networks or other conventional programmable apparatus whereby prima facie the novel features of the claimed invention are realized by means of a program or programs[258]. It interpreted the EPC to mean that if an invention did not differ from the prior art by at least one hardware feature, it was not patentable[259]. This interpretation was officially changed in 1985 when the EPO reformed its Guidelines for examination. It adopted the approach its Board of Appeal had presented earlier in the VICOM (T 208/84) decision: if an invention is patentable according to conventional criteria it should not be excluded from patentability merely because software is used for its implementation. What was decisive was the kind of technical contribution the invention considered as a whole made to the known art.[260] Similar interpretation was applied in the Koch & Sterzel/X-ray apparatus decision (T 26/86)[261]. This change was driven by the undeniable fact that since hardware and software are theoretically interchangeable[262], it was not reasonable to allow hardware inventions but not equivalent inventions embodied in software to be patentable[263].

The concept of technical contribution was first introduced in the previously-mentioned VICOM decision, but it has been interpreted in many ways since. The actual "contribution approach" applied by the Board of Appeals during the 1980s and 1990s was presented in decision IBM/Text Processing (T 38/86) in which BOA stated that it appeared to be the intention of the EPC to permit patenting only in cases in which the invention involved a contribution to the art in a field not excluded from patentability.[264] In this case, the invention related to a method for automatically detecting and replacing linguistic expressions which exceeded a predetermined

---

[257] Risto Sarvas & Aura Soininen, *Differences in European and U.S. Patent Regulation affecting Wireless Standardization* (International Technology and Strategy Forum, Workshop on Wireless Strategy in the Enterprise: An International Research Perspective, Berkeley, 15-16 October 2002).

[258] European Patent Office, *Case Law of the Board's of Appeal of the European Patent Office*, at 2 (4th edition, December 2001).

[259] Van den Berg, at 31 (1996); Beresford, at 23 (2000); Jonathan Newman, *The Patentability of Computer-related Inventions in Europe* at 707 (European Intellectual Property Review, Number 12, 1997, 701-708).

[260] Van den Berg, at 33 (1996); VICOM (T 208/84).

[261] In this case BOA examined whether an X-ray apparatus incorporating a data processing unit operating in accordance with a routine was patentable. The Board found that the routine produced a technical effect by controlling the X-ray tubes. (EPO, *Case Law of the Board's of Appeal of the European Patent Office*, at 2-3 (4th edition, December 2001).

[262] Messerschmitt & Szyperski, at 22 and 268 (2003); Samuelson, Davis, Kapor & Reichman, at 13 (1994).

[263] Westling, at 536 (2002).

[264] Van den Berg, at 35 (1996).

understandability level in a list of linguistic expressions. According to BOA the invention did not involve a technical contribution but had a linguistic character and effect.[265] Liesegang (1999) found that the logic behind the contribution assessment was the following:

- "Where subject-matter as defined in Article 51(2) EPC is explicitly claimed as such, *e.g.* in a "computer program product" claim, this will not be allowed, irrespective of the contents of the computer program;
- otherwise, the closest prior art in relation to the claimed subject-matter is determined and the difference between this piece of prior art and the claimed subject matter is identified;
- the effect of this difference as well as the problem solved by said effect within the context of the claimed invention is identified;
- the area in which the problem resides (e.g. financial, mathematical, technical, etc.) is identified;
- finally, the skills needed to understand what is realized by the invention–and how it is realized–should be identified."[266]

If the required skills did then reside in fields excluded from patentability, such as aesthetics, mathematics, finance, pure programming and linguistics, the invention was not of patentable subject matter[267].[268] Thus, the focus in the assessment of technical contribution was more on what the program did that was technical, than on how it did it. For instance in the EPO decision ATT/System for generating software source code (T 204/93) the Board ruled that generating concrete software programs from supplied generic specifications, *i.e.* reusable software modules, involving computer programs as such, and a computer implementation of mental acts, did not make a contribution in a field outside the range of excluded matters.[269]

The contribution approach was criticized for mixing assessments of technicality, novelty and non-obviousness, and therefore for not making an appropriate distinction between different patentability criteria[270]. Consequently, it was abandoned as an indicator of technicality in three Board of Appeal decisions, the IBM/Computer program product (T 1173/97, T 935/97) and the PBS Partnership/Controlling pension-benefits system (T 931/95). Nevertheless, apart from the first bullet point in Liesegang's presentation, it is still useful for examining the inventive step, which means that the process of determining patentability, but not the end result, has changed[271]. The pension-benefits case (2000) is one example of this "new" interpretation. It also clarifies the EPO's position regarding business-method patents. One thing did change, though: prior to 1999 it was thought that electrical manipulation of a computer by a program was not a technical

---

265 IBM/Text Processing (T 38/86).

266 Liesegang, at 49 (1999).

267 Liesegang, at 49 (1999).

268 For this reason it has not been possible to obtain patent protection for word processing, the generation of data components, tabulating programs, data encryption, authentication and time-series analysis, for example. Then again, protection has been allowed for control engineering, CAD/CAM, digital-signal processing, operating systems, aid programs, data compression and client management. (Blind, Edler, Nack & Straus, at XXII (2001).

269 ATT/System for generating software source code (T 204/93).

270 Beresford, at. 44 (2000); Van den Berg, at. 40 (1996); Liesegang, at. 49 (1999); Yannis Skulikaris, *Software-Related Inventions and Business-Related Inventions, A Review of Practice and Case Law in US and Europe* (Patent World, Febuary 2001, 26-33).

271 *See e.g.,* Jüngst, at 496 (2002).

process. The IBM decisions confirmed, however, that the execution of a program always involves physical effects. Such normal physical effects just are not enough to fulfill the requirement of technicality. Further technical effect is required.[272]

In the pension-benefits case, the invention was claimed as both an apparatus and a method. In the Board's opinion, all the features of the method claim represented steps in the processing and producing of information and were purely administrative, actuarial and/or financial in character. Therefore, it had no technical merit. The apparatus claims, on the other hand, were considered to have a technical character: a computer system suitably programmed for use in a particular field has the character of a concrete piece of apparatus in the sense of a physical entity, man-made for a utilitarian purpose. However, the improvement envisaged according to the patent application was essentially an economic one and thus resided in the field of economics. It had no technical contribution and could not be considered inventive.[273] In sum, if a computer-implemented invention has technical characteristics, it may be of patentable subject matter even though it is used in business. If, however, the actual invention resides in the business side, the patent is ultimately denied. This interpretation was also affirmed in the Board of Appeal's RICOH/Order management (T 172/03) and HITACHI/Auction method decision (T 258/03). Here the Board went even further than it did in the Pension Benefits decisions, however, and noted that, in general, a method involving technical means is also an invention within the meaning of Article 52(1) EPC[274]. The CATALINA/Discount certificates decision (T 531/03) issued on 17 March 2005 gives further lead to treatment of non-technical aspects in the assessment of inventive step. In this case BOA came to the conclusion that although an invention may contain a mixture of technical and non-technical features and still be considered to have a "technical character", the invention cannot be considered as "a whole" when assessing inventive step. Here the objective technical problem was to be reformulated in terms of providing a technical implementation of the underlying marketing strategy. The skilled person faced with the technical problem would not require any inventive skills to solve it, and thus the invention was not considered patentable.[275]

As explained previously, the technical nature of an invention is eventually established when the inventive step is assessed. If there is no technical contribution, the invention cannot be considered inventive. This has been clarified also in the Guidelines for Examination (2005), in which it is stated that if a claimed invention does not have a *prima facie* technical character, it should be rejected under Arts. 52(2) and (3), although in practice it might be more appropriate for the examiner to proceed directly to the questions of novelty and inventive step, without considering beforehand the question of technicality. If there is no objective technical problem for the invention to solve, the claimed subject matter does not satisfy the inventive-step requirement, at least.[276]

When, then, does an invention have a prima facie technical character, and when is it thought to contribute to the field of technology as regards to the inventive step assessment? According to the EPO Guidelines and the Board of Appeals' decisions, a computer-implemented invention is considered to have a technical character if it brings about a further technical effect when run on a

---

[272] Jüngst, at 494 (2002).

[273] PBS Partnership/Controlling pension-benefits system (T 931/95).

[274] HITACHI/Auction method decision (T 258/03).

[275] CATALINA/Discount certificates decision (T 531/03).

[276] EPO, *Guidelines for Examination* at Part C, Chapter IV, 1-5 (2005).

computer, for example. A further technical effect is defined as something more than the normal physical effects involved in using a computer: it is to be found in controlling an industrial process or processing data representing physical entities, or if technical considerations are required in order to carry out the invention. Moreover, if it solves a technical problem or contains technical features relevant to the problem solved it may become patentable.[277] In practice, the technical effect or technical advantage could be improved processing speed, the economical use of memory, improved or more convenient user interface, or easier image creation and manipulation[278]. It should be pointed out that inventive programming is not subject of patent protection. Software source code cannot be patented.

### (iii) Types of Claims

As the status of software patents has become established in the EPO, computer programs have been claimed as both apparatus and processes. The claims cover the same invention but differ in form: those for apparatus cover the program and the underlying computer machine or computer network executing the program, while process claims are understood to cover processes implemented by means of a computer or computer networks. The problem is that these two categories leave the actual invention, the computer program, less protected when it is not executed, such as when it resides on a separate carrier in the form of a portable diskette, for example.[279]

Patent protection for computer programs on their own is particularly relevant in terms of distribution. Programs can be easily replicated, copied and distributed without directly infringing apparatus or process claims. Nevertheless, distributing them on a carrier or via the Internet, for example, might constitute an indirect patent infringement in most European countries. This is more difficult to prove, though, and in practice gives less protection to the patent holder by making the enforcement of rights uncertain. It must also be recognized that there is no indirect infringement if someone does not infringe the patent directly. Thus, the export of items which constitute part of a claimed combination for putting it into practice in a country not covered by the patent is neither direct nor indirect infringement.[280]

The problem was eased when the Board of Appeals extended the protection for computer programs by allowing an invention to be claimed in itself or as a record on a carrier. This new "computer program product" category was first introduced in the IBM/Computer program product (T 1173/97) decision. It is not an independent claim category, though, but reference to product and/or process claims has to be made.

The extension of allowable claims had no impact on what constitutes patentable subject matter. Nevertheless, many assume that the form in which computer programs are patentable defines what "computer programs as such" means, and by giving up this requirement, the EPO interpretation is in contrast to the EPC. Although it is true that a computer program does not do anything unless it is combined with hardware, in my opinion this type of argumentation could be seen rather as an implication of the U.S. style of interpretation than something that draws a

---

[277] EPO, *Guidelines for Examination,* at Part C, Chapter IV, 4 (2005); *See also* Newman (1997); Beresford, at 39 (2000).

[278] Beresford (2001). *See also* Beresford, at 38-39 (2000).

[279] Sarvas & Soininen (2002); Beresford (2001).

[280] Beresford (2001); Beresford, at 90 (2000).

rational line between technical and non-technical subject matter. Technicality is one of the patentability requirements. It is not directly connected to the allowable claim format.

Another dilemma in the discussion on software patents relates to the fact that computer programs can be described and understood in various ways. For example, from the user point of view the result accomplished by using a program, its function, seems to be its most important characteristic. Then again, from the software engineer's viewpoint, the source code is still in many cases the most essential part of the software although the ideology of combining components producing different functionalities is strongly present when systems are being integrated. In the patent context, the actual source code is irrelevant, however. It cannot be patented in itself in Europe or in the U.S. where computer-program listings are regarded as non-functional descriptive material[281]. More abstract, functionality-based description is usually used for drafting a patent application. Means plus function claims are typical in the U.S., for example. Nevertheless, compared to other inventions traditionally protected by patents, software-related inventions are much more difficult to concretize, making it challenging to apply even the basic patent law concepts to these inventions.

Since the source code may be the practical implementation of the applied idea described in the patent, it is in my interpretation protected in practice, and can be attached to patent applications in the U.S. as an example of an invention reduced to practice. This is not necessary, however, and despite patent protection, the source code could be subject to trade-secret protection. The source code is also a subject to copyright protection.

### (iv) Harmonization Efforts at the European Union Level

The European Commission (EC) published its directive proposal on the patentability of computer-implemented inventions in February 2002. The objective was to harmonize EU member states' national patent laws concerning computer-related inventions.[282] The proposal was grounded on EPO practice, but it did take opposing views on certain issues. Compared to the European Patent Convention, it was more detailed in terms of the patentability of computer programs.

The most noticeable difference between the Directive Proposal and EPO practice was the form of the claims accepted for computer-implemented inventions. As explained earlier, the European Patent Office accepts claims related to a computer program in itself or to one on a carrier, as long as further technical effect can be found.[283] The directive proposal explicitly refused these types of claims[284]. It was also pointed out in the directive proposal that granting pure business-method patents should be avoided, which required codification of the technical contribution requirement in the context of assessing non-obviousness[285].

---

[281] United States Patent and Trademark Office, *Examination Guidelines for Computer-Related Inventions* (1996).

[282] Commission of the European Communities (EC), *Proposal for a Directive of the European Parliament and the Counsil on the Patentability of Computer-implemented Inventions* (COM (2002) 92 Final, Brussels, February 2002), <http://europa.eu.int/comm/internal_market/en/indprop/comp/com02-92en.pdf> (last visited 6/21/05.

[283] EPO, *Guidelines for Examination,* at Part C, Chapter IV, 4-5 (2005).

[284] EC, *Directive Proposal on the Patentability of Computer-implemented Inventions* (2002).

[285] *Ibid.*

The EC's directive proposal positioned itself based on hearings, which began in October 2000[286]. The Commission received a large quantity of submissions arguing that patents tended to restrict innovation in fields such as software development. These responses were mainly from supporters of open-source development. The Commission also received submissions from organizations such as the European Information and Communications Technology Association (EICTA), the Union of Industrial and Employer's Confederations in Europe (UNICE), and the European IT Services Association, which together represent thousands of companies. These associations were arguing mainly for the *status quo*. In their opinion, the directive should be consistent with EPO practice concerning computer-implemented inventions and the TRIPS agreement, and thus support European competitiveness in relation to U.S. and Japanese firms. Certain economic reports as well as the practices of the main trading partners such as the U.S. and Japan were also taken into account. Concerns about low-quality patents and the possibility that business-method patenting could stifle innovation in e-commerce were taken seriously during these considerations.[287]

According to the Commission, the objective of the directive was to achieve the right balance between making patents available where appropriate in order to reward and encourage innovation, while avoiding stifling competition and open-source development.[288] The directive proposal was not considered to be far-reaching enough by the Council of Ministers, however, which then made amendments to bring it in line with EPO practice. Thus, product claims to computer programs were accepted if further technical effect could be found.[289]

The directive was voted on in the European Parliament in September 2003, and radical changes to patent protection were accepted after intense lobbying. There was great concern about compatibility, for instance, and thus the European Parliament stated that "Member States shall ensure that, wherever the use of a patented technique is needed for a significant purpose, such as ensuring conversion of the conventions used in two different computer systems or networks so as to allow communication and exchange of data content between them, such use is not considered to be a patent infringement." They also suggested the adoption of a six-month grace period. There is currently a 12-month grace period in place in the U.S.[290], which means that the inventor can freely publish his invention without losing patent rights if he applies for a patent within the grace period. The European Parliament also attempted to ensure that inventions

---

[286] *See* PbT Consultants, *The Results of the European Commission Consultation Exercise on the Patentability of Computer Implemented Inventions,* <http://europa.eu.int/comm/internal_market/en/indprop/comp/softanalyse.pdf> (last visited 6/21/05).

[287] EC, *Directive Proposal on the Patentability of Computer-implemented Inventions,* at 4-5 (2002).

[288] The European Commission, *Proposal for a Directive on the Patentability of Computer-implemented Inventions –frequently asked questions* (20 February 2002), <http://europa.eu.int/comm/internal_market/en/indprop/comp/02-32.htm> (last visited 6/21/05).

[289] Counsil of the European Union, *Interinstitutional file: 2002/0047 (COD)* at 8 (Brussels, 8 November 2002), <http://register.consilium.eu.int/pdf/en/02/st14/14017en2.pdf> (last visited 6/21/05).

[290] Arlene McCarthy, *Patentability of Computerised Inventions* (PAR2, Parlement Européen, Ref: 03A_DN(2003)09-24, debate 23 September 2003, vote 24 September 2003), <http://www2.europarl.eu.int/registre/presse/debat_du_jour_daily_notebook/2003/en/03A_DN(2003)09-24(PAR2)_EN.doc> (last visited 6/21/05); *Position of the European Parliament Adopted at First Reading on 24 September 2003 with a View to the Adoption of Directive 2003/…./EC of the European Parliament and of the Council on the Patentability of Computer-implemented Inventions* (24 September 2003), <http://www2.europarl.eu.int/omk/sipade2?PUBREF=-//EP//TEXT+TA+P5-TA-2003-0402+0+DOC+XML+V0//EN&L=EN&LEVEL=3&NAV=S&LSTDOC=Y> (last visited 6/21/05).

related to data processing could not be patented, and that the production, handling, processing, distribution and publication of information, in whatever form, could never constitute direct or indirect infringement of a patent, even when technical apparatus would be used for that purpose.[291]

If the Council of Ministers had accepted these major changes the European Parliament made to the directive proposal, the role of patents especially in relation to standardization would have changed drastically. Patents relating to interfaces are the most significant in terms of leverage. However, the Council of Ministers adopted a less radical view. It was affirmed in the Political Agreement on the Council's Common Position that so-called product claims to computer programs are allowed in defined situations. Data processing was not excluded from patentability, and there was no mention of a grace period. As far as interoperability was concerned, it was stated in the Common Position that patents should not restrict the rights provided in the copyright regime in respect of decompilation and interoperability (Directive 91/250/EEC, Articles 5[292] and 6[293]), and that "the provisions of this directive are without prejudice to the application of Articles 81 and 82 of the Treaty, in particular, where a dominant supplier refuses to allow the use of a patented technique which is needed for the sole purpose of ensuring conversion of the conventions used in two different computer systems or networks so as to allow communication and exchange of data between them".[294] However, the Political Agreement did not hold, as Poland, among other countries required the directive to be dropped from the

---

[291] *Position of the European Parliament Adopted at First Reading on 24 September 2003 with a View to the Adoption of Directive 2003/…./EC of the European Parliament and of the Council on the Patentability of Computer-implemented Inventions* (2003).

[292] Article 5 Exceptions to the restricted acts: "1. In the absence of specific contractual provisions, the acts referred to in Article 4 (a) and (b) shall not require authorization by the rightholder where they are necessary for the use of the computer program by the lawful acquirer in accordance with its intended purpose, including for error correction. 2. The making of a back-up copy by a person having a right to use the computer program may not be prevented by contract insofar as it is necessary for that use. 3. The person having a right to use a copy of a computer program shall be entitled, without the authorization of the rightholder, to observe, study or test the functioning of the program in order to determine the ideas and principles which underlie any element of the program if he does so while performing any of the acts of loading, displaying, running, transmitting or storing the program which he is entitled to do".

[293] Article 6 Decompilation: "1. The authorization of the rightholder shall not be required where reproduction of the code and translation of its form within the meaning of Article 4 (a) and (b) are indispensable to obtain the information necessary to achieve the interoperability of an independently created computer program with other programs, provided that the following conditions are met: (a) these acts are performed by the licensee or by another person having a right to use a copy of a program, or on their behalf by a person authorized to do so; (b) the information necessary to achieve interoperability has not previously been readily available to the persons referred to in subparagraph (a); and (c) these acts are confined to the parts of the original program which are necessary to achieve interoperability. 2. The provisions of paragraph 1 shall not permit the information obtained through its application: (a) to be used for goals other than to achieve the interoperability of the independently created computer program; (b) to be given to others, except when necessary for the interoperability of the independently created computer program; or (c) to be used for the development, production or marketing of a computer program substantially similar in its expression, or for any other act which infringes copyright. 3. In accordance with the provisions of the Berne Convention for the protection of Literary and Artistic Works, the provisions of this Article may not be interpreted in such a way as to allow its application to be used in a manner which unreasonably prejudices the right holder's legitimate interests or conflicts with a normal exploitation of the computer program."

[294] Counsil of the European Union, *Interinstitutional File: 2002/0047 (COD)* (Brussels, 24 May 2004), <http://register.consilium.eu.int/pdf/en/04/st09/st09713.en04.pdf> (last visited 6/21/05); Counsil of the European Union, *Interinstitutional File: 2002/0047 (COD)* (Brussels, 10 May 2005), <http://register.consilium.eu.int/pdf/en/04/st09/st09277-ad01.en04.pdf> (last visited 6/21/05).

agenda[295]. After that the Council of Ministers reached consensus and the directive was put for the second time before the European Parliament[296] which rejected it by 648 votes to 14 with 18 abstentions. Attention is likely to move next to the proposed Community patent Act, that is currently being discussed in the Council, and has been mentioned by a number of MEPs as the appropriate legislative instrument to address the issue of software patentability.[297] The software patent directive was not the first patent-related directive proposal that has faced the same fate, however. In March 1995 the European Parliament rejected the then proposed biotechnological patent directive. The main reason for such a rejection was that the directive was considered by many to remove too many restrictions regarding the patentability of life forms. In the end the Commission came up with an amended proposal which took into consideration also the ethical dimensions. The directive entered eventually into force on 16 June 1998.[298]

## B. THE SITUATION IN THE U.S.

### (i) Statutory Requirements

U.S. patent law originates from the Constitution. Under Article I, Section 8 Congress is given the power to enact laws relating to patents in order to promote the progress of useful arts, which can be done by securing for limited times to inventors the exclusive right to their respective discoveries. Congress has used this power to enact various patent laws. The current version came into effect on 1 January 1953.

The patentability requirement, which has created problems in patenting computer programs in the U.S., is that an invention must belong to at least one of the statutory categories. Under the statutory requirement, any invention that falls into the process, machine, article of manufacture, or composition of matter category can be patented if it also fulfils the other patentability requirements of novelty, non-obviousness and utility, set in the Patent Act (§ 101).

The use of the term "any" in § 101 has been interpreted to mean that Congress did not intend to put any restrictions on patentability beyond those specifically mentioned in the Patent Act, but intended § 101 to extend to "anything under the sun made by man"[299]. In fact, if all statutory subject-matter classes are put together, they do include practically everything. Nevertheless, the Supreme Court has identified three categories of non-patentable subject matter: the laws of nature, natural phenomena and abstract ideas[300].

Mathematical algorithms were originally thought to belong to the category of non-patentable subject matter. It was ruled in the Gottchalk v. Benson case (1972) that they are not patentable to

---

[295] Lucy Sherriff, *Poland Halts Software Patent Directive* (The Register, 21 December 2004), http://www.theregister.co.uk/2004/12/21/patents_dropped/ (last visited 6/21/05).

[296] Ingrid Marson, *Software Patent Directive Adopted* (ZDNet UK, 7 March 2005), <http://news.zdnet.co.uk/business/legal/0,39020651,39190497,00.htm> (last visited 6/21/05).

[297] Rocard (2005).

[298] Tritton, Davis, Edenborough, Graham, Malynicz & Roughton, at 168-169 (2002).

[299] *See e.g.,* reasoning in case Diamond v. Chakrabarty, 447 U.S. 303, 100 S.Ct. 2204, 65 L.Ed.2d 144, 206 U.S.P.Q. 193 (Supreme Court, 1980). Reference to S. Rep. No. 1979, 82d Cong., 2d Sess., 5, 1952; H. R. Rep. No. 1923, 82d Cong., 2d Sess., 6, 1952.

[300] *Ibid.*

the extent that they are mere abstract ideas. Practical applications of these ideas may be patentable.[301] Nevertheless, the effect of this decision was essentially to prevent the patenting of computer programs,[302] specifically mathematical algorithms.

Almost a decade after the Benson decision, the Supreme Court recognized in the Diamond v. Diehr case (1981) that computer programs did sometimes deserve patent protection. In its view, the respondents in this case were seeking to patent not a mathematical formula *per se,* but the use of that formula in the context of a process of curing synthetic rubber. It further explained that a process is not non-patentable simply because it incorporates a law of nature or a mathematical algorithm. An application of a law of nature or a mathematical formula to a known structure or process may well be worthy of patent protection.[303]

The invention in the In re Alappat (1994) case was about the means for creating a smooth waveform display in a digital oscilloscope. To be more specific, the claims referred to a machine, a "rasterizer", and incorporated the "means for determining a vertical distance of vectors" and the "means for normalizing the vertical distance and elevation." The physical devices used to perform these tasks included digital computational devices.[304] According to the Federal Circuit, the invention was not a disembodied mathematical concept. It was a specific machine that produced a useful, concrete, and tangible result. Consequently, a computer operating pursuant to software may very well represent patentable subject matter if the claimed invention also fulfils the other patentability criteria.[305]

In the State Street Bank & Trust Co. v. Signature Financial Group (1998) case the useful, concrete and tangible result was achieved by something as abstract as the "transformation of data representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price". It was in this case that the "ill-conceived" business-method exception was laid to rest. The Federal Circuit stated: "Business methods have been, and should have been, subject to the same legal requirements for patentability as applied to any other process or method".[306]

The treatment of business-method patents is firmly connected with the patentability of software. In fact, most inventions involving business methods that have so far been tested in Court have been software-implemented. This does not mean that there is combination of software and business methodology involved in all these inventions, however. Unlike in Europe, the novelty and non-obviousness can very well reside on the business side.[307]

---

[301] Gottchalk v. Benson, 409 U.S. 63, 93 S.Ct. 253, 34 L.Ed.2d 273, 175 U.S.P.Q. 673 (Supreme Court, 1972).

[302] IPWatchdog.com, *Software Patents* (2003), <http://www.ipwatchdog.com/softwarepatents.html> (last visited 6/21/05). *See also* Merges & Duffy, at 164 (2002).

[303] Diamond v. Diehr 450 U.S. 175, 209 U.S.P.Q. (BNA) 1 (1981).

[304] Curtis R. Harrington, *Computer-program Patentability Update* (Reed Business Information, 12 June 1995) <http://www.manufacturing.net/dn/index.asp?layout=article&articleid=CA151434> (last visited 6/21/05).

[305] In re Alappat 33 F.3d 1526, 31 U.S.P.Q.2d 1545 (Fed. Cir. 1994).

[306] State Street Bank & Trust Co. v. Signature Financial Group 149 F.3d 1368, 47 U.S.P.Q.2d 1596 (Fed. Cir. 1998).

[307] Nolo, *Obtaining a Business Method Patent* (2005), <http://www.nolo.com/lawcenter/ency/article.cfm/objectID/C2DBFF26-7097-4B7B-AE36DA00499851EE> (last visited 6/21/05).

The non-patentability of business methods has its own, rather long history, too. The earliest known case, which is often cited as establishing the so-called "business method exception" doctrine, and was ultimately thrown out in the previously mentioned State Street bank decision, was Hotel Security Checking Co. v. Lorraine Co. (1908). In that case, the court held that systems for transacting business, such as a bookkeeping system to prevent embezzlement by waiters, were non-patentable.[308]

While many subsequent cases decided by the Federal Circuit have made reference to the business-method exception, they were all ultimately decided on other grounds. The problem with interpreting the Court's earlier decisions is that the concept of an invention was different before the Patent Act was modified in 1952. There was no clear distinction between patentable subject matter and non-obviousness.[309] Hence, it could be argued, as the Federal Circuit did in the State Street Bank decision, that there never was a business-method exception.

Business-method patents are not new in practice either. Indeed, they have been issued at least since 1971[310], and, in 1985 the USPTO granted almost a thousand patents that could be described as covering business methods, and it is currently granting approximately 10 to 12 thousand such patents per year. However, given a more narrow interpretation (class 705), there are less than 1,000 of them granted every year.[311] The reason for the dramatic increase in filings has been claimed to be the recent Internet boom combined with the State Street Bank decision, which brought the possibility for patent protection to everyone's attention[312]. Hence, within the last five years a large number of patents have been granted to software and Internet companies that have invented novel ways of doing business. Online ordering and reservation processes, Internet advertising schemes, auctions, credit card services, brokerage services, banking services and tax-preparation services are examples of these so-called business-method patents[313].

It is not only software and Internet companies, but also non-technology companies such as banks, insurance companies and even health-care service providers that are no longer relying merely on trade secrecy or claiming imitation to be an unfair business practice, but are continuously filing software and business-method patents. For example, the Cardiac Intelligence Corp. has several patents on its systems for the automated collection and analysis of cardiac information and remote patient care. Health Hero Network patented a networked system for communicating information to patients as well as for remote monitoring. True Position, Inc. was granted a patent for a wireless health-monitoring system.[314]

---

[308] Hotel Security Checking Co. v. Lorraine Co. 160 F. 467, 24 L.R.A.N.S. 665, 87 C.C.A. 451 (2d Cir. 10 March 1908).

[309] Merges & Duffy, at 171 (2002).

[310] Jaffe & Lerner, at 117 (2004).

[311] Hall, at 3-4 (2003).

[312] Michael J. Meurer, *Business Method Patents and Patent Floods*, at 12-13 (Boston University, School of Law, Working Paper Series, Law and Economics, Working Paper No. 02-02, 2002)). *See also* Glazier, at 23-24 (2000).

[313] Robert W. Morris, *Software and Business Method Patent Licensing* (Practising Law Institute, Patents, Copyright, Trademarks and Literary Property Course Handbook Series, PLI Order Number G0-01BF, September 2003 - January 2004); Hall, at 3 (2003).

[314] Scott J. Fields & Joan M. Roediger, *Health Care Business Method Patents* (September 2001), <http://www.physiciansnews.com/business/901fields.html> (last visited 5/24/04).

**(ii) Problems in Assessing Novelty and Non-obviousness: Actions Taken Regarding the Poor Quality of Business-method Patents**

Particularly Internet business-method patents have attracted a great deal of attention in the media as well as in the academic world[315]. Economists above all have been trying to determine whether granting these patents actually benefits society[316]. It is the purpose of the patent system, stated in the U.S. Constitution, to promote the progress of useful arts. If this does not take place, the system could be held unconstitutional.

As suggested earlier, in Chapter II C (Changes in Academic, Political and Legal Thinking), there is still a long way to go before it could be claimed that the U.S. patent system is unconstitutional, and more research that looks beyond technological innovation is required. Nonetheless, the system does need improvement. For instance, the lack of expertise and resources in the United States Patent and Trademark Office (USPTO) in terms of determining whether claimed software and business methods are actually novel and inventive has been heavily criticized[317]. Examiners are allowed as little as 18 hours per patent during the entire application procedure and they are rewarded for getting applications out of the door. It is simply easier to grant a patent than to continue the everlasting application procedure.[318]

The USPTO has responded to the criticism and has taken action to improve its patent scrutiny. It has improved the technical training of patent examiners and expanded their search activities: as regards some business-method patents (patent class 705), there is a mandatory search in certain databases and a second-level review conducted by senior patent examiners.[319] This resulted in a notable decline in patent grants in that particular class in 2001 and 2002[320].

In addition, Congress has taken action. The American Inventors Protection Act, which was approved in 1999, contains a special defense against infringement claims related to business-method patents. The new defense is based on earlier invention, and was brought in to cover a party that has, in good faith, reduced the subject matter to practice at least one year before the effective filing date of the patent he or she is claimed to have infringed. Commercial use of the subject matter before the effective filing date is required.[321] The problem is, however, that it is not determined what is meant by methods of doing or conducting business in this context. The legislative history of the American Inventors Protection Act does not give any hint of a useful definition either. This leaves it to the courts to determine which patents are and which are not

---

[315] John R. Allison & Emerson H. Tiller, *Internet Business Method Patents* at 259 (in Wesley M. Cohen and Steven Merrill (eds.) *Patents in the Knowledge-Based Economy*, National Academy Press, Washington, D.C. 2003, 259-282).

[316] *See e.g.*, Hall (2003).

[317] Allison & Tiller, at 260 (2002).

[318] Mark A. Lemley, *Rational Ignorance at the Patent Office*, at 2 (Northwestern University Law Review, Vol 95, No. 4, 2001), <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=261400> (last visited 6/21/05); *See also* Malone (2002).

[319] United States Patent and Trademark Office, *Business Methods White Paper* (2000).

[320] Hall, at 4 (2003).

[321] Merges & Duffy, at 173 (2002).

subject to the first-inventor defense available only for business-method patents[322]. Ironically, the Federal Circuit had already made a statement against this kind of division. In the State Street Bank decision it stated: "Any historical distinctions between a method of 'doing' business and the means of carrying it out blur in the complexity of modern business systems".[323]

The Business Method Patent Improvement Act was drafted in 2000. It was not passed then and a new version was presented to Congress in 2001. Had it been approved, changes would have followed. The application domain of this Act was broadly defined. According to Section 2, the term 'business method' means in this context

(1) a method
    a. of (i) processing data; or (ii) performing calculation operations; and
    b. which is uniquely designed for or utilized in the practice, administration, or management of an enterprise;
(2) any technique used in athletics, instruction, or personal skills; and
(3) any computer-assisted implementation of a method described in paragraph (1) or a technique described in paragraph (2).[324]

Then again, the term 'business method invention' was defined as to mean (1) any invention, which is a business method (including any software or other apparatus); and (2) any invention, which is comprised of any claim that is a business method.[325]

Under the proposed Business Method Patent Improvement Act, mandatory publication within 18 months of the original filing date of all patent applications that claim a business-method invention should have been introduced. Moreover, the implementation of a European-type opposition procedure for challenging granted business-method patents was suggested, and the Act proposed changes to the validity presumption both before and after the patent is granted. At that time and also today all patent applicants are entitled to a patent unless the USPTO can show that the patentability requirements are not met. Equally, the Courts base their decisions on the presumption of validity. The proposed act that never became law sought to reverse this presumption with regard to the non-obviousness of business-method inventions.[326] It is clear that propositions concerning business-method patents are, to a large extent, similar to those suggested in the FTC and NAS reports and the Patent Reform Act of 2005, which relate to reforming the entire U.S. patent system.

It is somewhat incongruous that, despite the critique and reforms relating to business-method patents and the drive to renovate the U.S. patent system, in the international context the U.S. is continuously suggesting that other countries should follow its lead and adopt similar patent

---

322 Jerry Riedinger, *Building Fences in Cyberspace: Business Method Patents and The Internet. Analysis of Recent Internet/E-Commerce Business Method Patents*, at 12-13 (prepared for the Practicing Law Institute Program on Patenting the New Business Model, Building Fences in Cyberspace, 16 June 2000).

323 Merges & Duffy, at 173 (2002); State Street Bank & Trust Co. v. Signature Financial Group 149 F.3d 1368, 47 U.S.P.Q.2d 1596 (Fed. Cir. 1998).

324 Tech Law Journal, HR 1333, *The Business Method Patent Improvement Act of 2001* (introduced 3 April 2001), <http://www.techlawjournal.com/cong107/patent/bus_method/hr1333ih.asp> (last visited 6/21/05).

325 *Ibid.*

326 *Ibid.*

regulation[327]. In fact, this is one of the actively discussed issues in the ongoing SPLT negotiations: in return for giving up its first-to-invent system the U.S. is interested in expanding the scope and power of the patent system, for example by reducing the exceptions to patentability or removing the technical character requirement[328].

## C. CRITICISMS

Obviously, the patentability of software and business methods is old news in the U.S. Even Congress, which has the ultimate power regarding changes in patent law, seems to have accepted the patentability of business methods. Consequently, the academic debate has focused on the soundness of the examiner's decisions about novelty and non-obviousness of claimed software and business-method inventions[329]. Today, despite the critical views, only a few scholars are suggesting that computer programs or business-methods should not be patentable at all[330].

Nonetheless, it has been demonstrated in the U.S. that technological complexity and cumulative, rapid innovation, which are characteristic of software development, make strong patent protection less attractive in these areas[331], and it is on this basis that the optimal scope of patent protection covering software and business methods has been studied. It has been suggested, for example, that the doctrine of equivalents should be applied very carefully in relation to software patents. A limited right to reverse-engineer patented computer programs has also been advocated since, unlike in most European countries, there is no fair-use or reverse-engineering exception in the U.S. Patent Act.[332]

Opponents of software patenting have entered the fray in Europe. Although much of the discussion in the media has been filled with misconceptions, hype and half-truths, and in many cases the discussants do not appear to have a very good understanding of the patent system, valid questions about its efficacy have been raised. The common claims are that software patents pose threats to open-source development, interoperability and standards, that small companies do not have the resources to file for patents and therefore large firms are favored, and that patent protection is not needed in the software industry as copyright provides the appropriate level of protection. Claims that software is different from other patentable inventions and should not

---

[327] *See e.g.,* Herbert C. Wamsley*, Achieving Additional Harmonization of Patent Laws* (Opening Statement at USPTO Public Roundtable Discussion, 19 December 2002) <http://www.uspto.gov/web/offices/com/speeches/openingst121902.htm> (last visited 6/21/05).

[328] GRAIN (2003).

[329] Lemley, Menell, Merges & Samuelson, at 259 (2000).

[330] One of these scholars is Dreyfuss. *See e.g.,* Rochelle Cooper Dreyfuss, *Are Business Methods Bad for Business?* (Public Law and Legal Theory Working Paper Series, Working Paper 17, March 2000) <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=219574> (last visited 6/21/05).

[331] *See e.g.,* Robert Hunt, *Patent Reform: A Mixed Blessing for the U.S. Economy?* (Federal Reserve Bank of Philadelphia, Business Review, November/December 1999, 15-29); Gallini (2002); Dominique Foray, *Intellectual Property and Innovation in the Knowledge-Based Economy* (ISUMA, Spring 2002).

[332] *See e.g.,* Cohen & Lemley (2001); Dan L. Burk & Mark A. Lemley, *Designing Optimal Software Patents* (Stanford Law School, Public Law & Legal Theory Working Paper series, Research Paper No. 108 and University of Minnesota law School, Legal Studies Research Paper series, Research Paper No. 05-11, March 2005).

therefore be patentable, as well as the fear of inadvertent patent infringement, also play a role in the opposition.[333]

The discussion on the role and effects of software patenting is valuable, but it is not likely that the result will be what its opponents are hoping for. The reality is that software has been patentable in Europe for decades. There is no evidence that software patents stifle innovation in Europe, and according to the TRIPS agreement, patent protection should be available in all fields of technology. Thus, it is unlikely that the EU would ultimately pass a directive that turned the situation upside down, although the parliament rejection of the directive was certainly a temporary victory for the opponents. However, the issue is not black and white: it is not merely a question of software being patentable subject matter, and opponents have raised a lot of good questions about the benefits. In fact, although, unlike in the U.S., patent protection does not cover private and non-commercial utilization, and there are specific exemptions for experimental use even for commercial purposes, limiting patent holders' rights in certain situations could be considered so that user-innovation would be promoted even though it took place on the Internet. Clarifying the exhaustion doctrine in the context of software patents is also a topic that deserves more attention[334], and the interpretation of patent claims in infringement cases and determining what constitutes direct and indirect infringement are also open to question. Moreover, although the technicality requirement is likely to keep pure business-method inventions out of the patentable arena, as has been witnessed in the U.S., the boundary is not clear. The time for this discussion is now, not after 20,000 patents have been issued covering (pure) business methods as a response to the urge for protection arising from the shift towards service-oriented information economy. It is also probable that the industrialization of the ICT meaning the automation of coding, for instance, will increase the pressure in accepting patent claims regarding inventions that today are usually though as contributing to the field of programming. Global scale patent law developments may also affect the situation in the future.

## D. SUMMARY

Patent offices and courts have spent the last three decades determining how concepts of patent law developed for the industrial world should be applied to the ground-breaking combination of hardware and software. Just as in the field of biotechnology, it has not been possible to find any exact limits, and practitioners have been operating on a sliding scale. For instance, the EPO's interpretation of the technical character of computer programs has shifted from excluding all software inventions from patentability to applying the technical-contribution approach, and further to examining their further technical effects, and finally to determining an invention technical if it contains technical elements. Currently, however, the assessment of technicality is factually conducted in relation to determining whether an invention is inventive meaning that the determination is basically the same as before. It is simply conducted in a later stage of the

[333] PbT Consultants (2001); Jeremie Zimmermann, *Europe Struggles over Software Patents* (IEEE Spectrum, September 2004, 61-63).

[334] It might turn out that a patent holder's rights are never exhausted in the software context. If making a copy of a computer program while using it is interpreted to be manufacturing, it might not be possible to use the program without the patent holder's consent even after the product has been legally sold or licensed. This is because, unlike the right to distribute further and to use that specific product, the right to manufacture is not subject to exhaustion. Moreover, process claims are not usually subject to exhaustion at all. In the software context, however, despite the actual form of the claims, the subject matter is the same. Although it seems rather absurd to interpret patent laws like this, it would lead to more control concerning the resale of patented products.

examination process. Then again, the reasoning in U.S. courts has swung from assuming that software is merely a concatenation of non-patentable algorithms to the view that as long as useful, concrete, and tangible results can be achieved, computer programs are patentable. Further, unlike in Europe, patents for business-method inventions are accepted in the U.S., and although a large proportion of these inventions are implemented in software, the invention itself may reside in the area of business. In Europe the technicality requirement is likely to keep pure business methods out of the sphere of patentable subject matter, but pressure to their acceptance may be hard to resist. On the other hand, if the developing countries are able to form a united front and promote stricter patentability requirements, the pro-patent pressure resulting from international patent law harmonization driven by the interests of developed countries could be downgraded.

As mentioned above software inventions (although not inventions of coding) can be patented in both Europe and the U.S., the differences residing mainly in the construction of the claims. Further differences can be found in the ways in which national patent offices apply their patent laws. Consequently, to harmonize patent office and court practices within the EU, the European Commission proposed a directive on the patentability of computer-implemented inventions. The directive proposal faced serious criticism that undermined its whole basis. In the end the European parliament rejected the proposal. Nevertheless, and although the still ongoing discussion on the need for and effects of software patents is relevant, it is unlikely that specific limits on patentability will be found in the future. Indeed, the scope of the discussion needs widening. To have any practical effect, it should in my opinion focus more on increasingly pressing topics such as assessment of the inventive step and the interpretation of patent scope.

## IV. PATENT STRATEGIES REFLECTING BUSINESS TRENDS IN THE INFORMATION AND COMMUNICATIONS TECHNOLOGY SECTOR

It has been established in the previous chapters that the company perspective on patent protection differs from that of academics, legislators and the courts. Rather than making decisions with society's best interests at heart, firms typically focus on their own agenda, in other words generating profit for their shareholders. In this they utilize the means available at a given time, and these means include patents. Thus the perspective in this chapter differs fundamentally from that adopted so far.

It was demonstrated above that patents as well as other intellectual property rights have become imperative for firms today due to the shift from an industrial to an information economy. In fact, a company's market value is to a large extent derived from its intangibles[335]. For instance, it has been estimated that in 2000 93.5% of Merck's, 97.8% of Microsoft's and 98.9% of Yahoo's value was based on intangible assets[336], which include knowledge, competence, intellectual property, brands, and customer relationships among others[337]. The problem with intangibles is that they can be easily leaked to competitors and their valuation is difficult. Intellectual property rights give some intangible assets a form, however, and provide the company with a limited right to exclude others from utilizing patented inventions, copyrighted works or registered/established trademarks. At the same time they offer the company something explicit to exchange. Although it is not at all easy to put a price tag on a right to manufacture patented inventions or to copy and distribute copyrighted works, for example, there is at least someone who has a defined right and who is entitled to give it away. Yet, the market value of intellectual property is always context-dependent and thus different for everyone[338].[339]

As the value of intangibles within companies' resource pools has risen and intellectual property rights have been increasingly used as a means of protecting and transferring these assets, firms have started to pay a lot of attention to managing these rights more effectively[340]. Well-thought-out IPR and patent strategies have emerged, and instead of being one of the supporting functions nobody pays any attention to, IPRs, and patents in particular as they provide the strongest protection, have assumed a more central role in companies' everyday business[341]. In fact, a glimpse at the prevailing business literature gives an idea of the recent interest in managing and

---

335 Parr, at 273 (2002).

336 Ron Laurie (Inflexion Point Strategy, Ltd), *The role of Claims Construction in Patent Valuation* (IP Society, Advanced Topics in IP Valuation Seminar, Palo Alto, 13 July 2004).

337 Teece, at 3 (2000).

338 Ron Laurie (Inflexion Point Strategy, Ltd), *IP Valuation – Magic or Myth* (IP Society, Intellectual Property Issues in M&A Transactions Seminar, Palo Alto, 29 April 2004).

339 For further information about the "valuation problem" *see e.g.,* Blair, Hoffman & Tamburo (2002).

340 *See e.g.,* Anthony L. Miele, *Patent Strategy, The Manager's Guide to Profiting from Patent Portfolios,* at. 1 (John Wiley & Sons, Inc. 2000).

341 *See e.g.,* Jackson Knight, *Intellectual Property "101" What Executives and Investors Need to Know About Patent Rights and Strategy*, at 4 (in Bruce Berman (ed.), *From Ides to Assets. Investing Wisely in Intellectual Property* (John Wiley & Sons 2002, 3-26).

utilizing patents and other intellectual property rights.[342] This chapter examines ways of managing and utilizing patents in the ICT sector. It will be shown that, although the objectives companies have set for their patent functions in conjunction with their business strategies have generally evolved and patents have become more entangled with everyday business, the variations are many. To some firms patents provide one way or even the only way to generate revenue, to some they give the freedom to innovate, some seek status value, and to some they are a nuisance to be avoided. On the whole, it is clear that the protective value of patents is not as high in the ICT sector as in some other fields such as pharmaceuticals[343], and that it is competition that drives the innovation in this field[344]. Nonetheless, at the moment patents provide a useful mean for improving a firm's position in the market.

As mentioned in previous chapters, standardization is a significant aspect of the business climate, particularly in the ICT sector. The problem with patents and (open) standards is that patents can potentially hold up standardization processes or prevent others from using the established standard. This may have serious repercussions for the development of the industry. Standardization is an interesting setting also for other reasons: in many cases it represents an exception to companies' licensing models[345]. Thus, following a discussion on patent strategies and their evolution in general, a more limited application will be examined. The question of how patents can be employed in the context of standardization will be addressed.

Finally in this chapter, the focus turns to the societal implications of ICT patent strategies, and the discussion will thus tie in with that in Chapters II and III. One of the key findings is that, although many problems potentially posed by patents are not impediments in practice, due to the hold-up problem particularly the U.S. patent system in its current form supports the type of opportunism in which having a patent that impinges on other firms' value streams is all that matters.

## A. TRENDS AND CHALLENGES

The term "patent strategy" can be used to mean a lot of things, but in my mind it refers to the long-term goals companies have set for their patent activities and to the implementation of these goals. Hence, it includes rewarding employees for patent disclosures and thus encouraging inventiveness. It includes filing and acquiring patents, making use of them in business through blocking others from using a technology, licensing and selling technology and patents, and enhancing the company's reputation. Enforcing patent rights and giving up those that are no longer useful is also part of it. The purpose is to unify the company's patent activities so that they support its business appropriately.[346] Naturally, the patent strategy goes hand in hand with the

---

[342] *See e.g.,* Julie L. Davis & Suzanne S. Harrison, *Edison in the Boardroom, How Leading Companies Realize Value from Their Intellectual Assets* (John Wiley & Sons, Inc 2001); Rivette & Kline (2000); H. Jackson Knight, *Patent Strategy for Researchers and Research Managers* (2nd edition, John Wiley & Sons, LTD 2001); Miele (2000); Glazier (2000); Megantz (2002); Bruce Berman (ed.), *From Ides to Assets. Investing Wisely in Intellectual Property (*John Wiley & Sons 2002).

[343] *See e.g.,* Cohen, Nelson & Walsh (2000); Levin, Klevorick, Nelson & Winter (1987); FTC, at Chapter 3, 31, 46 (2003).

[344] FTC, at Chapter 3, 31, 46 (2003).

[345] Interview data U.S. (2004).

[346] *See also* Deepak Somaya, *Theoretical Perspectives on Patent Strategy,* at 3-4 (Robert H. Smith School of Business, Maryland, Draft, 2002); Miele, at 1 (2000): Knight, at 14-17 (2002).

company's IPR and technology strategies, offering guidelines when decisions are made in individual cases. IPR and patent "strategies" concerning particular technological fields, products and their distribution, as well as other decisions that are made on separate occasions, could be called tactics.

The significance of patents to firms varies, as do their optimal patent strategies. Davis and Harrison (2001), for instance, divided companies' IP strategies into a value hierarchy of five levels. On the bottom is the defensive level, on which IPRs are generally viewed as legal assets. Next comes the cost-center, level, when companies focus on reducing the filing and maintenance costs of their IPR portfolios, but still primarily consider them as legal assets. It is on third level that firms begin to look at IPRs as business assets that have the potential of bringing in additional revenues. On the fourth, integrated level, IPRs are no longer managed in one department, but are integrated into day-to-day operations, procedures and strategies. The top level is the visionary level, on which IPRs are deeply integrated into the company's functions and are taken into account when its future is being planned.[347] The value hierarchy, based on the different expectations companies have about the contribution their IP function should be making to their corporate goals, is illustrated in Figure 4.

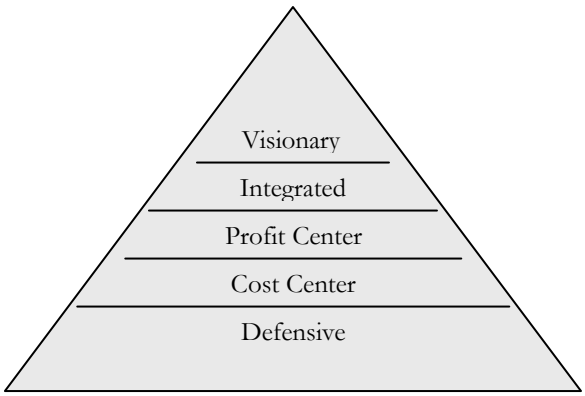



**FIGURE 4**. THE VALUE HIERARCHY[348]

In academic literature patent strategies are often divided into two categories: offensive, and defensive[349]. Some add the third, transactional strategy[350]. In practice, the strategy is company-specific and seldom fits in only one category. Patents can serve many functions at the same time, and the purposes for which they are used may change over time. Nevertheless, firms' strategies could be characterized as being more offensive, more defensive, more active, more passive[351],

[347] Davis & Harrison, at 12-14 (2001).

[348] Davis & Harrison, at 12 (2001).

[349] Granstrand, at 214 (1999); Rahnasto, at 7 (2003); Knight, at 19 (2002); Anthony Arundel & Pari Patel, *Strategic Patenting* at 3-4 (Background Report for the Trend Chart Policy Benchmarking Workshop New Trends in IPR Policy European, Trend Chart on Innovation, Luxemburg, 3-4 June 2003).

[350] Barton E. Showalter & Jeff D. Baxter, *Strategic use of Software Patents,* at 5 (Practising Law Institute, Patents, Copyrights, Trademarks, and Literary Property Course Handbook Series, PLI Order No. G0-004D, February-March, 1999).

[351] For instance Rahnasto has referred to active and passive patent strategies as strategies employed before the importance of IPRs increased and business-oriented view became prevailing. He has characterized these strategies as follows: "A passive intellectual property strategy meant that a company adopted a strategy of investing in intellectual

more adaptive or more static than those of other companies. The goal is to use patents so as to enhance competitive advantage. The value of the firm's intellectual capital should be maximized and the overall value of the enterprise boosted. Patents may be included in the company's risk management, too. In essence, the strategy is about getting more money or saving money.

In my perspective, a firm does not need patents for it to have a patent strategy. It may, for example, decide not to file for patents, but rather to publish its inventions contributing to "prior art". It may also protect its inventions in other ways and thus save money otherwise sunk in unutilized patents, their preparation and application. These resources could rather be invested in R&D. It could also adopt a strategy that does not involve patents in order to diminish the risk of infringing others' patent rights. I call this approach a "no patents" strategy. The strategy can be independent but it can also be perceived as complementary to all the other patent strategies: companies make negative decisions about applying for patents[352], licensing and asserting them, for example.

There are clear differences between legal and business cultures in the U.S. and Europe. These dissimilarities are echoed in patent strategies employed by U.S. and European ICT firms. In general, European companies do not consider patents as valuable to their businesses as their counterparts in the U.S. do[353]. Nonetheless, it is clear that the influence of the strategies is not limited to certain geographical areas. In the ICT sector, for instance, the aggressive nature of U.S. strategies affects the prospects of developments in Europe, partly because the U.S. firms had a head start in the software-patent rush[354]. Even today, they own a large proportion of the ICT patents granted in Europe[355], giving them strong leverage in these markets[356]. More importantly, the internationalizing business environment, and the Internet as a marketplace, make it extremely difficult for ICT companies today to refrain from paying any attention to patents irrespective of their business model and countries of operation. Given the number of patents issued for Internet business methods and software-implemented inventions, the risk of infringing someone's patents on the Internet is considerable. On the other hand, patent enforcement is challenging if the alleged infringement has taken place on the Internet. The market is international, and different parts of the patented processes may easily be carried out under different jurisdictions meaning

---

property as little as possible. An active intellectual property strategy meant that the company was actively organizing the detection of new innovations, was patenting its innovations, protecting its trade marks, clearing new products against prior rights and attacking imitators." (Rahnasto, at 6 (2003)).

[352] There are many reasons why firms do not consider patenting as worthwhile. In Cohen, Nelson & Walsh's study the share of companies that reported difficulty of demonstrating the novelty of an invention as a reason for not patenting was 31,2%, the amount of information disclosed in a patent application was supported by 24,3% of respondents, 15,7% named the cost of applying, 3.2% the cost of defending a patent in court, and 24,6% the ease of legally inventing around a patent. (Cohen, Nelson & Walsh, at 14 (2000)).

[353] Interview data Finland (2003) versus Interview data U.S (2004). *See also* DLA (2004); Blind, Edler, Nack & Straus (2001); Vonortas, at 33 (2003).

[354] Since it has been possible to patent software in the U.S. for longer than it has been in Europe, U.S. companies have been the ones filing patents for software-related inventions in Europe, while many European companies have been held back by the confusing wording of the European Patent Convention and of national patent laws. (Fred Blakemore, *Patenting Computer Software*, at 159 (Engineering Management Journal, August 1999, 157-160)).

[355] OECD, *Key ICT indicators, Share of countries in ICT patents at the EPO, according to the residence of the inventors, by priority year,* <http://www.oecd.org/dataoecd/20/9/34083345.xls> (last visited 6/20/05).

[356] Naturally, U.S. companies file a lot more patents in the U.S. than they do in Europe. One of the U.S. companies interviewed stated that of the patents that are filed in the U.S., the industry average for filing them internationally as well varies from 10% to 50%. The U.S. is a bargain when it comes to patents. (Interview data U.S. (2004)).

that there may be no infringement. Patent rights are also national and must be enforced separately in every country, making both filing and enforcement extremely costly[357]. It costs more than 100 000 euros to patent across Europe[358].

Four types of patent strategies are described in more detail in the following, and the trends that can be perceived in the ways in which ICT companies exploit patents are explored. Some of the discussion relies on empirical research data on Finnish and U.S. ICT firms. Finland is currently one of the top ICT countries[359], essentially because of Nokia's international success, and as such it represents the leading edge of Europe's ICT sector. The proportion of ICT patents compared to other patents is also particularly high in Finland[360].

**(i) Offensive Strategies**

Offensive patent strategies are based on strategic planning of the use of patents in business, proactive litigation, and active lobbying for new legislation[361]. They include generating revenue by preventing others from utilizing patented inventions and/or through licensing technology and patents[362]. Both of these methods are based on the patent holder's right to forbid others from utilizing the patented invention. In some cases the patent holder may even be able to prevent others from selling products that incorporate the invention described in the patent claims, even though the patent does not cover the entire product or process. Particularly, patents to so-called bottleneck inventions, which are difficult to design around and often relate to interfaces that enable complementary products to work together give a lot of leverage to the patent holder and are thus regarded as the most influential.[363]

If blocking others from utilizing patented inventions helps a company to fight off competitors and makes its products distinctive, the patent holder or the exclusive licensee may be in a monopoly position. It can price its products more highly than it could without a patent/patents[364]. The active enforcement of a patent holder's rights is naturally required in these cases.

In many cases, however, patents do not confer monopoly in practice: although they do offer stronger protection against imitation than copyrights, for instance, it is not easy to monopolize a product, process or technology through patenting in the ICT industry. First, it is costly to file and acquire patents, and in many areas, unlike in pharmaceuticals, one or two patents are seldom enough for providing wide enough protection. It is often necessary to file some broad

---

357 Wherry, at 20 (2002).

358 Vortonas, at 37 (2003).

359 *See e.g., The Global Information Technology Report 2001-2002: Readiness for the Networked World*, where Finland was ranked first and the U.S. second in countries' information technology readiness index. In *The Global Information Technology Report 2003-2004* the U.S, held the first place and Finland was third after Singapore.

360 OECD, *Science, Technology and Industry Scoreboard 2003 – Towards a Knowledge-Based Economy*.

361 Rahnasto, at 7 (2003).

362 Showalter & Baxter, at 5 (1999); Granstrand, at 214 (1999); Knight, at 19 (2002).

363 Somaya, at 9 (2002). For instance Gillette has a number of patents on the interface between their blades and razor handles enabling it to maintain its "cheap razors – expensive blades" business model (Somaya, at 9 (2002)).

364 Showalter & Baxter, at 5 (1999).

applications covering the key elements of the products or processes, and to follow this with some narrower applications in order to develop a related portfolio. Alternative ways of achieving the same result are also usually included in these applications, or they are patented separately: the aim here is to make the designing around more complicated and costly. Improvements developed later may also be patented in order to maintain the protection level.[365] Consequently, as start-up firms can only afford to patent those technologies which have greatest value to the business[366], portfolio building has often been considered a privilege of large and medium-sized companies, and even in these cases patents rarely block others from bringing comparable products onto the market. It is often possible to achieve the same functionality in different ways and to design around the patents[367]. Second, there are always those who could not care less about others' patents, and even if a company had good individual patents or a patent portfolio, unless the technology in question was imperative to it, the source of competitive advantage, it may not have the will or the resources to prevent others from using its patented inventions in practice.[368] Indeed, considering that it is difficult to tie a patent to a particular product and the products change too quickly for patents to provide return on investments, strong first mover advantages had previously been thought as the best protection method in the semiconductors, for example. Texas Instruments changed the game, however, when it started to assert its patents against competitors in mid-1980s. In 1999 TI's licensing revenues represented more than 55 % of its net income.[369]

Although active enforcement is expensive, and has therefore often been thought of as an option only for large and medium-sized companies, there has recently been a trend for small companies to win patent-infringement suits over large corporations in the U.S[370]. For example, in 1994 the court ordered Microsoft to pay Stac Electronics $120 million in damages for the unlicensed use of two Stac Electronics patents. These cases demonstrate that patents can also protect small firms,[371] and small high-tech companies in the U.S. have become more active in filing patents, building their own portfolios and also defending their rights[372]. Barely 5% of patents went to start-up firms and other first-time patentees in 1972, but by 1995 the proportion had grown to 23% of patent recipients. In addition, in the realm of Internet business methods, small companies and individuals hold a larger share of these patents (35.78%) than general patents (28.2%)[373]. The increase in patenting activity among small companies corresponds with the birth and development of the venture-capital industry[374]. Transactional patent strategies are discussed later

---

[365] *See e.g.,* Knight, at 48-53 (2001); Rice talks about so-called "rifle" and "shotgun" approaches. In the former only a few patents covering the technology are obtained, and in the latter the aim is to obtain as many patents as possible in a particular area of technology. The risk with "rifle" strategy is that if the core patents are found invalid, the patent holder does not have any fallback protection. The latter strategy is rather expensive. (Rice 2003).

[366] Washington CORE, at 6 (2003).

[367] Interview data Finland (2003). *See also* Jacob, Alexander & Lane, at 48 (2004).

[368] Derived form the Interview data Finland (2003), and Interview data U.S. (2004).

[369] Jaffe & Lerner, at 57 (2004).

[370] Arlen L. Olsen, *Patents Are Big Moneymaker These Days for Companies* (The Business Review, 11 August 2000).

[371] Showalter & Baxter, at 6 (1999).

[372] Washington CORE, *Patent Strategies for Venture Firms: Experiences from the Uniter States,* at 1, 5 (March 2003), <http://www.iip.or.jp/e/index.html> (last visited 6/21/05).

[373] Allison & Tiller, at 275-276 (2002).

[374] Washington CORE, at 4-5 (2003).

on. As regards to patent litigation in Europe, it has been estimated that two-thirds of patent cases is originated by small and medium sized firms[375].

Patents may be used not only for preventing others from utilizing patented, commercially valuable inventions, but also for acquiring external resources, including manufacturing, distribution and marketing capabilities, technologies, other IP, and capital[376]. Well-documented IP assets can be used as a basis for a joint venture, or a strategic alliance for instance, or they can otherwise assist a company in getting favorable deals[377]. In fact, a paradigm shift from closed to open innovation has taken place, making it necessary for companies to look for resources beyond their own borders: although firms used to be self-reliant, conducted most of their R&D internally, and marketed, distributed, supported and serviced their products on their own, the growing mobility of highly experienced and skilled people, the growth of the private venture-capital industry, and the increasingly fast time to market for many products and services have eroded the ideology that successful innovation requires control.[378] Increased R&D costs, rapid technological change, product complexity, specialization among firms and technological convergence have also been driving companies towards further dependency on other firms.[379] Hence, they cannot afford to block all others from using their patented inventions, but need to license their technologies to others to manufacture, distribute, use, and develop further, and vice versa. Well-reasoned licensing strategies complement and enhance the firm's product line, and assist in positioning it favorably in the markets[380]. Nevertheless, the interviews with the U.S. ICT firms revealed that, although it has become common to outsource manufacturing and distribution, R&D is still largely maintained within the company, and licensing in technologies is often limited to non-core elements[381]. Companies are afraid of giving up too much control to the licensor. Moreover, with the exception of open standards, technology out-licensing beyond the firm's own value network was limited[382]. Nonetheless, attitudes appear to be changing little by little, and markets for technology licensing are expanding. It is the (patented) technologies that firms do not utilize themselves in a certain market, for instance, that are the first to be licensed, sold or even donated to other firms, but if the price can be agreed upon, technologies incorporated into the company's own products and processes may also be available for license[383]. It has been estimated that over 95% of patents are currently unlicensed, and over 97% never generate royalties. This is often because the technology they cover is not useful, feasible or marketable.[384]

---

375 OECD, at 31 (1997).

376 Somaya, at 11-12 (2002).

377 Rice (2003); Miele, at 51-58 (2000); Somaya, at 4 (2002).

378 Chesbrough, at xx-xxv (2003).

379 OECD, at 16 (2004).

380 Megantz, at 80 (2002).

381 Interview data U.S. (2004).

382 Interview data U.S. (2004).

383 Derived from Interview data Finland (2003) and Interview data U.S. (2004). *See also* Somaya, at 11 (2002); Rice (2003); Megantz, at 80 (2002).

384 Samson Vermont, *The Economics of Patents and Litigation,* at. 332 (in Bruce M. Berman (ed.) *From Ideas in Assets, Investing Wisely in Intellectual Property*, Wiley & Sons, Inc., 2002, 327-372).

In the technology-licensing context, patents in conjunction with other IPRs enhance the technology's value. Patents can also be utilized in order to push the other party to license their essential technology. Japanese companies, for example, have been keen on practicing the so-called surrounding tactic, which means that the desired key technology is surrounded by improvement patents and patents covering alternative applications so that it is not possible to develop it further without licensing patents from a particular company. The licenses for improvement patents are conditional upon licensing the key technology.[385] Various patenting tactics are further illustrated in Figure 5.

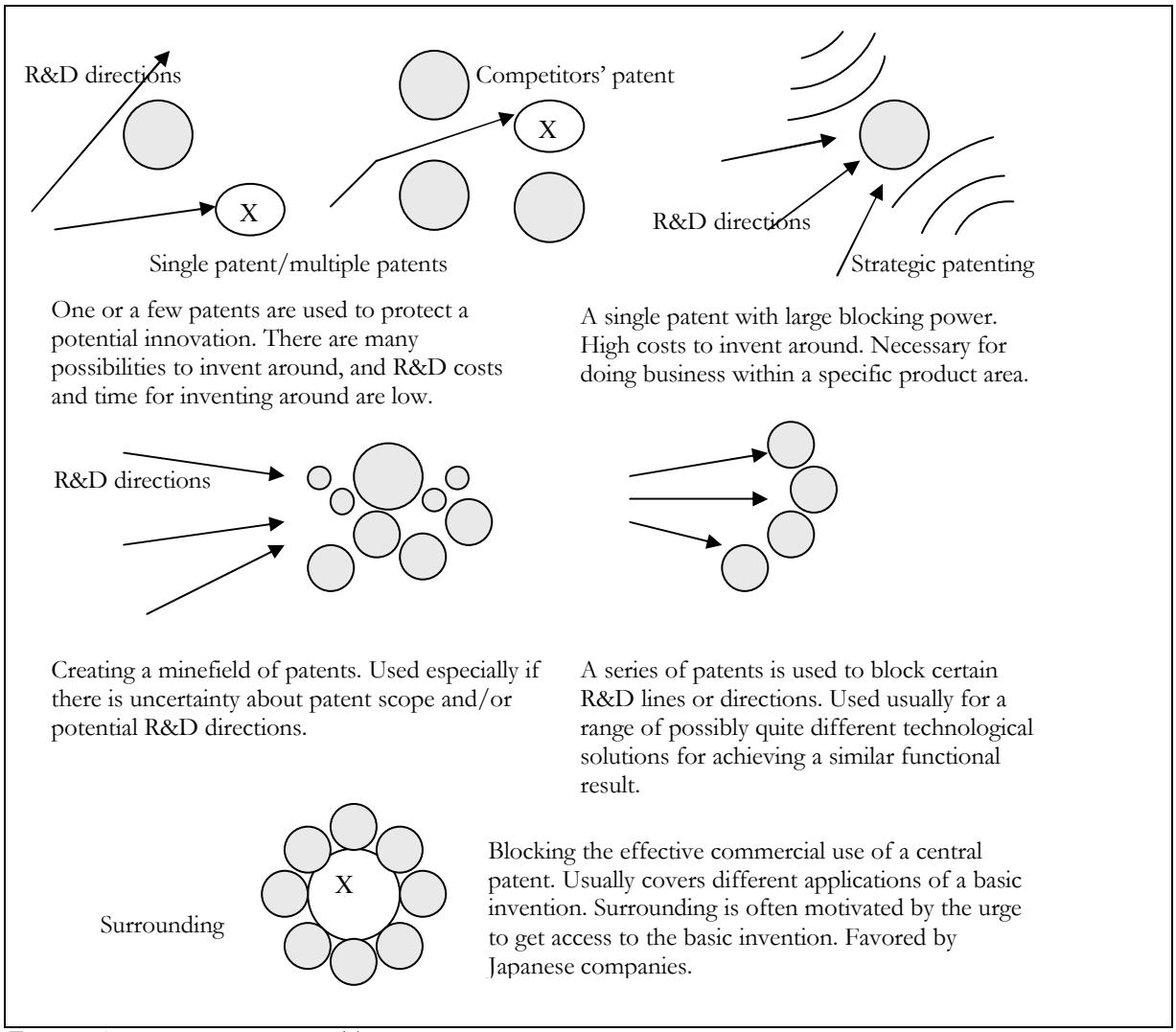



**FIGURE 5.** VARIOUS PATENTING TACTICS[386]

As mentioned above, patents are serving more and more as currency for acquiring intellectual property, other assets and direct licensing payments from other firms. This trend has probably been facilitated by the fact that, as a result of the increasing numbers of patents, it has become

[385] Donald M. Spero, *Patent Protection or Piracy – a CEO Views Japan* (Harvard Business Review (September-October 1990); Granstrand, at 221 (1999); Knight, at 53 (2001).

[386] Granstrand, at 219-222 (1999).

more challenging, and in many cases impossible, to avoid infringement[387].[388] This applies particularly in areas in which processes and products often consist of multiple components, many of which involve various patentable inventions, and many of these patentable inventions can be used in multiple products. Therefore, on the one hand a patent holder may have leverage concerning multiple innovations, and not just one product, but on the other hand, the product may involve inventions patented by others, and licenses from other companies are, at least in theory, required in order to manufacture, sell and distribute these products. In sum, a company may easily be in a position in which it has developed the technology independently but finds out later that, in order to actually market and sell the product or use the process it needs a license from someone.[389] As a result, it is not only patent licensing combined with technology and know-how licensing, but also bare patent licensing that has gained in popularity in recent years[390]. Bare patent licensing means that the licensee obtains the rights but no other deliverables.

Markets for bare patent and patent licensing combined with a know-how license, for example, have intensified, but the question remains as to whether this has affected ICT companies' operations. Are business synergies about to change due to patents? Recognition of the licensing option is, in fact, evident from companies' internal reorganizations. Many ICT firms in the U.S. are currently in the process of establishing new, more aggressive licensing programs or modifying their existing licensing operations to make them more effective.[391] The change begins with modifying the patenting processes. In order to establish a successful licensing program a company needs to actively file for patents that "read on" technologies employed or potentially employed by its prospective licensees. It is not enough, for instance, to rely only on in-house R&D and other employees' invention disclosures, and only to patent those inventions. The patenting process has to be more interactive and more business-oriented, and claims should be drafted and amended with the strategic market potential in mind.[392] It is also possible to acquire patents through direct sales, which is an increasing trend according to the U.S. companies interviewed[393].

Another perceptible change in companies' operations relates to the licensing negotiation process itself. An example of a successful operational reform is when IBM simplified its licensing-negotiation processes in 1992. According to DePalma (2004), the company used to enter the negotiations with a huge stack of patents, claiming infringement of at least one of them and trying to get results by wearing down the opponent. After 1992, it focused on one patent claim at

---

387 Interview data U.S (2004).

388 "Stick licensing" (patent infringement likely) is generally more profitable and less difficult than "carrot licensing" (voluntary license) because in the former situation the licensee is typically in a poor negotiation position. All its investments may be lost if it does not take a license. (Alexander I. Poltorak & Paul J. Lerner, *Essentials of Licensing Intellectual property*, at. 45-47 (John Wiley & Sons, Inc 2004)).

389 *See e.g.,* Shapiro (2001).

390 Somaya, at 4 (2002).

391 Companies are establishing subsidiaries with the sole purpose of managing and licensing their technology, for example. Furthermore, many are using their technologies as the basis for new businesses and strategic alliances. (Parr, at 277-278, 2002).

392 *See e.g.,* Stephen P. Fox & Guy J. Kelley, *Making Innovation Pay, Aligning Patent Rights with Business Strategy*, at 191-205; James Jorasch, *The Process Laboratory, Developing Business-Driven Patents in the Information Age*, at 139-156 (Both in Bruce M. Berman (ed.) *From Ideas in Assets, Investing Wisely in Intellectual Property*, Wiley & Sons, Inc. 2002).

393 Interview data U.S. (2004).

a time and demonstrated the infringement to the potential infringer in a simple way so that even non-engineers could understand it. The results were remarkable; IBM's licensing revenues went up from $150 million in 1992 to $800 million in 1995.[394] During 1999, 2000 and 2001 its yearly royalty rates were over 580 million dollars[395]. Asserting one's patent rights over someone, even competitors, and requiring licensing fees or for them to license their key technologies/patents in return may, however, turn out to be problematic in the prevailing business environment characterized by coompetition. Competitors in some fields may very well be business partners in another. Therefore infringement proceedings and licensing negotiations may affect a company's regular business with that same partner.[396] This is a growing concern that needs to be addressed when a company is thinking about accusing someone of patent infringement.

In addition to the traditional technology-intensive firms that develop and produce products and services but also license technologies and patents to other firms, there appear to be more and more companies basing their entire businesses on licensing patents and/or patented technologies. Lemelson Medical, Education and Research Foundation, which has generated $1.2 billion revenue since 1988, and Ronald A. Katz Technology Licensing, which has received $350 to $450 million in licensing fees since 1994, can be mentioned as examples of companies in the licensing business.[397] These companies acquire "interesting" IP from other firms, but they may also have their own R&D activities for licensing purposes. They usually do not manufacture any products themselves. The challenge they face is to keep up with technological developments and to file patents covering inventions that will become pervasive in the future[398]. It is always difficult to predict the technology that will be adopted in five to 10 years, and without direct feedback from the marketplace it is even more challenging. However, according to one of the U.S. companies interviewed, close cooperation with the licensee gives a company some reference concerning a specific market and its future developments[399].

Another difficulty in the licensing business is to find potential and actual licensees, and if they are not already utilizing the invention, to get them to manufacture and market it so that a royalty stream can be expected in the long run. This means that the protected technology has to have value in the market place, and that the licensor must have a deep understanding of the licensee's business in order to be able to contribute to making the product line profitable. The risk is on the licensor's side, and his revenues depend on the licensee's willingness to employ, develop and market the technology instead of designing around the patent and choosing another

---

394 Vince DePalma (DMF & Associates), *Process Packaging Technology* (IP Society, Licensing Semiconductor IP Seminar, Palo Alto, 3 June 2004).

395 Somaya, at 4 (2002).

396 Interview data U.S. (2004).

397 Brenda Sandburg, *You May Not Have a Choice. Trolling for dollars. Patent enforcers are scaring America and they are getting rich – very rich – doing it* (The Recorder, 30 July 2001), <http://www.phonetel.com/pdfs/LWTrolls.pdf> (last visited 6/21/05).

398 Companies utilize scenario processes to enhance the development of cognitive maps of possible future realities, and to further understanding of the fundamental drivers of business, markets and technological trends and changes. (Pia Hurmelinna, Jukka Bergman & Ari Jantunen, *Appropriability Strategy in Assessing Future Business Development. Case: Wireless Communication Technology* (International Journal of Learning and Intellectual Capital, 2004).

399 Interview data U.S. (2004).

technology.[400] One method of finding a customer base for licensing purposes is to do it the "Qualcomm way": there are multiple industry standards that incorporate Qualcomm's patented technology, thus licenses from Qualcomm are required in order to use them. A further possibility is to start "patent trolling", which has become common in the "down" economy. Patent trolls are organizations that purchase patents particularly from bankrupt firms, and then target companies whose technology these patents "read on". They use the threat of litigation to generate significant revenue streams from royalties.[401] Actually, even European companies that finance patent litigation in the U.S. have emerged. The idea is to file an infringement suit in court at first and then begin to negotiate, and settle the case with good profit.[402] The problem from society's perspective is that these firms do not typically produce anything, so there is no technology exchange involved. It remains to be seen whether this business concept will prevail in the future.

As far as Europe is concerned, it has also been argued that European companies use patents actively in their businesses, and that they enforce their patents aggressively even if it is virtually certain that no actual infringement has taken place[403]. Yet, none of the 11 Finnish ICT companies I interviewed during spring 2003 was vigorously and continuously attacking its competitors or other companies by claiming infringement. They usually did not actively search for patent infringements, or react before patents were granted, and even afterwards it had to be likely that an infringement had actually taken place. If one was detected, they contacted the likely infringers politely by letter. They specifically avoided filing patent suits, and none of them had initiated a public patent litigation.[404] Taken as a whole, there are only approximately 30 to 40 patent disputes (not just infringement cases) in Finland every year, half of which are settled.[405] To give some perspective, 7,834 patents were granted in Finland in 2004[406].

On the whole, the interviewed Finnish companies drafted their patent applications with maximum protection in mind so that one patent would cover as much as possible. Portfolio building was preferred in order to avoid the limitations of single patents. Nevertheless, patents seldom established an actual monopoly position. They were thought to be crucial, however, if the company manufactured products incorporating standardized technology, and hence licensing/cross-licensing was mandatory. In this context, patents were assumed to affect the company's ability to maintain a competitive price. Nonetheless, according to the interviewees, they would continue to innovate although patent protection was not available.[407]

Efforts to license patents and to create a revenue stream had turned out in many cases to require too many resources compared to the incoming money flow. One Finnish company was actively setting up a patent-licensing program, however, and at the time of the interview had hired agents

---

400 Kent Richardson (Rambus, Inc), *Patent Licensing in the Semiconductor Industry* (IP Society, Licensing Semiconductor IP Seminar, Palo Alto, 3 June 2004).

401 Rice (2003). *See also* discussion in FTC, *Patent Reform Workshop*, *Litigation Panel* (2004).

402 *See e.g.,* www.anadeus.com.

403 Petri Fiilin, *Patentti osaksi strategiaa* (Fakta 2001).

404 Interview data Finland (2003).

405 Annika Havaste, *Patenttiriitojen määrä ja oikeudenkäyntikulut patenttiasioissa* (in Sampo Teollisuusvakuutus, Vastuutiedote 3/2001).

406 Patentti- ja rekisterihallitus, *Myönnetyt patentit* (2004), <http://www.prh.fi/fi/patentit/tilastoja/patentit.html> (last visited 6/21/05).

407 Interview data Finland (2003).

in other countries to find potential licensees. Thus far, it had only licensed two of its patents (no technology was involved). Generally speaking, licensing was an afterthought, and although the firms did pay attention to the licensing option when they made decisions about patenting certain inventions, most of them were not actively seeking to patent technologies that had licensing potential in the marketplace. In fact, nearly all of the firms considered patents a waste of time and money, and relatively unimportant to their companies' core operations.[408] Clearly, patent portfolios were not regarded as "profit centers". Actually, when comparing the European and U.S. litigation atmosphere, associated risks and costs, it is easy to understand why the threat of litigation is not nearly as effective in terms of reaching an agreement in European countries than it is in the U.S.

Most of the U.S. companies interviewed did not view patents as profit-generating assets either. One of them clarified the situation by stating that it did business by selling innovative products, not patents, and that it already had a high profit margin to which licensing patents would probably not contribute appreciably. He added that many of the firms that currently had an active patent-licensing program were not successful with their core businesses: if you have a low profit margin, a very high profit margin from licensing is a good thing.[409]

**(ii) Defensive Strategies**

Although the trend is towards active and aggressive exploitation of patents, many U.S. and particularly European ICT companies do not consider them one of their key resources. They are rather acquired and used for defensive purposes.[410] The goal is to ensure the freedom to operate now and in the future, and to avoid infringement claims[411]. In fact, the avoidance of litigation also shows in these companies' own infringement surveillance. The interviewed U.S. companies that used patents defensively were not typically very active in detecting infringements or in accusing other companies of it. One of them explicitly mentioned that if there were an infringement it should be concerned with it would find out about it without making extensive monitoring efforts.[412]

The objective of guaranteeing companies' freedom to innovate may be accomplished by building large patent portfolios. Even though having patents does not necessarily provide absolute exclusivity over the technology in question, it gives some assurance that the company's products are proprietary, and that it is in a position to defend its business if the need arises.[413] Alternative technologies may also be patented so that others cannot prevent the firm from developing the patented technologies in the future. The further objective is to prevent other companies from producing functionally similar and thus competing products in the market place[414]. Indeed, according to Cohen, Nelson and Walsh's (2000), 81.8% of U.S. manufacturing companies file

---

408 Interview data Finland (2003).

409 Interview data U.S. (2004).

410 Rivette & Kline, at 3 (2000); Interview data Finland (2003); Interview data U.S. (2004).

411 Parr, at 282 (2002); Showalter & Baxter, at 6 (1999).

412 Interview data U.S. (2004).

413 Showalter & Baxter, at 6 (1999).

414 Knight, at 20 (2002).

product patents for blocking purposes[415]. Furthermore, if a company is likely to infringe the patents of other firms, it customarily makes sure that it has patents that are or can be infringed by those firms[416]. This enables companies to achieve more leverage in potential licensing negotiations, and ensures that they are capable of defending themselves better in case of patent-infringement claims. In fact, in the ICT industry, defensive concerns are often the main reason for licensing patents from other firms[417]. Licensing/cross licensing or forming a patent pool offers a company "not to sue" coverage in relation to a particular technology, although such coverage can also be achieved by adding patent-peace clauses to licensing or other agreements. According to one of the U.S. interviewees, these terms are used especially in various open-source licenses. Patent peace means that if the licensee sues the licensor in relation to the licensed technology, he or she has the right to terminate the license.[418]

From a business perspective, a defensive, or offensive, strategy has become a must, especially in the U.S. where multiple companies have started to use patents offensively, where there is a huge number of patents, and where the culture is far more litigation-oriented than in Europe. Although the number of granted software and business-method patents declined slightly after the USPTO took action to improve the validity of granted business-method patents[419], companies need to be in a position in which it is easy to refuse licensing patents that are questionable or otherwise nonessential, and to be able to avoid expensive and time-consuming litigation and potentially high damages. There are numerous studies reporting that the direct and indirect costs associated with preparing, negotiating, filing, and litigating patent cases have risen over time[420]. In the U.S. the average legal fees for litigating a patent case through trial are at least $2 million per side[421]. Of course, most suits are settled, but this does not usually come to pass until each side incurs more than $1 million in direct legal fees and indirect expenses.[422] Litigation costs are not nearly as extensive in Europe[423].

Negotiation and litigation costs may become even more overwhelming, but how high is the risk of being sued? Has this changed over time? Most patents are never litigated. In fact, according to one estimate, approximately 1.1% of all U.S. patents are litigated[424] and the number of litigations per number of granted patents is going down. For instance, the average litigation rate for semiconductor manufacturers fell by five percent between 1973-1985 and 1986-2000. On the other hand, if the number of case filings is compared with R&D spending, a different pattern emerges: the average rate of litigation for manufacturers rose noticeably between 1973-1985 and 1986-2000. There was a 45% increase in the number of patent cases filed, and almost twice as

---

415 Cohen, Nelson & Walsh (2000).

416 Rivette & Kline (2000); Showalter & Baxter, at 6 (1999); Miele, at 23 (2000).

417 *See e.g.,* Washington CORE, at (2003).

418 Interview data U.S. (2004).

419 Hall, at 4 (2003).

420 Rosemarie Ham Ziedonis, *Patent Litigation in the U.S. Semiconductor Industry,* at 204 (in Wesley M. Cohen and Steven Merrill (eds.) *Patents in the Knowledge-Based Economy*, National Academy Press, Washington, D.C. 2003, 180-216).

421 Vermont, at 335 (2002).

422 Vermont, at 328 (2002).

423 OECD, at 24 (1997).

424 Vermont, at 334 (2002).

many were under litigation per R&D dollar in the post-1985 period.[425] Furthermore, in addition to swelling the "regular" magnitude of patent litigation, the current economic slump has intensified rivalry: it has become an established part of e-commerce in recent years, for instance. Yahoo!, Microsoft, AOL and eBay have all been sued for patent infringement.[426] Moreover, despite the high litigation costs, it is not only large companies that sue other firms. ICT companies that are almost bankrupt do not have anything to lose, and litigation may be their last chance. Indeed, such companies have sometimes even been paid to start litigation. A firm claiming licensing fees from open-source software users, for example, is likely to be crucified in the media. It is definitely not an effective tactic for attracting more customers[427]. Hence, middlemen may be used to fight off competing products that are open-source based.

Does a defensive strategy work in practice? It certainly appears that way. According to Lanjouw and Schankerman (2003), the risk of being sued is lower if a company has a large patent portfolio than if it does not. For a small, unlisted U.S.-based company with a small portfolio of 100 patents, the average probability of litigating a given patent is two percent. For a similar company but with a moderate portfolio of 500 patents, the figure drops to only 0.5 percent. In addition, patent owners who are large relative to the disputants may be able to avoid litigation more effectively, or to reach agreement more easily in licensing negotiations than smaller companies.[428] Although it is difficult to measure whether someone has actually been discouraged from claiming patent infringement because of a company's patent portfolio, this was also the firm belief in the U.S. companies interviewed. The ability to cross-license was also claimed to have saved millions of dollars in direct-licensing fees.[429]

However, the "counterclaim strategy", optimally resulting in a win-to-win cross-license, is not viable against pure patent-licensing companies or companies operating in another line of business. They do not have operations that could infringe someone's patents and thus give them a strong negotiating position. Moreover, the lack of an operational side makes it difficult to settle a dispute on the basis of a "business solution".[430] According to the interviewees, patent-infringement claims can come from anyone nowadays, not only from competitors or someone in their value network. In fact, during the last five years more and more letters claiming patent infringement have been pouring in. This poses further challenges, particularly in terms of the patent strategies of so-called deep pockets.[431] However, small firms that do not have the resources to defend themselves against patent infringement claims may also be chosen as targets for demonstration purposes[432]. If infringement is claimed, the associated costs can easily wipe out the entire company.

---

[425] Rosemarie Ham Ziedonis, at 202-203 (2003).

[426] Riedinger (2000).

[427] Steven J. Franck, *Will Patent Pillage Open Source?* (News.com, 16 April 2003), <http://news.com.com/2010-1071-996906.html> (last visited 6/21/05).

[428] Jean O. Lanjouw and Mark Schankerman, *An Empirical Analysis of the Enforcement of Patent Rights in the United States,* at 147-148 (in Wesley M. Cohen and Steven Merrill (eds.) *Patents in the Knowledge-Based Economy*, National Academy Press, Washington, D.C., 2003, 143-179).

[429] Interview data U.S. (2004).

[430] Rice (2003). *See also* Somaya, at 15 (2002).

[431] Interview data U.S. (2004).

[432] Jaffe & Lerner, at 13-14 (2004).

Developments in intellectual-property insurance markets may very well improve the position of small companies in the future. Although IPR insurance markets are still undeveloped in Europe[433], the U.S. insurance business is broad-based and many companies offer protection against loss due to patent infringement. Liability insurance, which protects the insured against infringement claims by patent holders, is also widely available.[434] The latest development in this sector is that insurance is offered to Linux-using companies as "protection" against potential patent lawsuits. It has been claimed that there are 283 U.S. patents that are potentially infringed by the Linux operating system.[435] Nevertheless, it is unlikely that Linux-backing companies such as Hewlett-Packard, IBM, Novell and Oracle would assert these claims, but Microsoft owns 27 of the patents[436].

It is also typical for Finnish ICT companies to acquire and use patents for defensive purposes. According to my interview data, patents are applied for in most cases to ensure that a company is able to compete in certain markets in the future, even if someone terminates "the gentleman's agreement" and starts to use its patents offensively. It is assumed that the experience and the information about competitors and other relevant firms gained through patent activities function as insurance for "difficult times". To some companies, patenting was a numbers game particularly in relation to their main competitors. Nevertheless, they seemed to be selective about the inventions they filed patents for: not even half of the inventions that were reported to the employer were patented, and over 90% of the patent applications that were filed were issued in some form.[437]

Regardless of "the freedom to operate" perspective, the interviewed companies focused mainly on their own R&D development and patented only inventions they thought would be useful for their core businesses. They did not seek to patent entire technological fields, or constantly try to direct their patenting behavior to their competitors' R&D fields, for instance. Competitor location was certainly an element that was taken into account when decisions were made about the countries a patent/patent family should cover. Moreover, some Finnish companies applied for patents in the U.S. even though their primary operational area was elsewhere. They did this because software markets have no limits and they had realized that firms in the U.S. exploited their patents in a more active manner than Finnish companies in particular.[438]

While Finnish companies were preparing themselves for war by collecting weapons and comparing their resources to those of their competitors, they were passive in exploiting their patents. Relatively few patented inventions were actually used in their products, and only a few patents were licensed out. Nevertheless, most patents remained in force. It was very difficult to

---

433 *See e.g.,* Mette Gortz & Merete Konnerup, *Welfare Effects of Patent Insurance – Microeconomic Evaluation and Macroeconomic Consequences* (Policy Modelling for European and Global Issues –conference, Brussels, June 2001).

434 *See e.g.,* William N. Hulsey, *Patent Insurance Can Guard Intellectual Capital, Policies Can Help Cover the Costs of Litigation on Either Side of the Infringement Issue* (Austin Business Journal, 12 June 1998), <http://austin.bizjournals.com/austin/stories/1998/06/15/focus3.html> (last visited 5/21/05).

435 Stephen Shankland, *Group: Linux Potentially Infringes 283 Patents* (CNET, News.com, 1 August 2004), <http://news.com.com/Group%3A+Linux+potentially+infringes+283+patents/2100-7344_3-5291403.html> (last visited 6/21/05).

436 Charles Babcock & Larry Greenemeier, *Open Source Stress* (InformationWeek, 9 August 2004), <http://www.informationweek.com/showArticle.jhtml?articleID=26806464> (last visited 6/21/05).

437 Interview data Finland (2003).

438 Interview data Finland (2003).

predict which of them might be valuable in the future, and if cost were not a concern, even more relatively unimportant patents would be renewed. As far as detecting infringements was concerned, surveillance was focused on the most important patents and on the company's main rivals.[439] Consequently, small firms and those operating in other lines of business were often relatively free to infringe until they increased in size or entered relevant markets and were therefore considered threats.

The problem with implementing a purely defensive strategy in an environment in which nobody uses patents actively and in which the risk of being sued is low is that it is challenging to prove that patenting actually saves costs. Patents are company assets and they should be used efficiently to benefit the shareholders: it is wasteful if most of them are not utilized. Of course, it is not easy to establish a licensing program or to start to use patents more actively in other ways. This requires, above all, changes in attitudes, in patent practices and possibly even in organization structure. Based on the interviews of Finnish companies a trend towards the more active exploitation of patents seems nevertheless to be on its way[440].

### (iii) Transactional Strategies

Patents have become important for transactional purposes, including attracting capital funding and prospective partners. Investors have started to pay a lot of attention to whether a company has protected its key innovations before making decisions about granting it financing. It is essential from an investor's viewpoint that a company in which it invests has a secure and defendable position in the market, and that it is able to form partnerships with other companies and thus has access to external resources. Patents also have their value in exit scenarios. A start-up company usually has two exit possibilities: some of it could be sold on the public market through an initial public offering (IPO), or it could all be bought by another company. In either case its patent portfolio affects its value.[441]

It has been argued that venture capitalists do not usually consider the quality of company patents, but their mere existence and quantity are decisive factors[442]. It has to be noted, however, that investors in the U.S. seem to have become more careful when estimating the value of software and business-method patents after the dot-com bubble burst, and their quality has been questioned by academics, the USPTO, the Federal Circuit and Congress. It is no longer the mere existence of patents that makes a difference when companies are raising capital. According to Shelby (2003), companies should expect to have their intellectual property protection measures questioned and second-guessed by investors.[443] In fact, the change from a numbers game to a quality game is also relevant in the context of patent licensing/cross-licensing. The method of valuing a company's patents based on the height of the stack is about to become extinct: it is the

---

[439] Interview data Finland (2003).

[440] Derived from the Interview data Finland (2003).

[441] Showalter & Baxter, at 6-7 (1999); Washington CORE, at 4 (2003); Ron Corbett, *IP Strategies for Start-up eCommerce Companies in the Post-dot-bomb Era* (Texas Wesleyan Law Review, Issue 8, 2002, 643-663); Rice (2003).

[442] *See e.g.,* Zachary Roth, *The Patent Bubble* (Washington Monthly, June 2005), <http://www.washingtonmonthly.com/features/2005/0506.rothsidebar1.html> (last visited 29/9/05).

[443] Jeffrey Shelby, *Business Method Patents and Emerging Technology Companies,* at 116,118 (CASRIP Publication Series: Reconciling Int'l property, No. 7, 2001), <http://www.law.washington.edu/casrip/Symposium/Number7/3A-Shelby.pdf> (last visited 6/21/2005).

technology and what is protected that matter, not the number of patents involved. Quality is appreciated more than quantity[444], although quantity may have other functions, such as discouraging competitors from entering certain markets and reducing the incidence of infringement as explained above. Even a questionable patent can proof very valuable to a firm.

Some small Finnish ICT firms that were interviewed had filed patents for the purpose of attracting investors. They were thought to enhance their negotiation position when financing or partnering was desired, and for small start-up companies, even a single pending patent application was assumed to be better than just a good business idea. Moreover, their counterparts, some fairly large companies, affirmed that they considered patents when they made decisions about buying or partnering with a start-up. On the other hand, one company pointed out that they had changed their policy in this respect: they used to require start-ups to have a patent/patents, or to have filed for one before they came to present their business ideas. Nowadays, this company is not so concerned about patents, but it is not willing to enter into non-disclosure agreements either. It would be challenging to know whether equivalent inventions have already been developed within the company itself.[445] Thus, having a patent or a pending patent application may proof essential for the purpose of being able to discuss about the invention freely[446]. The U.S. companies also mentioned that, although patents were not typically the only basis for an acquisition, they were a concern that needed to be addressed. They could also turn out to be a very big problem if the company to be acquired had been sued for patent infringement: it could turn a cost-effective acquisition into a very expensive mess.[447]

Because the number of patents is often thought to be one sign of innovativeness, quantity may have status value also to large companies and it can indirectly affect investor preferences. Those with their eyes on technology leadership in particular appreciate them for this reason. Hence, it may be important to them that the name of the company shows in the patent statistics.[448] Of course, a company's entire patent strategy is an element that affects its brand. In addition, many consider patents a sign of a good, even cutting-edge, technology, and U.S. companies in particular tend to mark their products with a "patented" or "patent pending" sign. The marking of products indicates also that the company intends to protect them and the new features incorporated into them from imitation. According to one of the U.S. companies interviewed, however, putting patent notices on products is an administrative and a very time-consuming process.[449] For this reason many companies choose not to mark their products, even though making sure that patents are mentioned also has legal significance: if they are not mentioned, it is not possible to demand damages for infringement that took place before the potential infringer was adequately informed of the patent (35 USC § 287). Patent markings for such a possibility are not required in Europe.

The interviewees were asked about patents as status elements, and whether they were mentioned in their marketing: the Finnish ICT companies did sometimes bring up the number of patents in

---

[444] Ron Laurie (Inflexion Point Strategy, Inc), *IP Valuation – Magic or Myth* (IP Society, Intellectual Property Issues in M&A Transactions Seminar, Palo Alto, 29 April 2004).

[445] Interview data Finland (2003).

[446] *See also* Knight, at 66-67 (2001).

[447] Interview data U.S. (2004).

[448] Interview data Finland (2003).

[449] Interview data U.S. (2004).

their investor correspondence, but they were seldom mentioned in the marketing. Many firms actually pointed out that bringing up the fact that the company had patents might have a negative connotation since they are generally opposed on the grassroots level. In spite of this, one of the companies did continuously refer to its "patented technology" in its marketing information. It was hoped that patent marking would alarm potential competitors.[450]

The U.S. companies also recognized that patents may have a negative connotation, but they were not as concerned about it as the Finnish companies. They thought of patents as part of the business, necessary for protecting design freedom and preventing slavish copying. In the view of one company, people who believed that patents were "bad" were probably not educated enough to realize that having them and using them were two different things.[451] Indeed, as IBM and Sun have recently demonstrated, firms may even be willing to "donate" their patents to be used for free in open-source projects, for instance[452]. Actually, a separate patent commons project designed to increase the utility of the growing number of patent pledges and promises that have been made in support of open source software and open standards has been established. It provides a central database that comprises of these promises, pledges, covenants and other legal undertakings that have been made by its contributors.[453]

### (iv) The "No Patents" Strategy

An alternative or a complement to the offensive, defensive and transactional strategies is to have no patents. Copyright protection added to lead-time and secrecy might be enough to gain competitive advantage, especially in markets in which only a few companies have patents. Further, if it is not easy to detect a patent infringement, if the technology is most likely to be short-lived, or then if the invention is clearly company-specific and has no value to others, patenting may not be a viable option although it was possible.[454] In fact, in many European software firms patents' role could be described as peripheral. There are certain characteristics that pinpoint this marginal role in some ICT business models.

Firstly, the significance of the technology in the business and whether the company aims at technological leadership are decisive in assessing the value of patents to a firm. One of the reasons why they were not thought to be essential in the Finnish companies I interviewed was that they projected the profile of a "customer-oriented service company" rather than a "technology-oriented manufacturer". Although technology was the enabling factor in their operations, their core competitive advantage resided not in the technology, but in the service.[455]

Another factor that affects the role of patents is related to make-or-buy decisions. This applied to some of the Finnish companies interviewed, which licensed in a large share of the technologies

---

450 Interview data Finland (2003).

451 Interview data U.S. (2004).

452 *See e.g.,* Robert McMillan, *Developers Voice Mixed Reactions to IBM Patent Policy* (InfoWorld, 12 January 2005), <http://www.infoworld.com/article/05/01/12/HNpatentreaction_1.html> (last visited 6/21/05); Paul Krill, *Sun Introduces OpenSolaris, Releases 1670 Patents* (InfoWorld, 25 January 2005), <http://www.infoworld.com/article/05/01/25/HNsunsolarispatents_1.html> (last visited 6/21/05).

453 *See* Patent Commons Project, <www.patentcommons.org> (last visited 9/30/05).

454 Derived from Interview data Finland (2003); Interview data U.S. (2004).

455 Interview data Finland (2003).

they provided their customers with. Since it was generally thought among these companies that patents went hand in hand with their own R&D activities, patents were not a major concern for them.[456]

Software companies producing mainly tailor-made software form the third category of companies for which patents are often not crucial. According to the interviewees, patents added no value for their clients in these cases. It was assumed, however, that they might be somewhat useful if the company had software components it could use as a platform for various applications, or if it manufactured off-the-shelf software products. Nonetheless, short product cycles at the side of application procedures that could last from two to four years were believed to diminish patent usefulness even in this context. Then again, for some companies, software, whether tailor-made or not, was not the most important part of the transaction. It was more important to enhance the lock-in effect and thus secure after-sales-services such as maintenance.[457]

It is not only the role in-house technology plays in a company's business, but also knowledge about patents, attitudes towards them and what competitors do that affect their assumed value. In Finland many software companies, and software engineers in particular, are against patenting and in favor of the free exploitation of others' ideas, and it is rare for these companies to have more than a couple of patents. In fact, it became obvious in the interviews that Finnish software companies are accustomed to dealing with copyright protection rather than patents. Copyright formed the basis of their contracts and other activities.[458] This also seems to be the case in other parts of Europe. For instance, Blind, Edler, Nack and Straus's (2001) research results indicate that small IT companies are particularly reserved about the benefits of patent protection and simply do not apply for patents regardless of the amount of their R&D investments.[459]

Nevertheless, patents should not be irrelevant to these firms. Although other companies may only have a few relevant patents in a particular market, problems may very well arise when companies extend their operations to other countries or start to use the Internet as a distribution channel. Moreover, even if they base their business partly or entirely on technology licensed from other firms, third parties may well have patents covering the technology. It is therefore essential that the licensor bares the responsibility for potential infringement claims[460]. Other firms' patents may very well be of essence to firms that do not need their own, and for these companies the "no patents" strategy could be a viable option.

---

[456] Interview data Finland (2003).

[457] Interview data Finland (2003).

[458] Derived from the Interview data Finland (2003).

[459] Blind, Edler, Nack & Straus (2001).

[460] In the context of open-source software, for example, in addition to other insecurities inherent in these licenses, it is possible that third parties have patents relating to software licensed under open-source terms, and there is usually no one who takes responsibility for potential legal problems. It is also possible that parties that have contributed to the development of the code and licensed their contributions under the same terms have patents/patent applications that cover their contributions. Furthermore, although approximately half of the open-source licenses do not contain any patent terms, it is not advisable to claim patent licensing fees from future developers once the contributor has allowed the licensees to believe that they actually have permission to use, develop, and distribute the software under the terms defined. In fact, if earlier contributors have patents that cover the software, implied licenses may come to play. Naturally these patents can be used against other applications covered by the patent claims.

What the "no patents" strategy could mean in practice is that a company acknowledges the existence of patents and plans its operations accordingly. It respects the rights of others and takes the infringement risk into account in its contract practices, its insurance policy and its potential alliances, but does not consider it worthwhile to file or acquire patents even for defensive purposes. One way of averting the risk that someone else will patent the same invention is to publish early, and the threat of infringement claims could be reduced by incorporating "infringement check-points" into process/product-development processes. Then again, if the technology is acquired from someone else, the other party should be asked whether it is aware of any patents that may cover the technology, and what it has done to reduce the infringement risk. It would be valuable to be able to ascertain that there are no patents covering a certain product, process or technology.

There are organizations other than companies for which patents have no direct value. A "no patents" strategy could very well suit research institutes and universities, which generally have the goal of adding to public knowledge. However, the trend for universities in the U.S. in particular is to patent their inventions, license them to companies and hence create a revenue stream for themselves[461]. This trend is starting to affect thinking in European universities and research institutes too. Separate technology transfer units have been established, and the legal and regulatory framework has been updated.[462] For instance in Finland a new Act on University Inventions has been introduced. In general, it is regarded essential to stimulate collaboration between universities and the industry, technology transfer and commercialization of university-born inventions.[463] Although it is always helpful for society if universities are able to attract extra financing, in my view it is rather controversial to restrict the flow of information, especially if these institutions are government funded, and if we are talking about software the field in which companies further investments are typically not as extensive as they are in biotechnology or pharmaceutical industries, for example. Of course the argumentation is that patents make transactions simpler, and if exclusive or non-exclusive licenses can be granted, inventions have more potential to be developed into innovations[464]. On the other hand, as already mentioned, filing patents and granting licenses only to a restricted number of companies may hold back the utilization of that information by others[465]. Moreover, based on my experience researchers often have an agenda to publish their research results as early as possible, and are not keen on keeping their inventions secret until the patent application has been filed, as is required in Europe.

What the "no patents" strategy does not mean, however, is that the company has not acknowledged the existence of patent protection and considered whether patenting could benefit its operations in some way. During the course of this research, some of my and Olli Pitkänen's students conducted interviews in eight Finnish ICT companies that had no patents. They asked

---

[461] David A. Mowery, Richard R. Nelson, Bhaven N. Sampat & Arvids A. Ziedonis, *Ivory Tower and Industrial Innovation. University-Industry Technology Transfer Before and After the Bayh-Dole Act,* at 1-2 (Stanford Business Books 2004). *See also* Megantz, at 95-97 (2002).

[462] *See e.g.,* OECD, at 19-20 (2004); Commission of the European Communities (EC), Communication from the Commission, *The Role of Universities in the Europe of Knowledge* (COM(2003) 58 final, Bruessels, 5 February 2003), <http://europa.eu.int/eur-lex/en/com/cnc/2003/com2003_0058en01.pdf> (last visited 10/3/05).

[463] *Hallituksen esitys Eduskunnalle laiksi oikeudesta korkeakouluissa tehtäviin keksintöihin sekä laiksi oikeudesta työntekijän tekemiin keksintöihin annetun lain muuttamisesta* (HE 259/2004); OECD, at 19-20 (2004); EC, *The Role of Universities in the Europe of Knowledge* (2003); Arundel & Patel, at 9 (2003).

[464] Mowery, Nelson, Sampat & Ziedonis, at 2 (2004); Arundel & Patel, at 9 (2003).

[465] Mowery, Nelson, Sampat & Ziedonis, at 1 (2004).

why they did not think patenting was worthwhile, and the typical answer was that the company was simply not interested, and that it could not care less about others' patents. The attitude towards patents and their benefits was cynical. Some interviewees also assumed that computer programs were not patentable in Europe and, in general, knowledge about patent protection varied. One company representative stated explicitly that they were not familiar with the patenting process and would not be able to recognize patentable inventions. Since employees have seldom worked in companies in which patents have a significant role, there is no tacit patent tradition that could be passed on. In fact, patenting was also a relatively new phenomenon for many of the bigger Finnish companies that I interviewed: in many cases the first patents had been applied for in the 1980s. Among the reasons mentioned for the change in patenting behavior were the deregulation of national monopolies in the communications sector, and encounters in international markets.[466] In fact, taken as a whole, only a few of the Finnish companies interviewed had the type of patent activities that could be called a patent strategy, and relevant matters were often determined case by case. There was no continuity or clear guidance for possible future situations. This is natural, of course, since most of the companies had no or very few patents.

From the interviews with the Finnish ICT companies, the "no patents" strategy sounds hypothetical. Nonetheless, it does exist in practice, although I have not seen it referred to by that name. One of the U.S. companies interviewed could be mentioned as an example of a company with such a strategy. This company was providing its customers with technology developed by others and it did not have any patents of its own. It had considered the option of developing its own technology and a patent portfolio, but chose not to at the time. Its policy was rather to use others' technology, and if it were to develop something inventive itself, publication could very well be the way to go. As far as licensing in was concerned, it demanded that every contract it made with technology suppliers had a "non-infringe, you will defend, you will indemnify and hold harmless" clause. The aim was to redirect the responsibility for potential legal problems to a larger company with the resources to fight in court.[467]

Although the "no patent" strategy should be recognized, it is not likely to become the mainstream trend of the future. At the moment, as explained earlier, European ICT companies are rather becoming more interested in patents as a means of appropriating returns on R&D investments, and even small and medium-sized firms are developing their own strategies.[468] Furthermore, as ICT companies acquire knowledge about (software) patent protection and traditions, software companies are also likely to become more interested. Then again, in the U.S. patents are currently viewed as one of the most important intellectual property right even in the software industry. Trade secrets are slowly losing their appeal due to the inherent difficulty of keeping things a secret[469], and further because protecting the source code no longer gives the competitive advantage it used to as the bargaining power of customers has increased. Copyright protection has also turned out to be a fairly limited measure[470]. Indeed, U.S. companies realized long ago that they needed to acquire patents and to develop a patent portfolio. Naturally, fast

---

466 Interview data Finland (2003).

467 Interview data U.S. (2004).

468 *See e.g., Commission Evaluation Report on the Transfer of Technology Block Exemption regulation No 240/96 Technology Transfer Agreements under Article 81,* at 18 (2001); derived from Interview data Finland (2003).

469 Reichman, at 26 (2001); OECD, at 15 (2004).

470 Rice (2003); Graham & Mowery, at 225-226 (2003).

development and short product cycles reduce their value in many cases[471], although in the case of software, although new versions come out every few years and names change, the same code base can be used for decades[472].

If the trend towards weaker patent protection becomes prominent particularly in the U.S., the value of patents will probably diminish, which in turn may force companies to reassess their patent activities. Moreover, as the open-source and other open-licensing models become more popular, and as firms start to utilize the Internet's highly interactive nature to their benefit, a "no patents", strategy particularly as a dual strategy applied to certain products and processes, may become more appealing: copyrights are usually enough to maintain an appropriate level of control over the distribution and modification of software and to recoup derivative improvements made to the code. Naturally, the maturation of ICT, increasing service-orientation and commoditization of technologies do also affect the availability and importance of protecting the technologies by patents, and therefore "no patents' strategy may assume more applicability in the future. Of course there is nothing to prevent a patent holder from licensing its patented inventions without charge or for a low price, and under a non-restrictive license, if this benefits its business, either. As one of the interviewees stated, the existence and use of patents are two different things[473]. A company may seek to enlarge its current markets or to create future markets by promoting the use of its technology, in which case a low or zero price might encourage other companies to adopt the technology. Thus, it is the company's technology that becomes widely used, and the company is in the best position to offer services and other requisites related to it.[474] In the today's business environment, having patents may also prove more efficient from a defensive perspective than relying on partnering or litigation insurance, and in the case of software, copyright protection. In fact, even if a company's business model is such that patents are not vital for protection or licensing purposes, they may still be critical for defensive reasons, particularly if it operates in the U.S. In fact, some open-source companies have recently joined corporations utilizing open-source software, but at the same time known to have large patent portfolios, in the patent race. Linux and open source provider Red Hat, for one, has started to acquire patents for defensive purposes[475].

### (v) Implementation of Patent Strategies

Patent strategies are not effective unless they are implemented appropriately. If a company has intended patents to be an essential part of its business operations, the strategies should be integrated into its other strategies and practices, and its organizational structure has to facilitate the implementation of the strategy. In fact, some U.S. companies have tended to modify their organizations so that patent and other IPR activities are no longer managed merely through the legal/IPR departments and, to some extent, R&D, but are better integrated into all its functions[476]. This change is illustrated in two—the old and the new—organization charts

---

471 FTC, at Chapter 3, 55 (2003); Interview data Finland (2003).

472 Interview data U.S. (2004).

473 Interview data U.S. (2004).

474 *See e.g.,* Shapiro & Varian, at 292-294 (1999); Teece, at 143 (2000).

475 Red Hat, Inc, *Statement of Position and Our Promise on Software Patents* (2004), <http://www.redhat.com/legal/patent_policy.html> (last visited 6/21/05).

476 Rivette & Kline, at 90-91 (2000).

presented below. It has also become popular in the U.S. to separate intellectual properties altogether from other corporate liabilities, and even to form IP holding companies.[477] For instance, Hewlett-Packard has created a holding company for managing its IPR strategy and increasing the visibility, coordination and control of its IP assets[478].

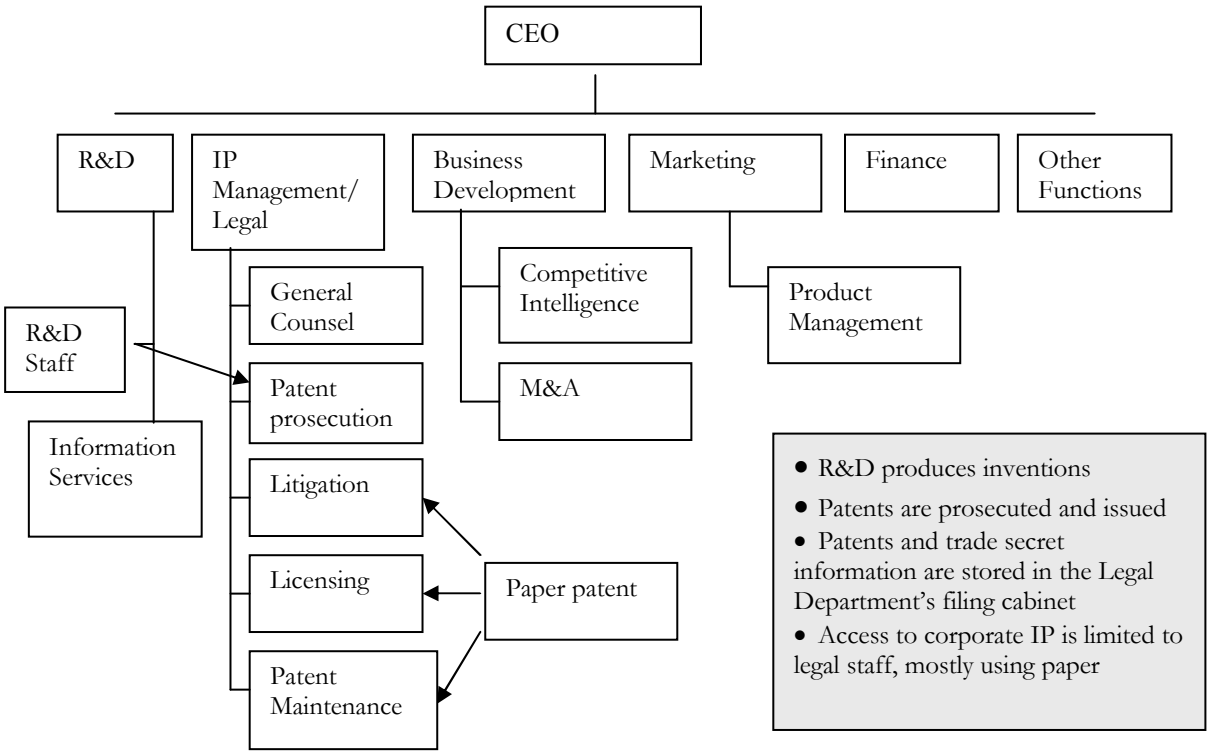



**FIGURE 6.** THE OLD ORGANIZATION CHART[479]

[477] The aim is usually to reduce federal and state taxes. Typically the parent company creates a corporate subsidiary in a state or in a foreign country where low or no taxes are imposed (e.g., Delaware, Nevada, Bahamas, Cayman Islands). The company's intellectual property is created by or transferred to the subsidiary and the subsidiary licenses these rights to the parent corporation and to other companies. (Kara K. Smith & Duane K. Schroeder, *Intellectual Property Holding Companies Can Create Significant Tax Savings and Protect Valuable Assets* (Fredrikson & Byron P.A., April 2003), <http://www.fredlaw.com/articles/ip/inte_0304_kks.html> (last visited 6/21/05)).

[478] HP, *Intellectual Property Licensing,* <http://www.hp.com/hpinfo/abouthp/iplicensing/> (last visited 6/21/05).

[479] Rivette & Kline, at 90 (2000).

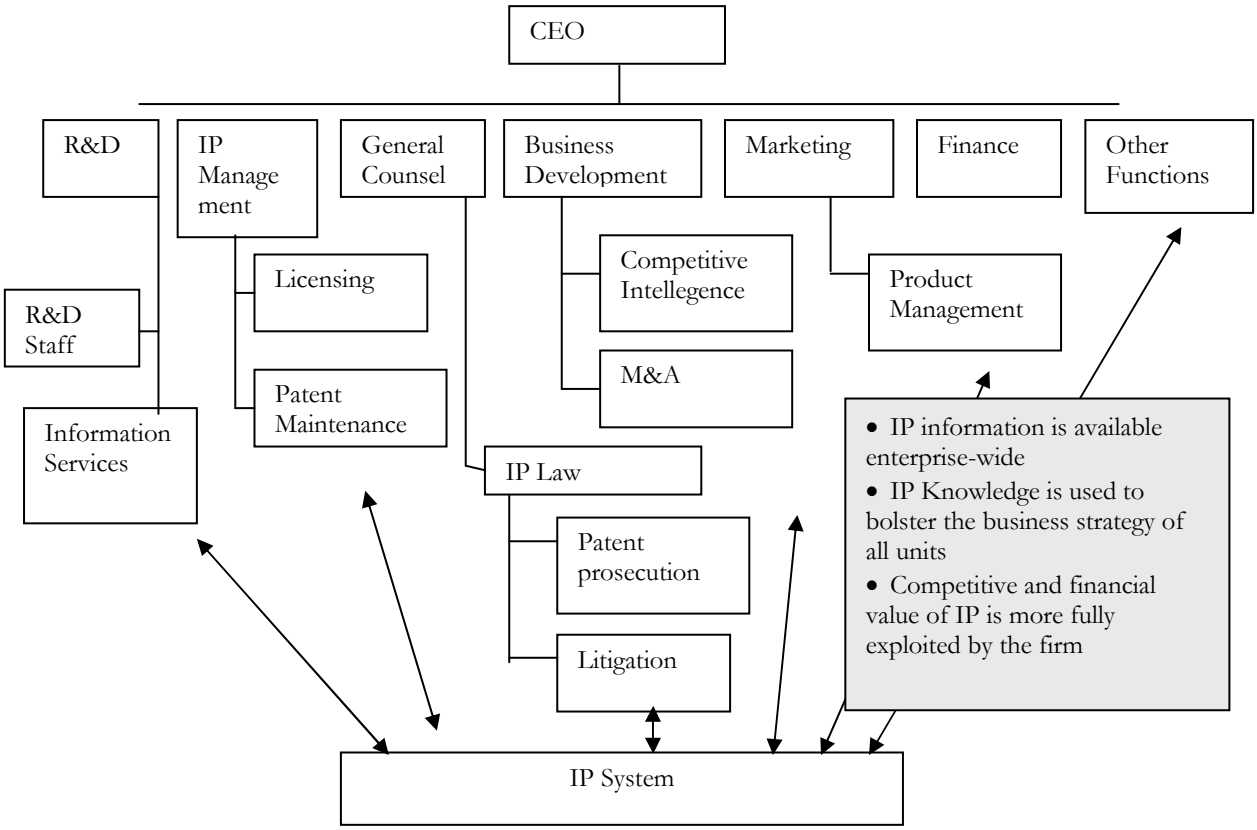



**FIGURE 7.** THE NEW ORGANIZATION CHART[480]

Many of the U.S. firms interviewed preferred a hybrid organization structure that combined characteristics of the old and the new models: the patent strategy was typically developed/accepted by the CEO and implemented by the legal department, the R&D departments, and special cross-functional patent committees formed in order to evaluate whether something was worth patenting. Some of the interviewees were of the opinion that the patent strategy should be closely, although not necessarily inextricably, tied to the business strategy, so that it was somewhere between an integrated part of the business strategy and separate from it.[481]

Then again, the link between the business and patent strategies was often non-existent in the Finnish companies. Patent activities were usually managed independently through legal or special IPR departments if the company was big enough to have one, and only major changes in business strategy resulted in changes in patent strategy. Sometimes patent activities were managed mainly through R&D departments, and central management was to a large extent not involved. The situation was different in small companies, where patent-related activities were deeply integrated into its operations, which were managed from one facility making communication between the partners and the few employees easy. In general, patents were not a main concern in the planning and amending of the business strategies.[482] Taken as a whole, Finnish ICT

[480] Rivette & Kline, at 91 (2000).

[481] Interview data U.S. (2004).

[482] Interview data Finland (2003).

companies tended to have a traditional organization structure that accommodated the approach to patents it had adopted. If companies are willing to develop their current practices so as to give patents a more active role in their businesses in the future, organizational changes are likely to lie ahead.

## B. STANDARD SETTING AND THE STRATEGIC USE OF PATENTS

Standard setting has its advantages, especially in an environment in which network effects are strong. Making sure that everyone is able to use the same communication protocol, for example, makes it possible for the various products to interconnect so as to ensure that there are complementary and interoperable products and services on the market. Indeed, standards development is essential, particularly in the digital economy: electronic payments systems, security and its service infrastructure, digital-rights management systems and high-speed network technologies all require them[483].

Consumers and manufacturers clearly profit from standards setting. Products are more useful from the consumer's point of view because there are more users with whom to interconnect, and the risk of choosing the "wrong" technology diminishes. Standardization provides consumers with reasonably priced products that are interoperable and interchangeable, which in turn accelerates the acceptance of a new technology.[484] Then again from manufacturer's viewpoint the setting of a standard allows it to have immediate access to a larger customer base than it would have without it[485]. In other words, standards define what is required to serve the market, allowing competition to take place on the implementation level[486]. Thus, standardization can promote competition and innovation among producers, and lower barriers to international trade. However, it may also restrict competition by reducing variety.[487]

Standard setting can be private, public or semi-public, open or proprietary, national or international. Openness in this context means that everyone is able to participate the standards setting process and the technology is available for everyone to use, not that there is no proprietary technology involved. Hence, using the standardized technology may require licensing.[488] Patent-free standards have traditionally been preferred[489], however, with a view to ensuring their success and promoting their use.

---

[483] Janice M. Mueller, *Patent Misuse Through the Capture of Industry Standards* (Berkeley Technology Law Journal, Volume 17, Issue 2, Spring 2002).

[484] Shapiro & Varian, at 233 (1999); Teece, at 141 (2000).

[485] Teece, at 141 (2000).

[486] Scott K. Peterson, *Consideration of Patents During the Setting of Standards*, at 1 (For FTC and DOJ Roundtable, Standard Setting Organizations: Evaluating the Anticompetitive Rules of Negotiating Intellectual Property Licensing Terms and Conditions before a Standard is Set, 6 November 2002); Knut Blind, Rainer Bierhals, Nikolaus Thumm, Kamal Hossain, John Sillwood, Eric Iverser, Rik von Reikum & Bruno Roxius, *Study on the Interaction between Standardization and Intellectual Property Rights*, at 43 (EC Contract No G6MA-CT-2000-02001, 2002).

[487] Mark Shurmer & Gary Lea, *Telecommunications Standardization and Intellectual Property Rights: A Fundamental Dilemma?,* at 51 (StandardView, Vol. 3, No. 2, June 1995, 50-59).

[488] *See e.g.,* Rahnasto, at 186-197 (2003).

[489] Steven J. Frank, *Can You Patent An Industry Standard?*, at 14 (IEEE Spectrum, March 2002, 14-15), Mueller (2002); Mark A. Lemley, *Intellectual Property Rights and Standard Setting Organizations*, at 25 (UC Berkeley Public Law and Legal Theory Research Paper Series, Research Paper No. 84, 2002).

Public standardization is the responsibility of governments or official organizations. The European Telecommunications Standardization Institute (ETSI), the American National Standardization Institute (ANSI) and the International Telecommunications Union (ITU) are examples of these official bodies.[490] The emphasis in the following is on potential patent strategies in the context of open standards set by different standardization organizations. It is not only product interoperability, however, that is driving standard setting, but also public health and safety, as well as global competitiveness[491]. The focus here is on interoperability or compatibility standards, which define the format for the interface between the core and complementary goods[492].

In choosing a standard it is important to be aware of all the IPRs involved, and at least to try to guarantee that everyone is able to use the standardized technology. It is for this reason that many standardization organizations have an explicit IPR or patent policy that more or less obligates companies taking part in the standard setting to disclose their essential patents, and to license them for royalty-free or on reasonable and non-discriminatory terms[493]. Since patent-free standards may be preferred in many cases[494], disclosure may negatively affect what technology is chosen as a standard, and companies may therefore have an incentive to hide their patents. Failing to disclose patents related to the technology in question could also be accidental: this is considered very probable especially for large companies with large patent portfolios. Going through the portfolio is time consuming and expensive.[495]

The obligation to disclose essential patents does not necessarily cover pending patent applications, especially unpublished ones[496]. Since standard setting takes a long time, many years in some cases, companies usually continue to file patent applications throughout the process. They may also modify their existing applications so that their claims cover the standard better.[497] The more patents companies have covering standards essential features, the fewer licensing fees they have to pay to others in case the standard is royalty-bearing[498]. Having patents in standardized technology can also be a valuable source of royalties.

If there is no obligation to disclose pending patent applications, waiting until the standard is set before allowing a patent to be issued does not typically constitute a policy breach[499]. Moreover, since the early disclosure of patents and patent applications can lead to a different standard being set, it is even more probable that many patents surface after it has been agreed upon if the obligation to disclose does not continue throughout the process. Once the standard has been

---

490 Rahnasto, at 186 (2003).

491 Mueller (2002).

492 Teece, at 140 (2000).

493 *See e.g.,* Frank, at 14 (2002); Lemley, at 23 (2002).

494 Frank, at 14 (2002); Mueller (2002); Lemley, at 25 (2002).

495 Sarvas & Soininen (2002); Jason Kipnis, *Beating the System: Abuses of the Standards Adoption Process,* at 104-105 (IEEE Communications Magazine, July 2000, 102-105).

496 Lemley, at 24 (2002).

497 Kipnis, at 105 (2000): Mueller (2002).

498 Interview data Finland (2003).

499 Kipnis, at 105 (2000).

widely implemented it is very difficult to design around a patent or change the specifications. In the worst case, the licensing fees charged after the standard has been established are so high that the only way out is to abandon the standard. One solution is to require that future patents granted in connection with standardized technology must be licensed under the same terms and conditions as the key ones granted before and during the standardization process.

As stated earlier, a royalty-free standard has better chances of being accepted and used as widely as possible than a standard that requires users to pay licensing fees. Manufacturing companies, in particular, may often prefer royalty-free standards, or those for which the cumulative royalty cap has been set beforehand. The fear is that otherwise the cumulative amount of royalties might be elevated to the point of unprofitable manufacture. This is particularly likely if a manufacturing company has no patents included in the standard, which makes cross-licensing with other patent holders challenging.[500] Price setting may be problematic from the antitrust perspective.

If a royalty-free licensing scheme cannot be negotiated, it is in the public interest to get the patent holder to agree to license on reasonable and non-discriminatory terms (RAND). If patents are licensed under RAND or other terms, companies have an incentive to obtain those that are essential for using the technology for the reasons mentioned above. For example, Qualcomm owned 28%, Nokia 16%, NTT DoCoMo 13%, Ericsson 8%, Motorola 7% and Hitachi 5% of the essential patents involved in the CDMA 2000 standard, while Ericsson has 30%, Nokia 21%, Qualcomm 20% and Motorola 14% of the essential patents included in the WCDMA standard.[501] Then again, companies such as Qualcomm, which do not manufacture the product themselves, do not have to pay other patent holders anything. Getting the technology for which they have the patents chosen for a standard guarantees them a royalty stream, and they probably do not have an incentive to license their patents royalty-free.

If a patent holder refuses to license on these vague terms, the standardization process is usually halted and other solutions are sought. In reality, refusing to license is rare, although it is the most influential form of leveraging patent rights[502] and is a feasible tactic for companies that oppose the standard. A company may have reason to oppose a standard if it has proprietary technology that competes with the standardized products, and it may also wish to delay the acceptance of the standard to give it more time to develop standardized products.[503]

The obligation to disclose relevant patents does not continue to apply to those who originally took part in the standard setting but later resigned from it, or to those who did not contribute to defining the standard at all[504]. Given the continuously growing numbers of patents, especially in the field of software, it is likely that third parties hold patents that are essential for using the standard. In these cases the patent holder is in a position to demand royalties even if the standard is royalty-free, and might even refuse to license the patent at all.[505] However, although the patent holder has very strong bargaining power if the patent surfaces after the standard has been established, third-party patents do not necessarily create problems, and reasonable licensing terms

---

[500] Jyrki Alkio, *Kovaa peliä patenteilla* (Helsingin Sanomat, 9 March 2003).

[501] Alkio (2003).

[502] Blind, Bierhals, Thumm, Hossain, Sillwood, Iverser, von Reikum & Roxius, at 47 (2002).

[503] Rahnasto, at 191-192 (2003).

[504] Lemley, at 31, 36-37 (2002).

[505] *See e.g.,* Daniel Clark, *Do Web Standards and Patents Mix?,* at 21 (Computer, October 2002, 19-22).

can be agreed upon in many cases. The risk of bad publicity is another reason why a patent holder would comply with the standardization organization's policy and license its patents royalty-free even if there is no obligation to do so.[506] Antitrust and competition laws could sometimes, although rarely, be applicable in these situations, too. In the U.S. the obligation to license could potentially be based on the essential-facilities doctrine if the patent holder's "immunity" were interpreted narrowly, whereas it is more likely to be imposed in practice in Europe[507]. In a recent IMS Health case (2004) the European Court of Justice was asked about the conditions under which the refusal by an undertaking in a dominant position to grant a copyright license constituted an abuse of that position. The court came to the conclusion that for a refusal to be regarded as abusive it must prevent the emergence of a new product or service for which there is a potential demand, be without objective justification and be capable of eliminating all competition on the relevant market.[508]

In sum, there are multiple dilemmas in the context of standard setting and patents. Some of these have already been argued in the courts, and as more verdicts based on antitrust, patent misuse, fraud, equitable estoppel, implied license doctrine and unfair or deceptive business practices[509] appear, the rules will ultimately become clearer and best practices relating to standard setting will become more apparent than they currently are. Taking part in various standardization processes and managing the rights involved, including applying for new patents, amending pending ones and disclosing required patent information, is and will continue to be an essential part of ICT patent strategy. Of course, if concerns about patents in interfaces and their potential effect on compatibility rise to the point that these patents are unenforceable, as suggested in the context of the EU software patent directive[510], or that they always have to be licensed to others on reasonable and non-discriminatory terms, the scene will change dramatically.

## C. SOCIETAL IMPLICATIONS

Although patents are used more and more vigorously in the ICT industry and some companies are able to generate profit through licensing patented technologies and bare patents, or by preventing others from using patented technologies, it is competition that drives innovation in the sector, not patents[511]. In fact, unlike in many other fields, patents are relatively insignificant in terms of appropriating returns on R&D investments. The reasons for this are many: the rapid pace of innovation, the relatively low R&D investments required for developing, manufacturing

---

506 Sarvas & Soininen (2002).

507 *Commission Evaluation Report on the Transfer of Technology Block Exemption regulation No 240/96 Technology Transfer Agreements under Article 81*, at 17 (2001); Mueller (2002); Alkio & Wik, at 387 (2004); Ingo Brinker, *Essential Facility Doctrine and Intellectual Property Law: Where Does Europe Stand in Aftermath of the IMS Health Case?*, at 137 (in Barry Hawk (ed.) *International Antitrust Law & Policy*, Corporate Law Institute, Fordham University School of Law, 2004, 137-150).

508 IMS Health GmbH& Co. OHG v. NDC Health GmbH & Co, Case C-418/01, [2004] 4 CMLR1543 (preliminary ruling).

509 Cases based on the FTC Act, Section 5 include In the Matter of Dell Computer Corporation, Decision and Order, Docket No. C-3658 (FTC, 20 May 1996), In the Matter of Rambus Incorporated, Initial Decision, Docket No. 9391 (FTC, 23 February 2004), and In the Matter of Union Oil Company of California, Opinion of the Commission, Docket No. 9305 (FTC, 27 July 2005).

510 *Position of the European Parliament Adopted at First Reading on 24 September 2003 with a View to the Adoption of Directive 2003/…./EC of the European Parliament and of the Council on the Patentability of Computer-implemented Inventions* (2003).

511 FTC, at Chapter 3, 31, 46 (2003).

and distributing new innovations, and the availability of other forms of protection such as trade secrets and software copyrights.[512] Nonetheless, the patent system with its shortcomings exists, and companies are interested in utilizing whatever helps them to achieve competitive advantage, acquire external resources and keep new entrants from eating away at their market share. Hence, it is only natural that many companies favor strong patent protection.

However, when all patents are put together in an industry such as ICT in which innovation is often incremental and cumulative, problems emerge. In many cases firms have to require access to dozens, hundreds or even thousands of patents to produce one commercial product. Finding all patent holders and negotiating licenses with them is time-consuming and costly, and in most cases impossible. In addition, the cumulative royalty rate may become overwhelming, making it unprofitable to manufacture a product. Then again, if all patent holders are not found *ex ante*, hold-up problems may be awaiting. Thus, patents may slow down further innovation.[513]

Companies are, in many cases, able to minimize the negative effects that would otherwise arise from a non-optimal legal framework. However, these practices are not without cost. For instance, as explained previously, some companies acquire patents for bargaining purposes so that others will not prevent them from developing new products and processes. This in turn increases the potential hold-up problem, and in fact the time and money a company spends on creating and filing these so-called defensive patents, which do not necessarily have any innovative value in and of themselves, could be better spent on developing new products.[514] It has also been claimed that the defensive game prevents new entrants with no patent power from entering the market[515]. Furthermore, it has raised unease in academia that some companies aim at "reserving" as extensive a part of a business sector or a technology domain as possible in order to guarantee their freedom to operate, but they do not necessarily ever utilize their patents[516]. It has been claimed that reserving certain technological fields through patenting may direct research away from these areas and thus inhibit R&D in that particular field[517].

Yet, on the evidence of the interviews conducted in Finnish ICT firms, although some large companies have a lot of patents this is not seen as preventing new entrants from entering the market. The main intention is not to forbid all others from using a patented technology, and if companies face a problem with patents they simply design around it, license it or infringe it if they are likely not to get caught.[518] Also, according to the results of a small-scale Dutch study, IT

---

512 *See e.g.,* FTC, at Chapter 3, 31-33, 44-46 (2003): Burk & Lemley, at 92 (2005), Cohen, Nelson & Walsh, at 6 (2000).

513 Shapiro, at 6-7 (2001), *See also* Foray, at 75 (2002); Arundel & Patel, at 5 (2003).

514 FTC, at Chapter 3, 52-53 (2003).

515 *See e.g.,* PbT Consultants (2001): Washington CORE, at 12 (2003).

516 *See e.g.,* OECD, at 29 (1997).

517 Although some studies touch upon the topic, I am not aware of any research papers that establish how severe the problem of not being able to conduct R&D because of patent thickets actually is. For instance, according to the results of a study about research tools and biomedical innovations, a field in which patents are more important for protection and hence utilized somewhat differently than in the ICT sector, only a few companies reported that they had been forced to stop or redirect a research project due to IPR problems (John P. Walsh, Ashish Arora & Wesley M. Cohen, Effects of *Research Tool Patents and Licensing on Biomedical Innovation* 285-340 (in Wesley M. Cohen and Steven Merrill (eds.) *Patents in the Knowledge-Based Economy*, National Academy Press, Washington, D.C. 2003), <http://books.nap.edu/books/0309086361/html/285.html#pagetop> (last visited 6/21/05)).

518 Interview data Finland (2003).

companies seldom report any patent barriers[519]. Of course, the more popular aggressive patent strategies become, the higher the risk of getting caught for infringement. Licensing, cross-licensing and patent-pooling networks, which have been claimed to deter market entry of small firms[520], are not yet as complex in Europe as they are in the U.S., but even in the U.S. I would not say that it is the small companies that are the main targets of patent-infringement claims. Anyone can be targeted. In fact, the notion that patents improve small firms' chances of entering markets was given more support than the opposite claim: ever since the mid 1990s U.S. start-up companies have been filing more patents than previously, and a large proportion of Internet patents has been granted to small firms and individuals[521]. This transition corresponds with the development of the venture-capital industry[522]. Good patents do appear to be important in terms of attracting financers and partners.

Although defensive patenting contributes to the hold-up problem, it could be beneficial from society's viewpoint as it might increase knowledge of new technologies through disclosure. Unfortunately, this part of the system is not functioning smoothly. Patents are not typically considered valuable sources of information in the ICT sector: the technology described in them rapidly becomes outdated, many of them do not contain anything that has innovative value, and in the software context, usually no source code is published so reading them may not be worthwhile.[523] Moreover, the tradition prevalent among engineers of actually reading patents may be lacking, or there may be other practical reasons keeping people from utilizing patents as sources of information. Complicated language and difficulties in finding relevant patents were mentioned by some of the Finnish ICT companies interviewed as obstacles to learning from them.[524] On the other hand, if patents were read more carefully, companies might be erroneously discouraged from doing research in heavily patented areas. Conversely, the U.S. companies did regard them as sources of information on technological developments in general. They did not believe that their mere existence would prevent anyone from entering into certain areas. In terms of infringement, it was simply not possible to know for sure if a product infringed someone's patents: in fact, due to overlapping, infringements were considered likely. Another intriguing feature that came up during the interviews was the role of patents in encouraging learning through licensing. If the licensor had them the licensee was not afraid of contamination. Contamination is a huge concern, particularly in the context of trade secrecy, and consequently firms often did not want to know anything except the necessary features of the technology they were licensing in.[525]

Although defensive patenting ultimately benefits nobody, it would be a challenge to get out of the vicious cycle or to choose not to be part of it. Companies that base their operations on open-source software have faced this reality. It is becoming increasingly difficult to develop software that does not infringe anyone's patents, and because of their very nature, open-source products have been claimed to be easier to screen for infringements than proprietary software. Therefore

---

519 Arundel & Patel, at 8 (2003).

520 Washington CORE, at 12 (2003). *See also* Shapiro, at 16 (2001).

521 Allison & Tiller, at 275-276 (2002).

522 Washington CORE, at 4-5 (2003).

523 FTC, at Chapter 3, 49-50 (2003).

524 Interview data Finland (2003).

525 Interview data U.S. (2004).

the risk of someone claiming licensing fees from open-source software users is regarded as high.[526] Of course, as long as open-source development does not erode anyone's market share, and developers and users are private individuals, the software is likely to blossom. Thus, even if firms were in a position to claim patent infringement against groups of hobbyists, they seldom have the economic justification to do so. Some companies holding rather large patent portfolios may even donate some of their patents to be used freely in open source projects[527].

Another negative aspect of patents in the ICT industry is that they may sometimes pose threats to interoperability and (open) standards[528]. Their use as a protection measure in order to keep something proprietary as well as the opportunity to carefully select one's licensees is at odds with the idea of giving everyone access to the technology at little or no cost. Fortunately, in most cases the market drives companies to modify their strategies and adopt a solution, such as an open standard that benefits the industry and ultimately also the consumers. Of course, diverging and even conflicting business interests may make the standardization process frustrating. The legal framework may also impose limits on potential business solutions: antitrust and competition laws, for instance, often view cooperation between companies, and particularly price setting, as anticompetitive. The risk of holding up technological development does not necessarily come from industry players developing products, though. It may reside in the unexpected sources, companies or individuals who seek to make money through patent enforcement and who did not participate in setting the standard. For these third-party companies, having a patent that "reads on" a widely adopted industry standard can be considered a jackpot.

Companies operate in a constantly evolving business environment. In fact, even the most static element, the legal framework, is currently under construction. Although both patent and antitrust/competition law systems have already responded to some challenges posed by the rise of the knowledge-based economy, much controversy has remained. As explained above, modifications, particularly in relation to improving the quality of software and business-method patents and making it easier to invalidate so-called questionable patents, are likely to follow. It is to be hoped that these revisions will alleviate some of the problems the ICT sector is currently facing. In fact, many suggestions made by the FTC and the NAS have received positive feedback from the industry[529]. Then again, in Europe it is still uncertain how developments in software and business-method patents will evolve. For the most part, the ICT industry has been in favor of *status quo* concerning software patentability, and it supported the EU Commission in its following of EPO practice in its directive on the patentability of computer-related inventions. It was mainly the small software vendors, individuals and supporters of open-source software who opposed patenting.[530] Whatever the legal changes, revisions will naturally affect the ICT industry. However, in the end it is the markets that determine how patents are utilized and what the factual effects of patent protection are.

---

[526] *See e.g.,* PbT Consultants (2001).

[527] *See e.g.,* Patent Commons Project, <http://www.patent-commons.org/> (last visited 9/30/05).

[528] *Ibid.*

[529] *See e.g.,* Federal Trade Commission, *Patent Reform Workshop* (The Ideas Into Action: Implementing Reform of the Patent System Conference, Berkeley, 16 April 2004).

[530] *See e.g.,* PbT Consultants (2001).

## D. SUMMARY

Patents have many functions. They give protection against imitation, and may thus help a company to differentiate its products from those of other firms. They increase the value of technology and may provide technology-licensing or patent-licensing revenues. They also have a leverage function, which may help a company to position itself favorably in the markets by means of cross licenses, joint ventures, and strategic alliances, for example. Furthermore, patents and the way a company manages its rights affect its brand and its value in the eyes of investors.

The importance of patents to a company determines its optimal patent strategy, and how much weight they carry in its business. They have traditionally been associated with R&D-intensive firms, but although they may be most important to those firms, patentable inventions do not come up only during R&D: some may very well relate to the implementation of technologies or to business methods. Patents are not necessarily relevant to all technology-producing companies either. For instance, lead-time, secrecy or copyrights may be enough particularly if infringements are not easy to detect, the problems solved are company-specific and do not benefit other companies, or the technology's expected life cycle does not exceed two to four years. Then again, even if a firm relies on others' technology, it may not be able to avoid legal problems: the licensor may be reluctant to guarantee that its technology does not infringe anyone's patents as this may be impossible to ascertain, and even if the licensor took the risk, its responsibility would most likely be very limited[531]. Firms down the line are not free from patent concerns either.

As indicated earlier, it is not only the need for protection that makes patents relevant to a company: third-party patents and infringement possibilities also have to be considered. These concerns have been highlighted even more in recent years as many, particularly U.S., firms have started to utilize their patents aggressively. These companies are usually seeking licensing revenues rather than injunctions, however. In fact, a scenario comprising thousands overlapping patents and systemic, interdependent innovations is optimal for the licensing business. To give some idea of the recent trends in technology and patent licensing, revenues in the U.S. increased approximately 4000% from 1980 to 1999[532].

In an environment in which many companies utilize patents offensively, it is vital to have a defensive patent strategy or the means to allocate the risk to someone who is able to bear it better (a "no patents" strategy). A company needs to be able to maintain its freedom to innovate, to be in a position in which it is able to refuse to license patents that are questionable or otherwise nonessential, and to be able to avoid expensive and time-consuming litigation and potentially extremely high damages, by cross-licensing, for example. However, the emergence of firms that generate their revenues primarily by licensing patents has posed new challenges to companies with a defensive patent strategy. Patent-licensing companies do not usually manufacture any products themselves, thus settling a dispute via cross-licensing is not a viable option.

In Europe, too, the more active exploitation of patents has aroused interest, although many of the large and medium-sized ICT firms that have a patent portfolio employ a defensive strategy. It also appears that, as awareness about the possibility to patent software in Europe increases, even smaller companies are becoming more interested in patents and in developing strategies. Currently, however, many European ICT companies simply do not have a patent strategy, or

---

[531] Megantz, at 80 (2002).

[532] Vermont, at 330 (2002).

patents for that matter. Although patents are clearly not useful for everyone, it would be in these firms' best interests to review their patent position otherwise they are likely to encounter problems when broadening their operations to other countries or using the Internet as a distribution channel.

The advantages and disadvantages of patenting in the area of software and business methods have been widely discussed in recent years. One of the main concerns in this discussion has been the patent holder's right to prevent others from designing interoperable products. However, having patents and using them are two different things. Although a company may have them, it may be willing to license its patented technology for little or no cost if it claims an open standard, for instance. Further, due to network effects, the development of complementary products usually increases the value of a company's technology, and it may therefore be keen on opening up its interfaces even if there was no standardization process. Naturally, not all firms are willing to relinquish control, and heavy negotiation may be involved before an optimal result can be reached. It is my belief that, from society's perspective, we should nevertheless be mainly concerned about the emerging business model called "patent trolls", facilitated particularly by the U.S. legal system, involving very high litigation costs and damages that can turn out to be overwhelming.

## V. DISCUSSION AND CONCLUSIONS

This paper has identified four interconnected and partially overlapping trends in the patent arena. Specifically, developments relating to software and business-method patents have been discussed and perceptions of future trends presented. Trends in 1) academic/public discussion, 2) political views, 3) the law and its interpretation and 4) the business climate, particularly in the patent strategies of ICT companies, have all been considered. Some problems and common misunderstandings have also been pointed out. The key findings are presented below.

### A. ACADEMIC TRENDS

Patents have attracted a great deal of attention among academics during the last few decades. This is because legal changes in conjunction with the emergence of the information society have increased their importance in business, and the recent media attention and critique have greatly increased awareness of software and business-method patents in particular, thus adding to the topic's attractiveness[533]. Also biotechnological and pharmaceutical patents have aroused worldwide interest, one of the most intriguing questions being their impact on the developing countries[534].

Many current academic papers deal with patent-related topics, and in particular, interdisciplinary research is becoming more fashionable. Academics by no means form a united front. There is, for instance, slight diversity in the interests of scholars in the U.S. and Europe due to dissimilarities in patent systems and diverging academic cultures. In general, the European style of research appears to be less political but also less practice-oriented than that in the U.S., although there are naturally variations between scholars in this respect: differences between lawyers, technologists and economists could be mentioned. Furthermore, it is my observation that the lawyers in both continents typically approach the patent system from the inside, take the rules as they are and when it comes to their interpretation highlight the coherency of the system. When discussing about the patentability of computer programs, for instance, European lawyers tend to focus on interpreting EPC Art 52 and its coherency with the TRIPS agreement. Then again, (software) engineers have the strongest personal opinions about patents, and they are often concerned about the risk of interference with design freedom. Indeed, many technologists have raised their voices in support of the open-source movement and open standards, and have opposed software patents. Reasons to criticize such patents are many: software is different from other patentable inventions, there is a high risk of non-deliberate infringement, and patents favor large companies instead of the small, innovative firms[535]. Actually, the last mentioned argument has been presented in pharmaceuticals and biotechnology, the field in which the discussion has had a lot to do with hard versus soft values; ethics and humanity. The fact that patents may be

---

533 Writings in the media include *e.g.* Pomerantz (2005); Reback (2002); Wherry (2002); Malone (2002); Hardy (2002); Pfeiffer (2002); Raymond (2002); Economist.com articles mentioned in references; Lohr (2005); Riordan (2004);Varian (2004). For more critical writings *see e.g.* discussion on the Internet at www.eff.org; www.bustpatents.com; swpat.ffii.org. Academic papers discussing about the topic *see e.g.* Merges (1999); Jaffe & Lerner (2004); Lessig (1999); Hall (2003); Perchaud (2003); Cohen & Lemley (2001); Bessen & Hunt (2004).

534 *See e.g.,* Drahos & Braithwaite, at 155-162 (2002).

535 PbT Consultants, at 6 (2001). *See also* League for Programming Freedom, *Against Software Patents* (28 February 1991), <http://lpf.ai.mit.edu/Patents/against-software-patents.html> (last visited 9/30/05).

used to prevent poor people in developing countries from accessing essential drugs has generated a lot of outrage.[536]

In addition to argumentation founded on legal rationale, personal views and ethics, the patent system has been examined on quantitative and qualitative basis. This has taken place particularly in the U.S: a fashionable research theme in the economics field is how firms' patent practices affect innovation. Moreover, studies have been carried out on the consequences of extending patent protection in the mid-80s, and on whether this benefited society. Defining the optimal patent scope, term and damage level are further research topics favored by economists.[537] Generally speaking, there is a lot more empirically-oriented research being carried out in the U.S. today than earlier. These studies rely primarily on statistical and econometric data.[538]

As a result of research on the economic functioning of the U.S. patent system, academics no longer presume that stronger rights automatically induce more R&D investments. They have reached a consensus that the impact of patent protection depends on the rate and type of innovation as well as on the technological complexity[539]. The intricacy of patent economics has also been realized. Patents are not merely about promoting innovation and restricting competition by providing the means to capture knowledge, and to enable the formation of cartels[540]: they may also have positive effects on technology diffusion and competition[541]. Nonetheless, the efficacy of the patent system has been widely questioned, particularly in the context of software and business methods but also in relation to biotechnological inventions. Primary concerns touch upon the hold-up problem resulting from patent thickets, and so-called questionable patents contributing to the dilemma. Various scholars in the U.S. call for reform. It is essential to prevent further damage to the U.S. economy and to change the patent law, and possibly even antitrust legislation, accordingly. In terms of patent law, changes to the presumption of validity, the obviousness standard and the experimental-use doctrine have been recommended. The adoption of a European-type opposition procedure has also been suggested, and amending the assessment of treble damages in cases in which patent infringement is willful has also been viewed as an improvement. The goal is to improve patent quality, and to encourage the dissemination of knowledge.[542]

---

536 Drahos & Braithwaite, at. 5-10 (2002).

537 Some of these articles have been referred in the course of this paper. Further academic research papers include *e.g.* Nancy Gallini & Suzanne Scotchmer, *Intellectual Property: When is it the Best Incentive System?* (UC Berkeley Working Papers, department of economics, Working Paper No. EOI-303); Mark Schankerman & Suzanne Scotchmer, *Damages and Injunctions in Protecting Intellectual Property* (RAND Journal of Economics, Vol 32, No. 1, Spring 2002, 199-220); Edward F. Sherry & David J. Teece, *Some Economic Aspects of Intellectual Property Damages* (Practising Law Institute, Patents, Copyrights, trademarks and Literary Property Course handbook Series, PLI Order No. GO-007N, New York City, October 7-8, 1999); Ted O'Donoghue, Suzanne Scotchmer & Jacquis-Francois Thisse, *Patent Breath, Patent Life, and the Pace of Technological Progress* (Journal of Economics and Management Strategy, Vol. 7, No. 1, Spring 1998, 1-32).

538 Thomas, at. 6-10 (2003).

539 *See e.g.,* Burk & Lemley, at 89 (2005); Jaffe & Lerner, at 198 (2004); Jaffe, at 24-25 (1999); Hunt (1999); Scotchmer (1991); Merges & Nelson (1990).

540 Drahos & Braithwaite (2002).

541 OECD, at 9 (2004).

542 *See e.g.,* FTC (2003); NAS (2004); Jaffe & Lerner (2004).

In general, scholars in the U.S. have covered the software and business-method patent lifecycle fairly well in their academic writings. Many of the early research papers focused on issues revolving around granting patent protection for these new types of inventions. However, once they became an established part of the U.S. patent system, in addition to identifying the practical problems involved, researchers have addressed topics such as the optimal interpretation of the scope of software and business-method patents[543].

In Europe the discussion on software and business-method patents has mainly concentrated on patentability, particularly in terms of their technical character[544]. There are many more areas that urgently need attention, however. Applying patent-law concepts from the industrial age to the combination of hardware and software is likely to be challenging in related areas, such as infringement determination. There is a scarcity of studies on the patent strategies employed by European companies, and on the efficacy of the European patent system. Even EU legislators appear to have relied on research conducted in the U.S. in this respect[545]. The problem is, of course, that these research papers build on the U.S. patent system, from which the European system differs fundamentally in many ways. It is to be hoped that research related to software and business-method patents conducted in Europe will fill at least some of the gaps, and present a more multifaceted view in the future.

In general, the problem in the academic discussion is that the complex effects of patents are often forgotten in the debate as to whether software and business-method patents promote or impede innovation. Although the goal of the system is to promote innovation through 1) stimulating inventiveness and investments in R&D, 2) encouraging the commercial exploitation of inventions by inducing direct investments in the production and marketing of innovations and by facilitating technology trade, and 3) encouraging the disclosure of technical information and thus furthering technological progress[546], it is often claimed on the basis of only one of the above elements that software and/or business-method patents do not achieve this goal[547]. Moreover, many functions of patents such as their status value are simply neglected if the analysis is not even partly based on primary data, in other words on first-hand empirical evidence. Assessments of the role of software and business-method patents in promoting innovation are also misleading if the focus is only on the software industry or on Internet companies. These patents are paramount in other industries, too. Furthermore, if and when the patent laws are being interpreted to encompass also other than technological innovations, *i.e.* business methods, this new development should be taken into account when assessing the economic functioning of the system as it changes the underlying structures of both the patent system and the business environment fundamentally.

---

543 *See e.g.,* Burk & Lemley (2005); Cohen & Lemley (2001).

544 *See e.g.,* Törnroth (1999); Saebo (2001); Jüngst (2002); Hansen (2002); Hansen (2004); Westling (2002); Tauchert (2000); Newman (1997); Cohen (1999); Beresford (2001); Liesegang (1999); Skulikaris (2001).

545 *See e.g.*. the report to the European Commission on the Economic Impact of Patentability of Computer Programs written by Hart, Holmes and Reid (2000). The report bases itself largely to research conducted in the U.S.

546 Granstrand, at 83 (1999).

547 *See e.g.,* Bessen & Hunt (2004).

## B. POLITICAL TRENDS

The political challenge is to balance the interests of individuals, companies and the general public, and to plan a supportive policy framework that corresponds with those needs at all times. This is not an easy task. The wording of the law is modified infrequently and the legislative process is extremely slow. As a rule, legislators are not able to keep up with technological, business and societal developments, and it is frequently the case that a law is already outdated when it is passed. Of course, the common-law system in which the courts also have "legislative" power is more adaptive in this sense than the civil-law system.

Typically, topics that are emphasized in the media and in the academic realm, as well as those that are considered important by companies and other countries, affect the direction and focus of political decision-making. Lately, the need to ensure that new inventions in the high technology industries, such as information technology and biotechnology, are developed and brought to market has been highlighted, and in this context, the protection of intellectual property has been one of the key issues. The crucial question concerns what the optimal protection scope is.

Views about optimal IPR and patent protection are diverse. Generally, however, politicians appear to be still very much in favor of strong rights. The concern in the U.S. about industrial stagnation and the lack of innovations led to a pro-patent, or actually to a pro-IPR era in the 1980s, and the idea that strong rights induce more innovations and are beneficial to society has been rooted in people's minds. Nonetheless, now that research papers, particularly the Federal Trade Commission (FTC) and the National Academy of Sciences (NAS) reports, have questioned this policy, it is probable that changes will ultimately follow. Furthermore, global concern over high prices of patented medicines has spurred further discussion on the real R&D costs and risks of the industry, and thus the actual impacts of patent protection[548]. It is not to be expected that U.S. patent law will be completely rewritten, however, or that the patent system will be abandoned entirely. The bottom line is that the U.S. patent system is regarded as one of the keystones of its economy[549]. Yet, it is likely that politicians and the courts will also at some stage start to question the positive impact of patents on innovation. Some signs of this transition can already be detected: new legislation regarding prior user rights has been issued in the area of business-method patents, for instance, and various bills proposing further changes to the U.S. Patent Act have been introduced to the Congress during the last five years. These bills include among others the Business Method Improvement Act of 2000 and 2001, Patent Quality Assistance Act of 2004, and Patent Reform Act of 2005. If the sweeping changes suggested in the Patent Reform Act of 2005 were accepted, the patent holder's position would deteriorate fundamentally.

There has been considerable concern within the European Union that Europe is being left behind the U.S. and Japan in economic development, and harmonizing EU member states' patent and copyright laws and strengthening the position of rights holders have been given priority[550]. However, within the last few years, during the harmonization process related to the patentability of computer-implemented inventions, views about the required protection level

---

[548] Drahos & Braitwaite, at 8 (2002).

[549] *See e.g.,* NAS, at 1, 18 (2004).

[550] *See e.g.,* EC, *Green Paper on Innovation* (995); EC, *Green paper on the Community Patent and the Patent System in Europe* (1997); EC, *Innovation Policy in Europe 2001*, at 22.

have changed. The harmonization process was initially fairly pro-patent, but although it was mainly a question of the technical character of computer programs and the form of allowable claims, general concerns about the efficacy of the patent system were brought up, and the entire basis of the reform was challenged. In the end, the parliament rejected the directive proposal[551]. Similar developments have taken place earlier in relation to biotechnological inventions[552].

In the context of the EU software-patent directive, concerns that patents could be used to slow down open-source development, restrict product interoperability, and make standard setting difficult were paramount[553]. As for business-method patents, since U.S. experiences had not been positive, the question was no longer whether it is a disadvantage to European companies that these inventions cannot be patented in Europe: the goal seemed to be to make sure that pure business methods are not regarded as patentable subject matter in Europe[554]. On this basis I believe that, despite the U.S. influence it is unlikely that such patents will be accepted in the near future. As the ICT industry matures, and becomes more service-oriented, pressure from the industry to accept these patents is about to become more prominent, however. Furthermore, the direction the WIPO-led international harmonization of substantive patent law will take, may also affect this development.

## C. LEGAL TRENDS

For the last twenty years the legal regime has favored rights holders: the U.S. Court of Appeals for the Federal Circuit has been patent-holder-minded, and has often kept patents in force. It has also been keen on granting preliminary injunctions providing the patent holders' an effective tool against the alleged infringers irrespective of the actual validity of their patents. Courts have also relaxed the non-obviousness requirement, issued extensive damages, and new areas have entered into the sphere of patentable subject matter.[555] Then again, in Europe, a pro-patent attitude has taken hold of politicians and lawyers in particular[556], and it has become easier to obtain patents for many European countries at the same time, and the scope of patentable subject matter has broadened[557]. Nevertheless, compared to the U.S. the patent scope is interpreted more narrowly in many European countries[558], and damages issued are also not nearly as extensive. The tendency of harmonizing and at the same time strengthening patent protection is nevertheless likely to

---

551 Rocard (2005).

552 Tritton, Davis, Edenborough, Graham, Malynicz & Roughton, at 168-169 (2002).

553 PbT Consultants, at 6 (2001).

554 *See* Commission of the European Communities, *Proposal for a Directive of the European Parliament and the Counsil on the Patentability of Computer-implemented Inventions* (2002).

555 *See e.g.,* Gallini (2002); Hall & Ham Ziedonis (2001); Kortum & Lerner (1999); Jaffe & Lerner (2004); Jaffe (1999); FTC (2003); Hunt, at 21 (1999).

556 *See e.g.,* Jacob, at 416 (2001).

557 OECD, at 18 (2004).

558 There are more exceptions to patent holder's rights in Europe than in the U.S. For instance, non-commercial and private actions, and experimental use fall beyond the scope of patent protection. There are also differences in the interpretation of the so-called doctrine of equivalents, *see e.g.* Kati Lassila, *Ekvivalenssiselvitys; Patentin suojapiirin tulkinta Suomessa ja muissa maissa* (KTM Julkaisuja 22/2004, Elinkeino-osasto); AIPPI, Question Q175 The role of equivalents and prosecution history in defining the scope of patent protection, <http://www.aippi.org/reports/working-guidelines/download/wg_q175_E.pdf> (last visited 9/30/05).

proceed particularly in the patent-enforcement arena in which the international nature of business has diminished the possibilities to enforce one's rights in practice[559].

The trend in the U.S. towards strong patent rights seems to be slowly changing its course. It has been realized that stronger is not always better from society's viewpoint, and that a dysfunctional patent system also harms the companies that utilize it the most. A better balance is needed and is being sought.[560] Official changes that have already taken place include the introduction of the American Inventor's Protection Act, the improved USPTO search facility for business-method patents, and the Supreme Court's clarification of the application of the doctrine of equivalents. To my knowledge, however, courts have not so far cited the FTC and/or NAS reports, and the strong assumption is still that a patent granted by the patent office is valid.

Besides offering strong patent protection, the U.S. antitrust approach has been fairly patent-friendly for the last two decades[561]. Patent holders have not often been subjected to antitrust scrutiny, as their actions can usually be justified from business perspectives. Thus, having patents offers a good explanation for behavior that would otherwise be regarded as anticompetitive. In general, unlike in the mid-20th century, antitrust and patents are considered complementary rather than conflicting.[562] On the other hand, their use is more likely to be considered anticompetitive in Europe, and the opportunities for patent holders to exploit their rights fully there are thus more limited than they are in the U.S.[563]

In the antitrust (U.S.) and competition law (Europe) arena, a balance between patents and antitrust in the "new economy" is constantly being sought. Nevertheless, although it was the FTC that released the report on patents and competition, there is no indication that antitrust laws will be applied more strictly in the future in cases when patent holders utilize their rights in an anticompetitive manner. The trend in Europe has also rather been towards the more flexible application of competition laws[564]. However, the potential problems associated with patents in relation to open standards may affect the application of antitrust regulation in the context of standardization.

Usually, many legal trends flow from the U.S. to the rest of the world, which is evident especially when international harmonization efforts take place. Developments in software patenting in Europe have also followed the U.S.[565], although the basis for granting patent protection in this context is different. The emphasis in Europe is on the lack of technicality, and it is explicitly stated in national patent laws and the European Patent Convention that computer programs as such are not patentable. The problem here has mainly been the difficulty of drawing the line

---

559 EU has already introduced an enforcement directive (2004/48/EC), and the Community patent Act is currently under discussion. Furthermore, adoption of a European Patent Litigation Agreement has been proposed.

560 *See e.g.,* NAS (2004); FTC (2003).

561 *See e.g.*. NAS, at 24-25 (2004).

562 FTC, at Executive Summary, 2 (2003); U.S. Department of Justice & Federal Trade Commission, *Antitrust Guidelines for the Licensing of Intellectual Property* (1995); *Commission Evaluation Report on the Transfer of Technology Block Exemption regulation No 240/96 Technology Transfer Agreements under Article 81,* at 10-11 (2001).

563 *See e.g., Commission Evaluation Report on the Transfer of Technology Block Exemption regulation No 240/96 Technology Transfer Agreements under Article 81*, at 17 (2001); Mueller (2002); Alkio & Wik, at 387 (2004); Brinker, at 137 (2004).

564 *See e.g.,* the Commission Regulation (EC) No 772/2004 on the application of Article 81(3) (group exemptions).

565 *See e.g.,* Westling, at 537 (2002).

between computer programs producing a technical effect or solving a technical problem, or a software invention incorporating technical means, and computer programs as such. This is because computer programs have many characteristics: on the one hand, software is purely information doing nothing, and on the other hand it causes the computer to perform[566]. Moreover, the close resemblance between algorithms and mathematics has been puzzling legislators, courts and patent offices.

As far as business-method inventions are concerned, the European technicality requirement is likely to hold them outside the patent scope for now. Of course, novel and non-obvious implementations of business methods may already be patentable, and the boundary between the technical implementation and the business method itself is not always clear. Deviating also from the general trend, European patent legislation is apparently regarded as a guideline in the U.S.: for example, as mentioned earlier, prior user rights have been recently introduced in the U.S. Patent Act. Moreover, there has been discussion on the adoption of patent opposition procedure and the first-to-file principle.[567]

## D. BUSINESS TRENDS

As a result of the transition from the industrial to the information economy, the proportion of intangible assets has expanded to take up the largest portion of the resource pools of quite a few companies[568]. Firms have also become more specialized, technology has become more complex, technological change more rapid, and innovation processes more decentralized than they used to be in the era of industrialism. Thus, the ability to acquire external resources has turned out to be of key importance.[569] Indeed, the general trend has been from closed innovation in which internal R&D, control over building, marketing, distributing, servicing, and supporting companies' own products has been essential towards a more open model in which the boundary between the firm and its environment is permeable allowing ideas and knowledge to flow more freely. Firms following the open innovation model may, for instance, commercialize their internal ideas through external channels, such as carve outs, joint ventures and other types of licensing arrangements, or they can bring outside ideas into the company to commercialize them.[570] These changes, combined with the formation of a highly interactive and international market place, the Internet, have affected the role patents have in today's business environment. Further, open, commonly established interoperability standards are critical in the ICT sector.

The role of software in all fields of business, not only in the ICT sector, has increased. Having good databases and the possibility to demand and transfer information as quickly as possible is, in fact, already an infrastructural element of corporate operations. Information and communications technologies are pervasive. They increase efficiency in business and in people's everyday lives. Therefore, although this paper has focused on software and business-method patents, and on ICT companies' patent strategies, such patents are not irrelevant to companies

---

566 Samuelson, Davis, Kapor & Reichman, at 15 (1994).

567 The Patent reform Act of 2005; FTC, at Executive Summary, 8, Chapter 5, 17-18 (2003); NAS, at 95-103 (2004); GRAIN (2003).

568 *See e.g.,* Jorash, at 140 (2002).

569 *See e.g.,* OECD, at 16 (2004).

570 Chesbrough (2003).

operating in other technological fields. Furthermore, all Internet companies, even those that have not traditionally paid any attention to patents, should keep an eye on developments relating to software and business-method patents and their use.

U.S.-based ICT companies in particular have recently started to utilize their patent portfolios actively and aggressively in order to enhance their competitive advantage[571]. It is not necessarily the legal protection, the possibility to prevent others from utilizing patented inventions, that is the most important function of patents, it is rather their licensing potential and the leverage they offer in negotiations.[572] In fact, many companies have been setting up patent-licensing programs, and even firms that do not manufacture any products and base their entire business on licensing have emerged as posing new threats, particularly to large and medium-sized U.S. firms. The changes that have taken place in the role of patents in companies' businesses can also be detected in their organization structures, which have recently been modified in order to better support the implementation of the chosen patent strategy[573].

Patents are often essential at the start-up phase of a company. This is no wonder, as the number of patents applied for, issued and litigated in the U.S., as well as the costs associated with litigation, have been on the rise for the last twenty years[574]. The risk of infringing someone's patents and being sued is therefore high. Consequently, even a small company operating in the U.S. should at least consider employing a defensive patent strategy. Venture capitalists typically welcome this approach, too[575].

In the licensing context, it has become more common to license patents even without any physical deliverables[576]. However, the current economic slump and the burst of the dot-com bubble have to my knowledge reduced the wildest attempts to base business entirely on the transaction of rights. Fortunately, also the mad years of evaluating patents on a quantitative basis instead of on subject matter quality appear to have to a large extent passed. This also applies to financing. Venture capitalists have become more careful when estimating the value of a company's patent portfolio[577]. Patents are not valuable in themselves, but the value is attached to the protected subject matter and its relevance or potential relevance in the marketplace. Nonetheless, on the whole, IP markets in the U.S. are developing quickly and they have a great, currently underutilized, potential.

Conversely, many ICT companies in Europe are only beginning to realize the worth of patents to their businesses, and patent strategies are often undeveloped[578]. SMEs as well as large companies are becoming more interested in developing IPR and patent strategies. Generally, the number of firms that are in a position to ignore patents altogether is decreasing. Even if the business model is such that patents have no value as protection measures, there may be third-party patents that

---

571 Rice (2003); Parr, at 283 (2002).

572 *See e.g.,* Parr (2002); Rivette & Kline, at 44 (2000); Chesbrough, at 159 (2003): Washington CORE, at 14 (2003).

573 *See e.g.,* Rivette & Kline, at 90-91 (2000); Parr, at 277-278 (2002).

574 Ham Ziedonis, at 204 (2003).

575 Showalter & Baxter, at 6 (1999); Rice (2003).

576 Somaya, at 4 (2002).

577 Shelby (2001). *See also* Roth (2005).

578 Interview data Finland (2003); DLA (2004); Vortonas, at 33 (2003); Blind, Edler, Nack & Straus (2001).

the company needs to be concerned about. In fact, although the strategies employed by European and U.S. companies are different, their impact is not limited to a certain geographical area. The internationalizing business environment, and the Internet as a marketplace, make it extremely difficult for ICT companies today to refrain from giving attention to patents irrespective of their business model and countries of operation. Thus, it is likely that European software firms in particular will face difficulties when expanding their businesses.

Most technology-intensive companies nowadays have to have a patent strategy. This does not mean that they need to have patents of their own. In fact, although the "not invented here" factor and the fear of losing control are still very strong[579], and the component-based software development appears to increase patents' attractiveness[580], the emergence of "nothing invented here" ideology[581], and particularly the success and the growing popularity of the open-source licensing model[582], combined with weaker patent protection, may very well diminish the attractiveness of proprietary strategies in general. Improvements in the choice of patent-litigation insurances may lessen the need for acquiring patents for defensive purposes, and a "no patents" strategy may therefore become more appealing in the future. Companies adopting this strategy have some concerns about third-party patents, and try their best to diminish the risk of infringing others' patents and being sued for potential infringement. One way of doing this is to contractually allocate the infringement risk to someone else. Of course, having patents does not mean that the firm is not able to use them flexibly, and even "donate" them for the public good, as collaboration in setting open, royalty-free standards and the recent efforts of companies such as Sun Microsystems and IBM to donate their patented inventions for public use have demonstrated[583]. Indeed, one characteristic of the ICT sector, software in particular, is the highlighted role of users. They have traditionally been major contributors in software development.[584]

When looking at the industry developments in the long run, we are able to detect the shift from an information economy focusing first on the infrastructure level and moving then increasingly towards services, followed by its industrialization[585]. These shifts are likely to affect further both the availability and usability of patent protection. It is to be expected, for instance, that at the time technological development shifts and ultimately slows down, many technologies become commoditized, and it becomes more difficult to base one's competitive advantage on technological innovation, ICT-patents' value to firms diminishes as both protection and leverage means. On this basis, I argue that even though patents may become more important in terms of leverage as firms open up their innovation models, when they reach the ultimate level of openness the value of patent protection is likely to become less, and as time goes by, there will probably be more ICT companies operating at this end of the spectrum. On the other hand it is probable that the pressure towards patenting pure business methods becomes prominent as it has

---

579 Interview data U.S. (2004); Vortonas, at 33 (2003).

580 Derived from Interview data Finland (2003).

581 *See e.g.,* R. P. Srikanth, *R&D Investments are No Longer an Indicator of How Innovative a Company Is* (Express Computer 31 January 2005), <http://www.expresscomputeronline.com/20050131/market08.shtml> (last visited 9/30/05).

582 *See e.g.,* Weber (2004); Rosen (2004).

583 *See e.g.,* McMillan (2005); Krill (2005).

584 *See e.g.,* Von Hippel, at 97-101 (2004).

585 Martikainen (2005).

already become more difficult to protect the Internet business models via secrecy than it used to be when operating on a conventional market place[586].

All the trends described in this paper are connected, and developments in one field affect other sectors. The connections between these various trends are illustrated and the trends summarized in Figure 8.

In summary it can be said that the software and business method patent ecosystem is characterized by an interplay between two forces: openness and free flow of scientific and business information on the one hand, and proprietarization of that information on the other. This interplay is present at both a company and a policy level. In fact, there is nothing new about this balancing act. It has been an essential element of the patent system ever since its foundation. Controversies and resulting patent law amendments have followed in cyclical manner. We do not have to look very far into the history to detect a general pro-patent shift (late 19th and early 20th century) that has been followed by an anti-patent attitude (mid 20th century) which has then switched back to pro-patent (late 20th century).[587] Indeed, the ongoing academic and public disputes regarding the patentability of software, business method and biotechnological inventions, and the problems that have arisen due to patent protection have led me to conclude that we will ultimately be heading towards weaker patent protection. As explained above, some signs of the transition can already be detected in the political and legal arenas. In any case, the shift is likely to be more noticeable in the U.S. than in Europe due to the rather stable nature of the European patent system: the atmosphere was never as anti-patentee as in the U.S[588], and also the pro-patent shift was less radical.

[586] OECD, at 15 (2004).

[587] *See e.g.,* Jaffe & Lerner, at 78-97 (2004).

[588] Jacob, at 416 (2001).

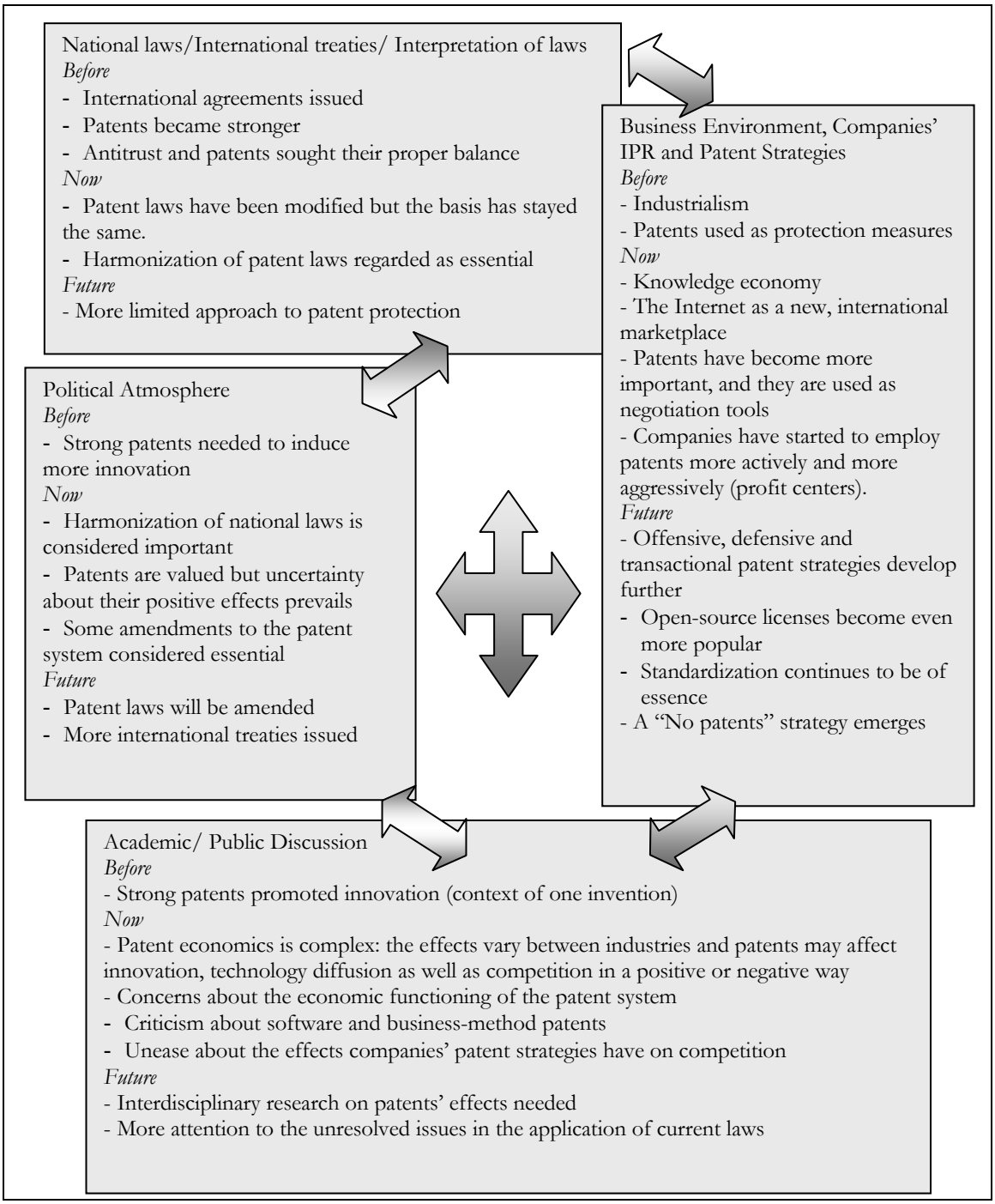



**FIGURE 8.** SUMMARY OF THE FOUR INTERTWINED PATENT-RELATED DEVELOPMENTS

## References

### Books

Mikko Alkio & Christian Wik, *Kilpailuoikeus* (Talentum 2004).

Keith Beresford, *Patenting Software Under The European Patent Convention* (Sweet & Maxwell 2000).

Paul van den Berg*, Patentability of Computer-Software-Related Inventions, The Law and Practice of the Enlarged Board of Appeal of the European Patent Office during its first ten years* (Köln – Berlin – Bonn – München 1996).

Bruce M. Berman (ed.) *From Ideas in Assets, Investing Wisely in Intellectual Property* (Wiley & Sons, Inc., 2002).

- Margaret M. Blair, Gary M. Hoffman & Salvatore P. Tamburo, *Clarifying Intellectual Property for the New Economy*, 83-108.
- Stephen P. Fox & Guy J. Kelley, *Making Innovation Pay, Aligning Patent Rights with Business Strategy*, 191-210
- James Jorasch, *The Process Laboratory, Developing Business-Driven Patents in the Information Age*, 139-156
- Jackson Knight, *Intellectual Property "101" What Executives and Investors Need to Know About Patent Rights and Strategy*, 3-26.
- Russell L. Parr, *IP Leverage, Facilitating Corporate Value Creation,* 271-291.
- Samson Vermont, *The Economics of Patents and Litigation,* 327-372.

Paul E. Ceruzzi, *A History of Modern Computing* (The MIT Press 1998).

Alfred D. Chandler Jr, *Inventing the Electronic Century. The Epic Story of the Consumer Electronics and Computer Industries* (The Free Press 2001).

Henry W. Chesbrough, *Open Innovation, The New Imperative for Creating and Profiting from Technology* (Harvard Business School Press 2003).

Julie L. Davis & Suzanne S. Harrison, *Edison in the Boardroom, How Leading Companies Realize Value from Their Intellectual Assets* (John Wiley & Sons, Inc 2001).

Rochelle Dreyfuss, Diane L Zimmerman & Harry Fist (ed.), *Expanding the Boundaries of Intellectual Property Innovation Policy for the Knowledge Society* (Oxford University Press 2001).

- Frank H. Easterbrook, *Who Decides the Extent of Rights in Intellectual Property?,* 405-413.
- Hon. Sir Robin Jacob, *The Onward March of Intellectual Property Rights and Remedies*, 415-419.
- Hon. Jon O. Newman*, Academia and the Bench: Toward a More Productive Dialogue,* 421-430.
- Jerome H. Reichman, *On Green Tulips and Legal Kudzu: Repacking Rights in Subpatentable Innovation*, 23-53.
- Hans Ullrich, *Intellectual Property, Access to Information, and Antitrust: Harmony, Disharmony, and International Harmonization,* 366-402.

Peter Drahos & John Braithwaite, *Information Feudalism. Who Owns the Knowledge Economy?* (Earthscan 2002).

Stephen C. Glazier, *e-Patent Strategies for Software, e-Commerce, the Internet, Telecom Services, and Business Methods (with Case Studies and Forecasts)* (LBI Law & Business Institute, Inc, 3rd edition, 2000).

Ove Granstrand, *The Economics and Management of Intellectual Property, Towards Intellectual Capitalism* (Edward Elgar 1999).

Pirkko-Liisa Haarmann, *Immateriaalioikeuden oppikirja* (Kauppakaari 2001)

Barry Hawk (ed.) *International Antitrust Law & Policy* (Corporate Law Institute, Fordham University School of Law, 2004).

- Ingo Brinker, *Essential Facility Doctrine and Intellectual Property Law: Where Does Europe Stand in Aftermath of the IMS Health Case?*, 137-150.

Pekka Himanen*, The Hacker Ethic and the Spirit of the Information Age* (Random House 2001).

Eric von Hippel, *Democratizing Innovation* (The MIT Press 2005).

The Rt. Hon. Sir Robin Jacob, Daniel Alexander & Lindsay Lane, *A Guidebook to Intellectual Property, Patents, Trade Marks, Copyright and Designs* (Sweet & Maxwell 2004).

Adam B. Jaffe & Josh Lerner, *Innovation and Its Discontents, How Our Broken Patent System Is Endangering Innovation and Progress, and What to Do About It* (Princeton University Press 2004).

H. Jackson Knight, *Patent Strategy for Researchers and Research Managers* (2nd edition, John Wiley & Sons, LTD 2001).

Dundar F. Kocaoglu & Timothy R. Anderson, *The Role of Intellectual Property Rights. Technology Management in the New Technology Era* (2001).

- Davis Lee, *Profiting from Innovations in Digital Information Goods*, 471-480.

Morgens Koktvedgaard & Marianne Levin, *Lärobok i immaterialrätt* (Norstedts Juridik AB 2000).

William M. Landes & Richard A. Posner, *The Economic Structure of Intellectual Property Law* (The Belknap Press, Harvard University Press 2003).

Mark A. Lemley, Peter S. Menell, Robert P. Merges & Pamela Samuelson, *Software and Internet Law* (Aspen Law & Business 2000).

Lawrence Lessig, *The Future of Ideas, The Fate of the Commons in a Connected World* (Random House 2001).

Robert C. Megantz, *Technology Management, Developing and Implementing Effective Licensing Programs* (John Wiley & Sons, Inc 2002).

David G. Messerschmitt & Clemens Szyperski, *Software Ecosystem, Understanding an Indispensable Technology and Industry* (The MIT Press 2003).

Robert P. Merges & John F. Duffy, *Patent Law and Policy: Cases and Materials* (LexisNexis, 3rd edition, 2002).

Robert P. Merges, Peter S. Menell, Mark A. Lemley, *Intellectual Property in the New Technological Age* (Aspen Publishers 2003).

Anthony L. Miele, *Patent Strategy, The Manager's Guide to Profiting from Patent Portfolios* (John Wiley & Sons, Inc. 2000).

David A. Mowery, Richard R. Nelson, Bhaven N. Sampat & Arvids A. Ziedonis, *Ivory Tower and Industrial Innovation. University-Industry Technology Transfer Before and After the Bayh-Dole Act* (Stanford Business Books 2004).

Alexander I. Poltorak & Paul J. Lerner, *Essentials of Licensing Intellectual Property* (John Wiley & Sons, Inc 2004).

Ilkka Rahnasto*, Intellectual Property Rights, External Effects, and Anti-trust Law, Leveraging IPRs in the Communications Industry* (Oxford University Press 2003).

Kevin Rivette & David Kline, *Unlocking the Hidden Value of Patents, Rembrandts in the Attic* (Harvard Business School Press 2000).

Lawrence Rosen, *Open Source Licensing, Software Freedom and Intellectual Property Law* (Prentice Hall PTR 2004).

Carl Shapiro & Hal R. Varian, *Information Rules. A Strategic Guide to the Network Economy* (Harvard Business School Press 1999).

Suzanne Scotchmer, *Innovation and Incentives* (MIT Press 2004).

David J. Teece, *Managing Intellectual Capital. Organizational, Strategic and Policy Dimensions* (Oxford University Press 2000).

Guy Tritton, Richard Davis, Michael Edenborough, James Graham, Simon Malynicz & Ashley Roughton, *Intellectual Property in Europe* (2nd edition, Sweet & Maxwell, 2002).

Peter Wahlgren (ed), *IT Law* (Scandinavian Studies in Law, Vol 47, Stockholm Institute for Scandinavian Law 2004).

- Kim G. Hansen, *Software Patents in Europe,* 173-201

Charles Walker & Mark A. Bloomfield, *Intellectual Property Rights and Capital Formation in the Next Decade* (New York, University Press of America, 1988).

- Edwin Mansfield, *Intellectual Property Rights, Technological Change, and Economic Growth,* 221-244.

Steven Weber, *The Success of Open Source* (Harvard University Press 2004).

## Research papers

James Bessen, *Patent Thickets: Strategic Patenting of Complex Technologies* (ROI Working Paper 2003) <http://www.researchoninnovation.org/thicket.pdf> (last visited 6/21/05).

James Bessen & Robert E. Hunt, *An Empirical Look at Software Patents* (Federal Reserve Bank of Philadelphia Working Papers, Working Paper No.03-17/R, March 2004), <http://www.researchoninnovation.org/swpat.pdf> (last visited 6/21/05).

James Bessen, & Eric Maskin, *Intellectual Property on the Internet: What's wrong with Conventional Wisdom* (ROI Working Paper 2004) <www.researchoninnovation.org/iippap2.pdf> (last visited 6/21/05).

James Bessen & Eric Maskin, *Sequential Innovation, Patents, and Imitation* (MIT Working paper (1999), Revised July 2002).

Knut Blind, Rainer Bierhals, Nikolaus Thumm, Kamal Hossain, John Sillwood, Eric Iverser, Rik von Reikum & Bruno Roxius, *Study on the Interaction between Standardization and Intellectual Property Rights* (EC Contract No G6MA-CT-2000-02001, 2002).

Michele Boldrin & David K. Levine, *Rent-seeking and Innovation* (Working paper, 13th July 2003) <http://levine.sscnet.ucla.edu/papers/cr35.pdf> (last visited 6/21/2005).

Dan L. Burk & Mark A. Lemley, *Designing Optimal Software Patents* (Stanford Law School, Public Law & Legal Theory Working Paper series, Research Paper No. 108 and University of Minnesota law School, Legal Studies Research Paper series, Research Paper No. 05-11, March 2005).

Wesley M. Cohen, Richard R. Nelson & John P. Walsh, *Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (Or Not)* (NBER Working Paper Series, Working Paper 7552, 2000).

Rochelle Cooper Dreyfuss, *Are Business Methods Bad for Business?* (Public Law and Legal Theory Working Paper Series, Working Paper 17, March 2000) <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=219574> (last visited 6/21/05).

Bronwyn H. Hall, *Business Method Patents, Innovation and Policy* (NBER Working Paper Series, No 9717, May 2003), <http://papers.nber.org/papers/w9717.pdf> (last visited 6/21/05).

Adam J. Jaffe, *The U.S. Patent System in Transition: Policy Innovation and the Innovation Process* (NBER Working Paper No. W7280, August 1999).

Samuel Kortum & Josh Lerner, *What is Behind the Recent Surge in Patenting?* (Research Policy 28, 1-22, 1999).

Mark A. Lemley, *Intellectual Property Rights and Standard Setting Organizations* (UC Berkeley Public Law and Legal Theory Research Paper Series, Research Paper No. 84, 2002).

Richard C. Levin, Alvin K. Klevorick, Richard R. Nelson & Sidney G. Winter, *Appropriating the Returns from Industrial Research and Development* (Cowles Foundation Paper 714, 1987).

Michael J. Meurer, *Business Method Patents and Patent Floods* (Boston University, School of Law, Working Paper Series, Law and Economics, Working Paper No. 02-02, 2002)).

Robert W. Morris, *Software and Business Method Patent Licensing* (Practising Law Institute, Patents, Copyright, Trademarks and Literary Property Course Handbook Series, PLI Order Number G0-01BF, September 2003 - January 2004).

Denis T. Rice, *Building a Strategic Internet IP Portfolio in a "Down" Economy* (Practising Law Institute, Patents, Copyrights, Trademarks, and Literary Property Course Handbook Series, PLI Order Number G0-018F, 7th Annual Internet Law Institute, July 2003).

Jerry Riedinger, *Building Fences in Cyberspace: Business Method Patents and The Internet, Analysis of Recent Internet/E-Commerce Business Method Patents* (prepared for the Practicing Law Institute Program on Patenting the New Business Model, Building Fences in Cyberspace, 16 June 2000).

Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard-Setting* (March 2001), <http://faculty.haas.berkeley.edu/shapiro/thicket.pdf> (last visited 6/21/05).

Barton E. Showalter & Jeff D. Baxter, *Strategic Use of Software Patents* (Practising Law Institute, Patents, Copyrights, Trademarks, and Literary Property Course Handbook Series, PLI Order No. G0-004D, February-March, 1999).

Deepak Somaya, *Theoretical Perspectives on Patent Strategy* (Robert H. Smith School of Business, Maryland, Draft, 2002).

John R. Thomas, *The Status of Intellectual Property Research in the U.S.* (IIP, Institute of Intellectual Property, March 2003) <http://www.iip.or.jp/summary/pdf/thomas2.PDF> (last visited 5/25/05).

Washington CORE*, Patent Strategies for Venture Firms: Experiences from the Uniter States* (March 2003) <http://www.iip.or.jp/e/index.html> (last visited 6/21/05).

## Journals

Ashish Arora, Andrea Fosfuri, and Alfonso Gambardella, *Markets for Technology and their Implications for Corporate Strategy* (Industrial and Corporate Change, Volume 10, Issue 2, 1 June 2001, 419-451).

David E. Balto & Andrew H. Wolman, *Intellectual Property and Antitrust: General Principles* (IDEA, Journal of Law and technology, Vol. 43, No 3, 2003, 394-474).

Keith Beresford, *European Patents for Software, e-Commerce and Business Model Inventions* (World Patent Information, Vol 23, Issue 3, September 2001, 253-263).

(Fred Blakemore, *Patenting Computer Software* (Engineering Management Journal, August 1999, 157-160).

Erik Brynjolfsson & Michael D. Smith, *Frictionless Commerce? A Comparison of Internet and Conventional Retailers* (Management Science, Vol. 46, No. 4, April 2000, 563-585).

Henry Chesbrough, *The Logic of Open Innovation: Managing Intellectual Property* (California Management Review, Volume 45, number 3, 2003, 33-58).

Julie E. Cohen & Mark A. Lemley, *Patent Scope and Innovation in the Software Industry* (89 California Law Review, January 2001) <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=209668> (last visited 6/21/05).

Ron Corbett, *IP Strategies for Start-up eCommerce Companies in the Post-dot-bomb Era* (Texas Wesleyan Law Review, Issue 8, 643-663, 2002).

Dominique Foray, *Intellectual Property and Innovation in the Knowledge-Based Economy* (ISUMA, Spring 2002).

Nancy T. Gallini, *The Economics of Patents: Lessons from Recent U.S. Patent Reform* (Journal of Economic Perspectives, Vol 16, number 2, Spring 2002, 131-154).

Bronwyn H. Hall & Rosemarie Ham Ziedonis, *The Patent Paradox Revisited: an Empirical Study of Patenting in the U.S. Semiconductor Industry, 1979-1995* (RAND Journal of Economics, Vol 32, No 1, Spring 2001, 101-128).

Kim G. Hansen, *Kommentar til EU's forslag til et direktiv om computer-implementerede opfindelsers patenterbarhed* (NIR, Vol. 71, No. 6, 2002, 545-551).

Michael A. Heller, *The Tragedy of Anticommons: Property in the Transition from Marx to Markets* (Harvard Law Review 111, 1998, 621-688).

Robert Hunt*, Patent Reform: A Mixed Blessing For the U.S. Economy?* (Federal Reserve Bank of Philadelphia, Business Review, November/December 1999, 15-22).

William N. Hulsey, *Patent Insurance Can Guard Intellectual Capital, Policies Can Help Cover the Costs of Litigation on Either Side of the Infringement Issue* (Austin Business Journal, 12 June 1998) <http://austin.bizjournals.com/austin/stories/1998/06/15/focus3.html> (last visited 5/21/05).

Pia Hurmelinna, Jukka Bergman & Ari Jantunen, *Appropriability Strategy in Assessing Future Business Development. Case: Wireless Communication Technology* (International Journal of Learning and Intellectual Capital, 2004).

Oliver Jan Jüngst, *Novelty and Industrial Applicability in Computer Programs in Europe* (NIR, Vol. 71, No. 5, 2002, 490-499).

Eva Liesegang, *Software Patents in Europe* (Computer and Telecommunications Law Review, Issue 2, 1999, 48-51).

Daniel Lin, *Research versus Development: Patent Pooling, Innovation and Standardization in Software Industry* (John Marshall Review of Intellectual Property Law, Vol. 1, 2002, 274-309) <http://www.jmls.edu/ripl/vol1/issue2/lin.pdf> (last visited 6/21/05).

Mark A. Lemley, *Rational Ignorance at the Patent Office* (Northwestern University Law Review, Vol 95, No. 4, 2001) <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=261400> (last visited 6/21/05).

Robert P. Merges, *As Many as Six Impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform* (Berkeley Technology Law Journal, Volume 14, 1999).

Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope* (Columbia Law Review 90(4), 1990, 839-916).

Janice M. Mueller, *Patent Misuse Through the Capture of Industry Standards* (Berkeley Technology Law Journal, Volume 17, 2002).

Jonathan Newman, *The Patentability of Computer-related Inventions in Europe* (European Intellectual Property Review, No. 12, 1997, 701-708).

Marcus Norrgård, *Immaterialrättens sanktionssystem och Enforcement-directivet* (NIR, Number 5, Edition 73, 2004, 444-468).

Sylvain Perchaud, *Software Patents and Innovation* (JILT (1) 2003) <http://elj.warwick.ac.uk/jilt/03-1/perchaud.html> (last visited 6/21/05).

Robert Pitofsky, Donna Patterson & Jonathan Hooks, *The Essential Facilities Doctrine under U.S. Antitrust Laws* (Antitrust Law Journal, Vol 70, No 2, 2002, 443-462).

Michael E. Porter, *Strategy and the Internet* (Harvard Business Review*,* March 2001, 63-68).

Jarle Roar Saebo, *Patent på datamaskinprogrammer – oppfinnelsesbegrepet* (NIR, Vol. 70, No. 3, 351-380).

Pamela Samuelson, Randall Davis, Mitchell D. Kapor & J.H. Reichman, *A Manifesto Concerning the Legal Protection of Computer Programs* (Columbia Law Review, Vol. 94, December 1994).

Daniele Schiuma, *TRIPS and Exclusion of Software "as Such" from Patentability* (IIC Vol 31, No 1/2000).

Suzanne Scotchmer, *Standing on the Shoulders of Giants: Cumulative Research and the Patent Law* (Journal of Economic Perspectives 5(1), 1991, 29-41)

Jeffrey Shelby, *Business Method Patents and Emerging Technology Companies* CASRIP Publication Series: Reconciling Int'l property, No. 7, 2001) <http://www.law.washington.edu/casrip/Symposium/Number7/3A-Shelby.pdf> (last visited 6/21/2005).

Donald M. Spero, *Patent Protection or Piracy – a CEO Views Japan* (Harvard Business Review, September-October 1990).

Karly Stoehr, *Patent Pending…Pending…Pending, The Evolution of Equivalents: Festo Corp. v. Shoketsu Kinzoku Kabushiki Co.* (Computer Law Review and Technology Journal, Vol VII, 2003, 321-329).

Wolfgang Tauchert, *Patent Protection for Computer Programs – Current Status and New Developments* (IIC, Vol. 31, No. 7-8/2000, 812-824).

Tech Law Journal, HR 1333, *The Business Method Patent Improvement Act of 2001* (introduced April 3, 2001) <http://www.techlawjournal.com/cong107/patent/bus_method/hr1333ih.asp> (last visited 6/21/05).

Winfried Tilmann, *Community Patent and European Patent Litigation Agreement* (EIPR, Vol 27, Issue 2, February 2005, 65-67).

Lennart Törnroth, *Datorprogram och patentskydd – utvecklingen av svensk rättspraxis i belysning av främst EPO-praxis* (NIR, Vol. 68, No. 1, 1999, 86-98).

Carl Westling, *Patent på datorprogram och affärsmetoder – tillika en kommentar till EG-kommissionens förslag till directiv för datorprogramrelaterade uppfinningars patenterbarhet* (NIR, Vol 71, No. 6, 533-544).

## Magazines

Gregory Aharonian, *Does the Patent Office Respect the Software Community?* (IEEE Software July/August 1999, 87-89).

Jyrki Alkio, *Kovaa peliä patenteilla* (Helsingin Sanomat, 9 March 2003).

Charles Babcock & Larry Greenemeier, *Open Source Stress* (InformationWeek, 9 August 2004) <http://www.informationweek.com/showArticle.jhtml?articleID=26806464> (last visited 6/21/05).

Daniel Clark, *Do Web Standards and Patents Mix?* (Computer, October 2002, 19-22).

Gavin Clarke, *IBM pushes 'software as a service' on partners* (The Register, 27 May 2005) <http://www.theregister.co.uk/2005/05/27/ibm_saas_pw/> (last visited 6/7/05).

Stephen C. Durant & Thomas C. Chuang, *E-commerce Patents and Shifting Balances in Patent Law* (IEEE Communications Magazine, July 2000, 106-110).

The Economist, *Europe's Patent Mess* (Economist.com, 20 May 2004).

The Economist, *The Broken Patent System* (Economist.com, 11 November 2004).

The Economist, *Monopolies of the Mind* (Economist.com, 11 November 2004).

The Economist, *Patent Wars, Better Get Yourself Armed, Everyone Else Is* (Economist.com, 6 April 2000).

Scott J. Fields & Joan M. Roediger, *Health care business method patents* (Physician's News Digest, September 2001) <http://www.physiciansnews.com/business/901fields.html> (last visited 5/24/04).

Petri Fiilin, *Patentti osaksi strategiaa* (Fakta 2001).

Steven J. Frank, *Can You Patent An Industry Standard?* (IEEE Spectrum, March 2002, 14-15).

Steven J. Franck, *Will patent pillage open source?* (News.com, 16 April 2003) <http://news.com.com/2010-1071-996906.html> (last visited 6/21/05).

Quentin Hardy, *In the Path of an Avalanche. An Examiner at the U.S. Patent Office Explains How He Manages the Never-ending Flow of Applications* (Forbes Global, 24 June 2002)

Jason Kipnis, *Beating the System: Abuses of the Standards Adoption Process* (IEEE Communications Magazine, July 2000, 102-105).

Eric Knorr, Leon Erlanger & James R. Borck, *A Field Guide to Software as a Service* (InfoWorld, 18 April 2005) <http://www.infoworld.com/article/05/04/18/16FEsasdirect_1.html> (last visited 6/7/05).

Paul Krill, *Sun Introduces OpenSolaris, Releases 1670 Patents* (InfoWorld, 25 January 2005) <http://www.infoworld.com/article/05/01/25/HNsunsolarispatents_1.html> (last visited 6/21/05).

Lawrence Lessig, *The Problem With Patents* (The Standard, 23 April1999).

Steve Lohr**,** *Sharing the Wealth at I.B.M.* (The New York Times, 11 April 2005).

Michael S. Malone, *The Smother of Invention. The World's Most Important Patent Office is 200 Years Old and Showing Its Age* (Forbes Global, 24 June 2002).

Ingrid Marson, *Software Patent Directive Adopted* (ZDNet UK, 7 March 2005), <http://news.zdnet.co.uk/business/legal/0,39020651,39190497,00.htm> (last visited 6/21/05).

Olli Martikainen, *Innovaatioiden kolmas aalto lisää yhteentoimivuutta* (Tiedosta-lehti 2/2005). <http://www.tieke.fi/tiedosta-lehti/?ARTICLE_NUM=14275> (last visited 9/7/05).

Robert McMillan, *Developers Voice Mixed Reactions to IBM Patent Policy* (InfoWorld, 12 January 2005) <http://www.infoworld.com/article/05/01/12/HNpatentreaction_1.html> (last visited 6/21/05).

Arlen L. Olsen, *Patents Are Big Moneymaker These Days for Companies* (The Business Review, 11 August 2000).

Eric W. Pfeiffer, *Managing Your Knowledge. Companies Are Coining Intellectual Property* (Forbes Global, 24 June 2002).

Dorothy Pomerantz, *Get Katz. Telecom Patent King Ronald Katz Has Extracted $750 Million from Companies in Licensing Fees. They Want Him Stopped* (Forbes Magazine, 28 March 2005).

David Raymond, *How to Find True Value in Companies. Look for Patent Relevance to Pay Off* (Forbes Global, 24 June 2002).

Gary L. Reback, *Patently Absurd* (Forbes.com, 24 June 2002).

Teresa Riordan, *Patents; A Patent Owner Claims to Be Owed Royalties on Much of the Internet's Media Content* (The New York Times, 16 August 2004).

Zachary Roth, *The Patent Bubble* (Washington Monthly, June 2005) <http://www.washingtonmonthly.com/features/2005/0506.rothsidebar1.html> (last visited 29/9/05).

Brenda Sandburg, *You May Not Have a Choice. Trolling for Dollars. Patent Enforcers Are Scaring America and They Are Getting Rich – Very Rich – Doing It* (The Recorder, 30 July 2001), <http://www.phonetel.com/pdfs/LWTrolls.pdf> (last visited 6/21/05).

Roland H. Schwillinski & Benjamin Hershkowitz, *Are Major Changes in Store for the U.S. Patent System?* (IPFrontline.com, 4 November 2005), <http://www.ipfrontline.com/depts/article.asp?id=6969&deptid=8> (last visited 11/12/05).

Stephen Shankland, *Group: Linux potentially infringes 283 patents* (CNET, News.com, 1 August 2004) <http://news.com.com/Group%3A+Linux+potentially+infringes+283+patents/2100-7344_3-5291403.html> (last visited 6/21/05).

Lucy Sherriff, *Poland Halts Software Patent Directive* (The Register, 21 December 2004), http://www.theregister.co.uk/2004/12/21/patents_dropped/ (last visited 6/21/05).

R. P. Srikanth, *R&D Investments Are No Longer an Indicator of How Innovative a Company Is* (Express Computer, 31 January 2005) <http://www.expresscomputeronline.com/20050131/market08.shtml> (last visited 9/30/05).

Mark Shurmer & Gary Lea, *Telecommunications Standardization and Intellectual Property Rights: A Fundamental Dilemma?* (StandardView, Vol. 3, No. 2, June 1995, 50-59).

Yannis Skulikaris, *Software-Related Inventions and Business-Related Inventions, A Review of Practice and Case Law in US and Europe* (Patent World, Febuary 2001, 26-33).

Hal R. Varian, *Patent Protection Gone Awry* (The New York Times, 21 October 2004).

Rob Wherry, *Patent Peril, If You Thought Inventing Was Hard, Just Wait till You Try to Protect the Invention in Markets Across the Globe* (Forbes Global, 24 June 2002)

Jeremie Zimmermann, *Europe Struggles over Software Patents* (IEEE Spectrum, September 2004, 61-63).

## Reports and OECD Statistics

AIPPI Reports, Summary Report, *Question Q 157 The Relationship between Technical Standards and Patent Rights*, 2001 <http://www.aippi.org/reports/q157/q157-Summary-e.htm> (last visited 6/21/05).

Knut Blind, Jakob Edler, Ralph Nack & Joseph Straus, *Mikro- und makroökonomische Implikationen der Patentierbarkeit von Softwareinnovationen: Geistige Eigentumsrechte in derIinformatinstechnologie im Spannungsfeld von Wettbewerb und Innovation,* at XXII (Forschungsprojekt im Auftrag des Bundesministeriums für Wirtschaft und Technologie, Forcshungsauftrag 36/00, 2001) <http://www.computerundrecht.de/docs/computerprogrammen.pdf> (last visited 6/21/05).

Wesley M. Cohen and Steven Merrill (eds.) *Patents in the Knowledge-Based Economy* (National Academy Press, Washington, D.C. 2003).

- John R. Allison & Emerson H. Tiller, *Internet Business Method Patents*, 259-282.
- Stuart J. H. Graham & David C. Mowery, *Intellectual Property Protection in the U.S. Software Industry,* 219-258.
- Rosemarie Ham Ziedonis, *Patent Litigation in the U.S. Semiconductor Industry,* 180-216.
- Jean O. Lanjouw & Mark Schankerman, *An Empirical Analysis of the Enforcement of Patent Rights in the United States,* 143-179 .
- John P. Walsh, Ashish Arora & Wesley M. Cohen, *Effects of Research Tool Patents and Licensing on Biomedical Innovation* 285-340.

Commission on Intellectual Property Rights (CIPR)*, Integrating Intellectual Property Rights and Development Policy* (September 2002) <http://www.iprcommission.org/graphic/documents/final_report.htm> (last visited 9/5/05).

DLA, *European Intellectual Property Survey* (2004) <http://www.dlapiper.com/files/tbl_s47Details/FileUpload265/98/EuropeanIPSurvey.PDF> (last visited 8/32/05).

Federal Trade Commission (FTC), *To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy* (2003), <http://www.ftc.gov/os/2003/10/innovationrpt.pdf> (last visited 5/25/05).

Robert Hart, Peter Holmes & John Reid, *Study Contract ETC/99/B5-3000/E/106: The Economic Impact of Patentability of Computer Programs* (Report to the European Commission, October 19th 2000), <http://europa.eu.int/comm/internal_market/en/indprop/comp/study.pdf> (last visited 6/21/05).

Kati Lassila, *Ekvivalenssiselvitys; Patentin suojapiirin tulkinta Suomessa ja muissa maissa* (KTM Julkaisuja 22/2004, Elinkeino-osasto).

National Academy of Sciences (NAS), *A Patent System for the 21st Century* (April 2004) <http://www.nap.edu/books/0309089107/html/> (last visited 5/25/05).

OECD, *ICT patents as a percentage of national total (EPO) in selected countries, According to the residence of the inventors, by priority year 1991, 2000* <http://www.oecd.org/dataoecd/20/8/34083325.xls> (last visited 5/25/05).

OECD, *Key ICT indicators, Share of countries in ICT patents at the EPO, according to the residence of the inventors, by priority year* <http://www.oecd.org/dataoecd/20/9/34083345.xls> (last visited 6/20/05).

OECD, *Measuring the Information Economy 2002, Annex 1. The OECD Definition of the ICT Sector*, at 81 <http://www.oecd.org/dataoecd/34/37/2771153.pdf> (last visited 5/25/05).

OECD, *OECD Science, Technology and Industry Scoreboard 2003, Towards a Knowledge-Based Economy* (2003) <http://www1.oecd.org/publications/e-book/92-2003-04-1-7294/A.4.3.htm> (last visited 5/25/05).

OECD, *Patents and Innovation in the International Context*, (OCDE/GD(97)210, Paris 1997).

OECD, *Patents and Innovation: Trends and Policy Challenges* (2004), <http://www.oecd.org/dataoecd/48/12/24508541.pdf> (last visited 5/25/05).

PbT Consultants, *The Results of the European Commission Consultation Exercise on the Patentability of Computer Implemented Inventions* (2001) <http://europa.eu.int/comm/internal_market/en/indprop/comp/softanalyse.pdf> (last visited 6/21/05).

TEKES, *The Future is in Knowledge and Competence, Technology Strategy -a review of choices,* at 12 (June 2002) <http://www.tekes.fi/julkaisut/Tekes_Teknstrat_eng.pdf> (last visited 5/25/05).

Nicholas S. Vonortas, *Technology Licensing* (Final report, October 10, 2003), <http://www2.gwu.edu/~cistp/PAGES/licensing.pdf> (last visited 9/8/05).

World Economic Forum, *The Global Information Technology Report 2001-2002: Readiness for the Networked World.*

World Economic Forum, *The Global Information Technology Report 2003-2004.*

## Patent Offices and Other Official Organizations

*Act Revising the Convention on the Grant of European Patents* (MR/3/00 Rev.1e, Munich 29 November 2000) <http://www.european-patent-office.org/epo/dipl_conf/pdf/em00003a.pdf> (last visited 6/21/05).

*Basic Proposal for the Revision of the European Patent Convention* (MR/2/00 e, Munich 13 October 2000) <http://www.european-patent-office.org/epo/dipl_conf/pdf/em00002.pdf> (last visited 6/21/05)

*Betenkning angående nordisk patentlovutgivning,* NU 1963:6.

European Patent Office (EPO), *The EPO in figures* (2003) <http://annual-report.european-patent-office.org/2003/statistics/_pdf/epa_jb03_76_splitted.pdf> (last visited 6/20/05).

EPO, *Guidelines for Examination* (December 2003).

EPO, *Case Law of the Board's of Appeal of the European Patent Office* (December 2001, 4th edition).

EPO, *Legislative Initiatives in European Patent Law, EPLA – European Patent Litigation Agreement,* <http://patlaw-reform.european-patent-office.org/epla/> (last visited 9/3/05).

*Hallituksen esitys Eduskunnalle laiksi oikeudesta korkeakouluissa tehtäviin keksintöihin sekä laiksi oikeudesta työntekijän tekemiin keksintöihin annetun lain muuttamisesta* (HE 259/2004).

(Finnish) Patent office (PRH), *Myönnetyt patentit* (2004) <http://www.prh.fi/fi/patentit/tilastoja/patentit.html> (last visited 6/21/05).

PRH, *Päätös tietokoneella toteutettavia keksintöjä koskeviin patenttihakemuksiin liittyvästä PRH:n patentti- ja innovaatiolinjalla noudatettavasta käytännöstä*, Jan 14, 2003 <http://www.prh.fi//fi/uutiset/111.html> (last visited 6/17/05).

U.S. Department of Justice & Federal Trade Commission, *Antitrust Guidelines for the Licensing of Intellectual Property* (April 1995) <http://www.usdoj.gov/atr/public/guidelines/ipguide.htm> (last visited 6/21/05).

United Stated Patent and Trademark Office (USPTO), *Business Methods White Paper* (2000).

USPTO, *Examination Guidelines for Computer-Related Inventions* (1996).

USPTO, *U.S. Patent Statistics Chart Calendar Years 1963-2003* <http://www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.htm> (last visited 6/20/05).

USPTO, *White Paper, Automated Financial or Management Data Processing Methods (Business Methods)* (2000) <http://www.uspto.gov/web/menu/busmethp/index.html> (last visited 5/25/05).

WIPO, *Patent Law Treaty (PLT)* <http://www.wipo.int/patent/law/en/plt.htm> (last visited 9/2/05).

WIPO, *Substantive Patent Law Harmonization* <http://www.wipo.int/patent/law/en/harmonization.htm> (last visited 9/2/05).

## European Commission, Council and Parliament

Commission of the European Communities, *Commission Evaluation Report on the Transfer of Technology Block Exemption regulation No 240/96 Technology Transfer Agreements under Article 81* (COM(2001) 786 final, Brussels, 20 December 2001) <http://europa.eu.int/comm/competition/antitrust/technology_transfer/en.pdf> (last visited 6/21/05).

Commission notice: *Guidelines on the application of Article 81 of the EC Treaty to Technology Transfer Agreements* (Official Journal C 101 of 27.04.2004) <http://europa.eu.int/eur-lex/pri/en/oj/dat/2004/c_101/c_10120040427en00020042.pdf> (last visited 6/21/05).

European Commission (EC), *Green Paper on Innovation* (COM(95) 688, December 1995).

European Commission, *Green Paper on the Community Patent and the Patent System in Europe* (COM(97) 314, June 1997).

European Commission Press Releases, *Industrial Property: Commission Proposes Establishing Community Patent Court,* IP/04/137, (Brussels, 2 February, 2004) <http://europa.eu.int/rapid/pressReleasesAction.do?reference=IP/04/137&format=HTML&aged=0&language=EN&guiLanguage=en> (last visited 6/21/05)

European Commission, *Innovation Policy in Europe 2001* (European Trend Chart on Innovation, Innovation Papers No. 17) <http://trendchart.cordis.lu/annualreports/innovation%20policy%20europe%202001%20en.pdf> (last visited 9/19/05).

Commission of the European Communities (EC), *Proposal for a Council Regulation on Community Patents* (COM(2000) 412 final, 2000/017 (CNS), Brussels, 1 August 2000).

Commission of the European Communities, *Proposal for a Directive of the European Parliament and the Counsil on the Patentability of Computer-implemented Inventions* (COM (2002) 92 Final, Brussels, February 2002), <http://europa.eu.int/comm/internal_market/en/indprop/comp/com02-92en.pdf> (last visited 6/21/05).

The European Commission, *Proposal for a Directive on the Patentability of Computer-implemented Inventions – frequently asked questions* (20 February 2002) <http://europa.eu.int/comm/internal_market/en/indprop/comp/02-32.htm> (last visited 6/21/05).

Commission of the European Communities, *Report from the Commission to the European Parliament and the Council, Development and Implications of Patent Law in the Field of Biotechnology and Genetic Engineering* (COM(2002) 545 final, Brussels, 7 October 2002).

Commission of the European Communities, Communication from the Commission, *The Role of Universities in the Europe of Knowledge* (COM(2003) 58 final, Bruessels, 5 February 2003) <http://europa.eu.int/eur-lex/en/com/cnc/2003/com2003_0058en01.pdf> (last visited 10/3/05).

Counsil of the European Union, *Interinstitutional file: 2002/0047 (COD)* at 8, (Brussels, 8 November 2002) <http://register.consilium.eu.int/pdf/en/02/st14/14017en2.pdf> (last visited 6/21/05).

Counsil of the European Union, *Interinstitutional File: 2002/0047 (COD)* (Brussels, 10 May 2005) <http://register.consilium.eu.int/pdf/en/04/st09/st09277-ad01.en04.pdf> (last visited 6/21/05).

Counsil of the European Union*, Interinstitutional File: 2002/0047 (COD)* (Brussels, 24 May 2004) <http://register.consilium.eu.int/pdf/en/04/st09/st09713.en04.pdf> (last visited 10/12/04).

Arlene McCarthy, *Patentability of Computerised Inventions* (PAR2, Parlement Européen, Ref: 03A_DN(2003)09-24, debate 23.9.2003, vote 24.9.2003) <http://www2.europarl.eu.int/registre/presse/debat_du_jour_daily_notebook/2003/en/03A_DN(2003)09-24(PAR2)_EN.doc> (last visited 6/21/05)

*Position of the European Parliament Adopted at First Reading on 24 September 2003 with a View to the Adoption of Directive 2003/…./EC of the European Parliament and of the Council on the Patentability of Computer-implemented Inventions* (24 September 2003) <http://www2.europarl.eu.int/omk/sipade2?PUBREF=-//EP//TEXT+TA+P5-TA-2003-0402+0+DOC+XML+V0//EN&L=EN&LEVEL=3&NAV=S&LSTDOC=Y> (last visited 6/21/05).

Michel Rocard, *No Directive on Software Patents* (European Parliament, *Report on the Council Common Position for Adopting a Directive of the European Parliament and of the Council on the Patentability of Computer-implemented Inventions (11979/1/2004 – C6 0058/2005 - 2002/0047(COD*), July 6, 2005) <http://www2.europarl.eu.int/omk/sipade2?PUBREF=-//EP//TEXT+PRESS+DN-20050706-1+0+DOC+XML+V0//EN&L=EN&LEVEL=2&NAV=X&LSTDOC=N#SECTION1> (last visited 9/3/05).

## Conferences and Workshops

Anthony Arundel & Pari Patel, *Strategic Patenting* (Background Report for the Trend Chart Policy Benchmarking Workshop New Trends in IPR Policy European, Trend Chart on Innovation, Luxemburg, 3-4 June, 2003).

Federal Trade Commission (FTC), *Patent Reform Workshop* (The Ideas Into Action: Implementing Reform of the Patent System Conference, Berkeley, 15-16 April 2004) <http://www.law.berkeley.edu/institutes/bclt/patentreform/transcripts/BCLT_Patent_Transcripts.pdf> (last visited 6/21/05).

Mette Gortz & Merete Konnerup, *Welfare Effects of Patent Insurance – Microeconomic Evaluation and Macroeconomic Consequences* (Policy Modelling for European and Global Issues –conference, Brussels, June 2001).

Olli Martikainen, *All-IP Trends in Telecommunications* (International Workshop NGNT 2002) <http://saturn.acad.bg/bis/pdfs/01_doklad.pdf> (last visited 5/25/05).

Jerry A. Riedinger, *Building Fences in Cyberspace: Business Method Patents and The Internet*, *Analysis of Recent Internet/E-Commerce Business Method Patents* (prepared for the Practicing Law Institute Program on Patenting the New Business Model, Building Fences in Cyberspace, 16 June 16 2000).

Scott K. Peterson, *Consideration of Patents during the Setting of Standards* (For FTC and DOJ Roundtable, Standard Setting Organizations: Evaluating the Anticompetitive Rules of Negotiating Intellectual Property Licensing Terms and Conditions before a Standard is Set, 6 November 2002).

Robert Pitofsky, *Challenges of the New Economy: Issues at the Intersection of Antitrust and Intellectual Property* (American Antitrust Institute Conference: An Agenda for Antitrust in the 21st Century, National Press Club, Washington, D.C. 15 June 2000).

Risto Sarvas & Aura Soininen, *Differences in European and U.S. Patent Regulation affecting Wireless Standardization* (International Technology and Strategy Forum, Workshop on Wireless Strategy in the Enterprise: An International Research Perspective, Berkeley, 15-16 October 2002).

Aura Soininen & Pia Hurmelinna, *Patent Strategies and Licensing Practices in Closed versus Open Innovation Models* (R&D Management Conference, Pisa, 6-8 July 2005).

Herbert C. Wamsley, *Achieving Additional Harmonization of Patent Laws* (Opening Statement at USPTO Public Roundtable Discussion, 19 December 2002) <http://www.uspto.gov/web/offices/com/speeches/openingst121902.htm> (last visited 6/21/05).

## Oral Presentations

Vince DePalma (DMF & Associates), *Process Packaging Technology* (IP Society, *Licensing Semiconductor IP Seminar*, Palo Alto, 3 June 2004).

Robert R. Kimball (RealNetworks Inc.), *General Counsel Roundtable – How Do E-Commerce Best Practices Evolve?* (Stanford Ecommerce Best Practices Conference, 25 June 2004).

Olli Martikainen, *Innovaatioiden kolmas aalto* (TeliaSonera Finland Research Foundation, Award event, 4 April 2005).

Ron Laurie (Inflexion Point Strategy, Ltd), *IP Valuation – Magic or Myth* (IP Society, *Intellectual Property Issues in M&A Transactions Seminar*, Palo Alto, 29 April 2004).

Ron Laurie (Inflexion Point Strategy, Ltd), *The role of Claims Construction in Patent Valuation* (IP Society, *Advanced Topics in IP Valuation Seminar*, Palo Alto, 13 July 2004).

Kent Richardson (Rambus, Inc), *Patent Licensing in the Semiconductor Industry* (IP Society, *Licensing Semiconductor IP Seminar*, Palo Alto, 3 June 2004).

Patrick H. Sullivan (ICMG), *The Valuation Paradox* (IP Society, *Advanced Topics in IP Valuation Seminar*, Palo Alto, 13 July 2004).

## Other

Biology-online.org, <http://www.biology-online.org/dictionary/ecosystem> (last visited 9/1/05).

Ericsson AB, *Evolution towards All-IP: the Service Layer* (White Paper 2005) <http://www.ericsson.com/products/white_papers_pdf/evolution.pdf> (last visited 5/25/05).

Grain, *One Global Patent System? WIPO's Substantive Patent Law Treaty* (October 2003) <http://www.grain.org/briefings_files/wipo-splt-2003-en.pdf> (last visited 9/3/05).

FFII, *Top EPO Software Patent Applicants 1978-2003* <http://swpat.ffii.org/patents/stats/index.en.html#jarappl> (last visited 5/25/05).

Annika Havaste, *Patenttiriitojen määrä ja oikeudenkäyntikulut patenttiasioissa* (in Sampo Teollisuusvakuutus, Vastuutiedote 3/2001).

Curtis R. Harrington, *Computer-program Patentability Update* (Reed Business Information, June 12, 1995) <http://www.manufacturing.net/dn/index.asp?layout=article&articleid=CA151434> (last visited 6/21/05).

HP, *Intellectual Property Licensing* <http://www.hp.com/hpinfo/abouthp/iplicensing/> (last visited 6/21/05).

IEEE Standard Glossary of Software Engineering Terminology (1990)

IPWatchdog.com, *Software Patents* (2003) <http://www.ipwatchdog.com/softwarepatents.html> (last visited 6/21/05).

League for Programming Freedom, *Against Software Patents* (28 February 1991) <http://lpf.ai.mit.edu/Patents/against-software-patents.html> (last visited 9/30/05).

Learnthat.com <http://www.learnthat.com/define/view.asp?id=302> (last visited 9/1/05).

Nolo, *Obtaining a Business Method Patent* (2005) <http://www.nolo.com/lawcenter/ency/article.cfm/objectID/C2DBFF26-7097-4B7B-AE36DA00499851EE> (last visited 6/21/05).

Open Source Initiative <http://www.opensource.org/docs/definition_plain.php> (last visited 6/14/05).

Patent Commons Project <http://www.patent-commons.org/> (last visited 9/30/05).

Red Hat, Inc, *Statement of Position and Our Promise on Software Patents* (2004) <http://www.redhat.com/legal/patent_policy.html> (last visited 6/21/05).

Software History Center, *The Software Industry in the 1970s*, <http://www.softwarehistory.org/history/d_70s.html> (last visited 6/17/05).

Kara K. Smith & Duane K. Schroeder, *Intellectual Property Holding Companies Can Create Significant Tax Savings and Protect Valuable Assets* (Fredrikson & Byron P.A., April 2003)) <http://www.fredlaw.com/articles/ip/inte_0304_kks.html> (last visited 6/21/05).

Southern Illinois University Carbondale, Office of Research Development and Administration (ORDA), *Glossary of Research terms* <http://www.siu.edu/orda/general/glossary.html> (last visited 5/25/05).

Webopedia <http://www.webopedia.com/TERM/E/embedded_system.html> (last visited 6/7/05).

## Case Law

### Case Law of U.S. Courts and Competition Authorities

American Photocopy Equipment Co v. Rovico, Inc, 384 F.2d 813, 11 Fed.R.Serv.2d 777, 155 U.S.P.Q. 119 (CAIll, 22 August 1967).

Diamond v. Chakrabarty, 447 U.S. 303, 100 S.Ct. 2204, 65 L.Ed.2d 144, 206 U.S.P.Q. 193 (Supreme Court, 1980).

Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd. 535 U.S. 722, 122 S.Ct. 1831 (Supreme Court, 2002).

Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd. 344 F.3d 1359, 68 U.S.P.Q.2d 1321 (Fed.Cir., 2003).

Gottchalk v. Benson, 409 U.S. 63, 93 S.Ct. 253, 34 L.Ed.2d 273, 175 U.S.P.Q. 673 (Supreme Court, 1972).

Hotel Security Checking Co. v. Lorraine Co. 160 F. 467, 24 L.R.A.N.S. 665, 87 C.C.A. 451 (2d Cir. 10 March 1908).

In the Matter of Dell Computer Corporation, Decision and Order, Docket No. C-3658 (FTC, 20 May 1996).

In the Matter of Rambus Incorporated, Initial Decision, Docket No. 9391 (FTC, 23 February 2004).

In the Matter of Union Oil Company of California, Opinion of the Commission, Docket No. 9305 (FTC, 27 July 2005).

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

In re Independent Service Organizations, 203 F.3d 1322, 2000-1 Trade Cases P 72,795, 2000 Copr.L.Dec. P 28,026, 53 U.S.P.Q.2d 1852 (Fed. Cir., 2000).

Madey v. Duke University, 307 F.3d 1351, 170 Ed. Law Rep. 164, 64 U.S.P.Q.2d 1737 (Fed. Cir. 2002).

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

**Case Law of European Patent Office Boards of Appeal**

ATT/System for generating software source code (T 204/93).

CATALINA/Discount certificates decision (T 531/03).

HITACHI/Auction method decision (T 258/03).

IBM/Computer program product (T 1173/97).

IBM/Computer program product (T 935/97).

IBM/Text Processing (T 38/86).

Koch & Sterzel/X-ray apparatus decision (T 26/86).

PBS Partnership/Controlling pension-benefits system (T 931/95).

RICOH/Order management (T 172/03).

**Case Law of the European Court of Justice**

IMS Health GmbH & Co KG v. NDC Health, Case C-418/01[2004] 4 CMLR1543 (preliminary ruling).

Radio Telefis Eireann (RTE) and Independent Television Publications Ltd (ITP) v Commission, Joined cases C-241 and 242/91P, [1995] ECR 1-743, [1995] 4 CMLR 718. ("Magill").

Volvo AB v. Erik Veng (U.K.) Ltd, Case 238/87 [1988] ECR. 6211 [1989] 4 CMLR. 122.

**Appendix 1**

Interview data; Finnish ICT companies that have patents

| Revenue | Number of Companies |
|---|---|
| €0 –100 000 | 2 |
| €100 000 – 1 M | 1 |
| €1 – 50 M | 2 |
| €50M – 1 billion | 1 |
| €1 – 7 billion | 3 |
| €7 – 25 billion | 1 |
| over €25 billion | 1 |
| Table 1. Revenue (2002) | |

| Personnel | Number of Companies |
|---|---|
| 1 – 5 | 1 |
| 6 – 20 | 1 |
| 21 - 100 | 1 |
| 100 - 500 | 2 |
| 500 – 3000 | 1 |
| 3000 – 10 000 | 2 |
| 10 000 – 30 000 | 2 |
| Over 30 000 | 1 |
| Table 2. Personnel | |

| Country | Number of Companies |
|---|---|
| Finland | 11 |
| Other Scandinavian countries | 9 |
| Germany | 8 |
| Great Britain | 6 |
| United States | 5 |
| China | 4 |
| Baltic countries | 6 |
| Benelux countries | 5 |
| Japan | 3 |
| France | 3 |
| Middle East | 2 |
| Examples of some other countries of operation: Russia, Kazakhstan, Ukraine, Slovakia, Czech Republic, Switzerland, Italy, Thailand, Brazil, and Poland | |
| Table 3. Countries of Operation | |

| Patent Applications/patent families | Number of Companies |
|---|---|
| 0 – 5 | 6 |
| 6 – 30 | 2 |
| 31 – 2000 | 2 |
| over 2000 | 1 |
| Table 4. Number of patent applications and patent families (patents concerning the same invention) | |

**Appendix 2**

Interview data; Finnish ICT companies that have no patents

| Revenue | Number of Companies |
|---|---|
| €100 000 – 1 M | 4 |
| €1 – 3M | 3 |
| Over €20 M | 1 |

Table 5. Revenue (2002)

| Personnel | Number of Companies |
|---|---|
| 1 – 5 | 3 |
| 6 – 20 | 2 |
| 21 - 100 | 2 |
| 100 - 500 | 1 |

Table 6. Personnel

# PART III: SPECIFIC PART

# PUBLICATION 2

Aura Soininen

**Patents and Standards in the ICT Sector:**
**Are Submarine Patents a Substantive Problem or a Red Herring?**

International Journal of IT Standards and Standardization Research (IJITSR)
Special Issue: Papers Presented at the 4th International Conference on
Standardization and Innovation in Information Technology (SIIT2005)
Volume 5, Issue 1, January-June 2007, 41-83

Invited publication/Extended version of the peer-reviewed conference paper titled
"Open Standards and the Problem with Submarine Patents"

Minor modifications have been made to the original publication,
and it has been formatted to fit the style of this dissertation.
Following the original publication, APA style referencing is used.

# PATENTS AND STANDARDS IN THE ICT SECTOR: ARE SUBMARINE PATENTS A SUBSTANTIVE PROBLEM OR A RED HERRING?

Aura Soininen*

**Abstract**

*Multiple cases have been reported in which patents have posed dilemmas in the context of cooperative standard setting. Problems have come to the fore with regard to GSM, WCDMA, and CDMA standards, for example. Furthermore, JPEG and HTML standards, as well as VL-bus and SDRAM technologies, have faced patent-related difficulties. Nevertheless, it could be argued that complications have arisen in only a small fraction of standardization efforts, and that patents do not therefore constitute a real quandary. This article assesses the extent and the causes of the patent dilemma in the ICT sector through a brief analysis of how ICT companies' patent strategies and technology-licensing practices relate to standard setting and by exemplifying and quantifying the problem on the basis of relevant articles, academic research papers, court cases and on-line discussions. Particular attention is paid to so-called submarine patents, which bear most significance with respect to the prevailing policy concern regarding the efficacy of the patent system.*

* This paper appears in International Journal of IT Standards and Standardization Research, Volume 5, Issue 1 edited by Kai Jacobs. 

## CONTENTS

# I. INTRODUCTION

## A. BACKGROUND

Our society is filled with various types of standards, commonly agreed ways of doing things. Standards may be socio-cultural, political, economic, or technical. Language is a standard, the metric system is a standard, and so is our social etiquette (Cunningham, 2005). Technical standards could be defined as any set of technical specifications that either provide or are intended to provide a common design for a product or a process. They range from a loose set of product characterizations to detailed and exact specifications for technical interfaces. Some of them control product interoperability, some ensure quality or safety, and some are so-called measurement standards (Grindley, 2002).

Particularly interoperability/compatibility standards are paramount in industries such as information and communications technology (ICT) that are dependent on interconnectivity. In fact, the telecommunications industry has relied on them throughout its history. These standards define the format for the interface, allowing different core products, often from different manufacturers, to use the same complementary goods and services, or to be connected together as networks (Grindley, 2002; Teece, 2000). Thus, interoperability standards enable gadgets to work together and thereby they further the goal of increased communicative potential. This follows that their use may also lead to financial benefits due to so-called network externalities (Cunningham, 2005; Shurmer & Lea, 1995). These strong network effects are present when a product or a service becomes more valuable to users as more people use it. Examples of products that benefit from network effects include e-mail, Internet access, fax machines, and modems. (Shapiro & Varian, 1999).

A further economic effect of interoperability standards is that they reduce the switching costs from one supplier to another by preventing producers and consumers from being locked into a proprietary system. Standards, however, do not totally eliminate switching costs. When producers and users become committed to a particular system or standard, and the longer they stay with it, the more expensive and difficult it is for them to switch to another that is comparable (Blind, 2004). Consequently, due to these strong economic effects, control of the outcome of standard setting may yield significant economic advantage on the sale of both core and related products (Hjelm, 2000). Patents that provide their holders with a defined right to prevent others from making, using and selling an invention can be used to gain that leverage or to control the adoption of a standard. Therefore, potential conflicts between patent rights and the need for standardization affect the ICT industry and the consumers at large, and these economic effects need to be bared in mind when examining the deficiencies of prevailing standard-setting procedures and the legal framework.

This article studies the patent-related dilemmas that may arise both in the course of standard setting and after the standard has been established. Potential conflicts and their causes are identified and exemplified on specific case studies, and the study of Blind, Bierhals, Thumm, Hossain, Sillwood and Iverser (2002) is used to quantify the problems further. The aim is to find out whether the problem with patents, particularly with so-called submarine patents, is substantial, or whether it is only a minor concern that has attracted undeserved attention. Term "submarine patent" is used here for patent applications and patents that may yield significant economic power because they "read on" a standard and come to the fore after it has been established.

### (i) Standardization and Patents in General

Standards can be established in many ways: the markets determine *de facto* standards, and organized standards bodies agree upon *de jure* standards. These bodies could be said to include government legislators, official standards organizations, various industry committees and consortia. Unlike de facto standards, de jure standards are usually established in advance and are later implemented by multiple vendors (Grindley, 2002; Messerschmitt & Szyperski, 2003; Mueller, 2001).

Standards emerge from all the sources in the ICT sector listed previously. The Internet Society (ISOC), The Organization for the Advancement of Structured Information Standards (OASIS), The World Wide Web Consortium (W3C), and The Internet Engineering Task Force (IETF) could be mentioned as examples of bodies active in the field of software and the Internet. Then again, The European Telecommunications Standardization Institute (ETSI), The American National Standardization Institute (ANSI), The International Telecommunications Union (ITU) and The International Organization for Standardization (ISO) could be mentioned as organizations operating in the telecommunications industry (Rahnasto, 2003).

A further distinction is that between open and proprietary standards. The purpose of open standards is to provide an industry with well-documented open specifications that could be implemented without prior business and legal arrangements (Caplan, 2003; Messerschmitt & Szyperski, 2003). Furthermore, with open standards, unlike proprietary standards, development of the specification is open to participants without restrictions. The openness may not always be absolute, however, and as a consequence the term "open standards" has various interpretations in practice (Caplan, 2003; Messerchmitt & Szyperski, 2003). In fact, although patent-free standards have traditionally been preferred in the interests of ensuring their success and promoting their use, it has become more difficult to design standards that do not contain any patentable inventions. This holds true particularly when the aim is to choose pre-eminent technology for a standard (Frank, 2002; Soininen, 2005). Therefore, it is not rare to call a standard open even if it includes patented technology providing that licenses are accessible to all. This definition has been adopted in this article as well.

As to the connection between de facto and de jure standards and open and proprietary standards, privately set de facto standards are typically proprietary in nature (Lemley, 2002) meaning that the patent holder controls their utilization. Then again, official standards organizations typically promote open standards, and those originating from various industry groups and consortia may fall in either category or somewhere in between depending on whether everyone has been able to participate in the selection of the technical specification, or whether the standard has been agreed upon by a handful of companies having the technical knowledge in the area and who then have it adopted throughout the industry (Rahnasto, 2003). The focus of this article is on open, commonly agreed de jure standards.

As said earlier, although open standards are in principle available for anyone to use proprietary technology may be involved in their implementation, and using the specification may require a license (Rahnasto, 2003). Consequently, many official standards organizations and also some consortia have policies that permit their members to contribute proprietary technology under certain conditions: disclosure of the contributor's essential patents may be required, and before the technology is elected, patent holders are asked whether they are willing to offer a license at least on a non-discriminatory basis and on fair and reasonable terms (Frank, 2002). The purpose

is to protect the patent holder's interests while fostering standards that incorporate the best technology and have the capacity for worldwide promulgation (Berman, 2005; Soininen, 2005). These organizations are called together as "standards bodies" or "standards organizations" from now on.

From the companies' perspective the dilemma between patents and open standards arises from the need to ensure returns on R&D investments through the exclusion of others while interoperability requires the inclusion of other parties. In fact, patent holders are free to refuse licensing altogether or they may choose the licensees and the licensing terms freely as long as the practice complies with relevant legislation, such as competition/antitrust regulation. Thus, companies appear not to be very willing to license their patented technologies to everyone, particularly not to their competitors, on a royalty-free basis or for low returns. It seems, however, that in the context of common standards a limited exception can often be made for business reasons (Interview data U.S., 2004). Indeed, the use of common protocols and interfaces may expand the markets for networks of products that implement them, and producers then compete by innovating on top of the standardized functions (Peterson, 2002a). Nonetheless, even if a company decided to take part in standard setting, the interests of firms, individual contributors and users participating diverge and patents may be utilized strategically to achieve patent holder's objectives. Consequently, the standardization process may turn out to be burdensome as the mere existence of vested interests, *e.g.,* intellectual property rights (IPRs), complicates matters (Farrell, 1996; Shurmer & Lea, 1995; Soininen, 2005). Identifying relevant patents and agreeing on their licensing cause complications and delays to the standardization process.

The relationship between ICT companies' patent strategies and technology licensing practices discussed earlier is in general and in respect to open standards one of the main questions that needs to be addressed further in order to find an explanation to why it is that patents may raise such thorny issues in respect to standards. Moreover, attention has to be paid to the standards organizations' practices and bylaws aimed at reducing that tension in practice.

### (ii) Standardization and Submarine Patents

As mentioned earlier, different types of standards bodies play an important role in establishing standards in the ICT sector, and many of them allow patented or patentable technology to be submitted, but specifically require disclosure of the patents and occasionally even of pending patent applications during the standardization process, as well as a promise of their licensing. This is to clarify relevant rights during the process of standard development and reduce the risks of submarine patents so that patent holders cannot claim infringements afterwards, and thereby prevent others from using a standard, or to extract overly high licensing fees. If all essential, relevant rights are clarified during the process, a well-informed decision can be made (Kipnis, 2000). It might also be possible to design around the identified patents and patent applications, or to choose another technology for a standard. In fact, since patent-free standards are often the first choice, disclosure may have a negative effect on what technology is chosen (Soininen, 2005). For instance, when selecting the GSM standard another viable option was apparently rejected because it was considered too proprietary (Bekkers, Verspagen & Smits, 2002).

Since proprietary technology may easily be discriminated, companies may even have an incentive to manipulate the standardization process and hide the fact that they have relevant patents. Standardization namely gives patents market power they did not have before (Rahnasto, 2003), which in turn improves the holder's negotiation position following the election and adoption of a

standard. Furthermore, the disclosure requirement has its shortcomings and therefore companies may not even need to break the rules to capture an industry standard. The disclosure requirement is not necessarily extended beyond the personal knowledge of the individual participant, it may not be practically possible for a company to clarify all the patents and patent applications, and the obligation does not always cover pending patent applications, especially unpublished ones (Lemley, 2002). Consequently, a large share of the rights is not necessarily considered during the standardization process. Moreover, since standard setting may take a long time, many years in some cases, undertakings usually continue their R&D projects and file more and amend their existing patent applications during that period. Therefore, if the obligation to disclose does not hold throughout the standard setting, it is even more likely that patents will surface after it has been established (Soininen, 2005).

The optimal scope of the disclosure requirement, what happens if the guidelines are breached, and what course of action should be taken if there was no contractual duty or even a recommendation to disclose patents or pending applications and a patent surfaces after the adoption of the standard, remain matters for debate both outside and inside the courts. The submarine-patent risk stemming partially from non-disclosure also involves third-party patents. Indeed, as Lemelson's submarine-patent tactic has demonstrated, it is ideal from the patent holder's perspective to have a patent claiming technology that becomes widely adopted within an industry (Soininen, 2005). In fact, the submarine-patent scenario could be said to have become more probable in recent years as numerous cases have been reported in which, despite efforts to identify relevant patents, claims have surfaced after the standard has been agreed upon (Blind et al., 2002). Furthermore, the importance of patents in business has increased in many respects and the legal framework constituting of patent laws and competition/antitrust regulation that may pose limits to the utilization of patents could also be described as pro-patent even though the system has been severely criticized (FTC, 2003, OECD, 2004). This has resulted not only in a higher number of applied-for and granted patents, but also in more aggressive enforcement and increases in technology licensing, bare patent licensing and cross-licensing, which in turn has the potential of generating more conflicts (Peterson, 2002). In fact, it appears that there is an increase in all types of patent claims and charges that relate to standards, and particularly in telecommunications, negotiations over such matters cause delays in the development of standards worldwide (Krechmer, 2005). Therefore it is essential to study the patent landscape in the ICT sector further, take a closer look at realized disputes and examine the loopholes of the system. Only by understanding how it is failing, it is possible to implement better practices.

### (iii) Standardization and Licensing

There is another quandary involving patents and standards in addition to the submarine-patent dilemma described earlier, and that has to do with licensing. This dilemma relates mainly to the mainstream obligation to license one's essential patents on fair, reasonable and non-discriminatory terms (RAND). The problem is that this promise may be limited in firms' patent statements in various ways, resulting in unexpected hold-ups. Companies may, for example, agree to license only patents that are essential for using that portion of the standard they have suggested, or they may impose limits by stating that licenses are available to any qualified applicants (Frank, 2002; Rahnasto, 2003). One typical qualification is that licenses are offered only to companies that offer reciprocal treatment or promise not to threaten patent litigation against the licensing company (Berman, 2005). Moreover, specific licensing terms are not typically agreed upon during the standardization process so that the standards organization would play a role in it (Kipnis, 2000). Each company negotiates terms separately, which allows it to

apply its own interpretations of what is considered fair, reasonable and non-discriminatory. (Frank, 2002; Rahnasto, 2003; Soininen, 2005) In fact, it is for this reason that manufacturers participating in standards committees may even be forced to delay the standards development in order to negotiate acceptable terms before the final vote. The worst-case scenario is that the sum of license fees exceeds the total profit available to a product manufacturer, and that the standard never becomes adopted (Krechmer, 2005). Ultimately, consideration of the fairness, reasonableness and non-discriminatory nature of the terms is left to the courts (Soininen, 2005). So far, however, the courts have not provided proper guidelines on how to determine what is fair, reasonable and non-discriminatory (Rahnasto, 2003).

Thus, the problems related to the adoption of standardized technology may have to do with disagreement over the content of a company's licensing statement, even in the absence of submarine patents. One might even wonder, considering the large number of patents that are being reported as essential in the course of standardization, whether the disclosure obligation bears any significance in practice. Therefore, it is not enough to concentrate merely on the submarine-patent problem and its causes when there is a possibility that limiting that particular risk might have only minimal effect.

## B. RESEARCH OBJECTIVE AND METHODOLOGY

Standard setting is the cornerstone of today's economy, and it is essential particularly in the ICT sector. The most important feature of open standards is that they have the potential to become widely promulgated and used without undue restriction: this is essential to their success and to the very idea of something being or becoming a standard. Patents may, however, be used exclusively and therefore they may jeopardize the purpose for which standards have been created. Indeed, submarine patents as well as perplexity regarding proper licensing terms may result in increased costs in the form of excessive licensing fees, or they may force the industry to abandon the standard altogether meaning that the societal benefits may be lost. Since patents help companies to gain leverage over the standard-setting procedure and the adoption of the standard, potential dilemmas addressed in this article are also a policy concern. One may ask particularly in the context of so-called submarine patents whether the patent system fulfils its goal. These patents have factually been hidden and thus they have not contributed to technological development of that specific industry, as is the purpose of the patent system.

This article examines the patent-related dilemmas and analyses their causes by exemplifying and quantifying them on the basis of newspaper stories, online articles, research papers, and trial documents. Further data was collected from interviews with eleven Finnish ICT companies and eight U.S. ICT companies in order to illustrate the relationship between patent strategies and licensing practices in general and in the context of standard setting. The interviews with the Finnish companies focused on patent strategies and were conducted by the author in 2003. Those with U.S. companies based in the San Francisco Bay Area, CA, were more general and related to their innovation models, appropriability strategies and licensing practices. They were conducted by the author in cooperation with Pia Hurmelinna-Laukkanen and were completed in 2004. The interviewed firms included different types of ICT companies operating in the fields of information technology (software, hardware and related services for different purposes), chip interface technology, audio technologies, and digital entertainment products designed for computers and the Internet, and telecommunications. It should be noted that most of the U.S. case companies were larger than the Finnish companies, their revenues spanning from $ 60

million to $19 000 million. Furthermore, the size of their patent portfolios was substantially larger and varied mostly between 300 and 2000 issued patents (one of the companies did not have patents at all). Only one Finnish company had a substantial portfolio of over 5000 issued patent families, two of them had a medium-sized portfolio of approximately 60 issued patent families and close to 200 pending applications, and the rest had less than 10 issued patents/pending patent applications. The U.S. companies were also more actively involved in standard setting than the Finnish companies.

Obviously, it is difficult to make generalizations on the basis of such limited data. Thus, the data are used to complement other studies and views presented in the literature. In some cases, however, there were common features applicable to all of the firms, or several of them were found to have certain common denominators. Then again, some of the results are presented as examples of corporate operational models. One reason for this is that the interviews were in-depth in nature, meaning that the discussion was sometimes focused more on certain areas, and it would not therefore be possible to say whether the expressed views were common to all of the companies or not. Furthermore, in some situations less than 8 (U.S.) or 11 (Finnish) companies yielded relevant data: only a few companies in the Finnish sample were involved in setting standards. In the following, I refer to the interview data as interview data U.S. (2004) and interview data Finland (2003).

I will start by re-examining the submarine-patent concept because the original meaning of submarine patents has largely disappeared as a result of legislative amendments. Nevertheless, certain aspects of the current patent law still contribute to their existence. I will then study ICT companies' patent strategies and technology licensing practices in order to demonstrate the general developments in the area and tensions between proprietary and open operation models and their implications on standardization. After that I will review the disclosure and licensing challenges that have been reported in the context of standardization and patents, and examine the likelihood of such conflicts. I conclude the article by considering the extent of the problems and whether the submarine-patent problem really exists and can be limited, or whether it is merely a red herring that needs no further attention. It should however be noted that the sufficiency and flexibility of the prevailing legal framework applicable to solving potential conflicts is not particularly examined in this article even though it is clear that applicable legal tools influence companies' negotiation power, and thereby their behavior during and after standard setting. These legal tools could also prove helpful in minimizing the harmful societal effects of submarine patents. This type of in-dept analysis would be the next phase following the recognition of the prevailing problem, its magnitude and main causes.

## II. THE ORIGINS OF SUBMARINE PATENTS

The term submarine patent has been traditionally used to refer to (U.S.) patents that are issued after a long, intentionally delayed pendency at the patent office. The purpose of prolonging the application period by filing continuation applications, for example, has been to keep the invention secret as long as necessary for the industry to mature on the basis of the technology. When the industry is faced with the challenge of changing the technology, the patent is allowed to be issued, and the patent holder is in a position to prevent others from utilizing the invention and to demand royalties from those who began to use the technology while the application was pending (Heinze, 2002). Indeed, in the U.S. it is possible to file continuation applications and to preserve the priority date of the parent application as long as the parent application and the following continuation application disclose the same invention. There are no limitations on how many times a parent application can be continued (Graham & Mowery, 2002). The application period may thus last over a decade, and all this may happen even if the patent has not made any contribution to the development of the technology it covers: if it has been secretly pending for a long time, no-one has had the opportunity to find out about the invention, design alternative technologies, or develop the patented technology further. Thus, the trade-off between the inventor (the right to exclude others) and society (detailed information about the invention), the keystone of the patent system, is not in balance (Soininen, 2005). Figure 1 illustrates the popularity of continuations in relation to software and other patents in the U.S.

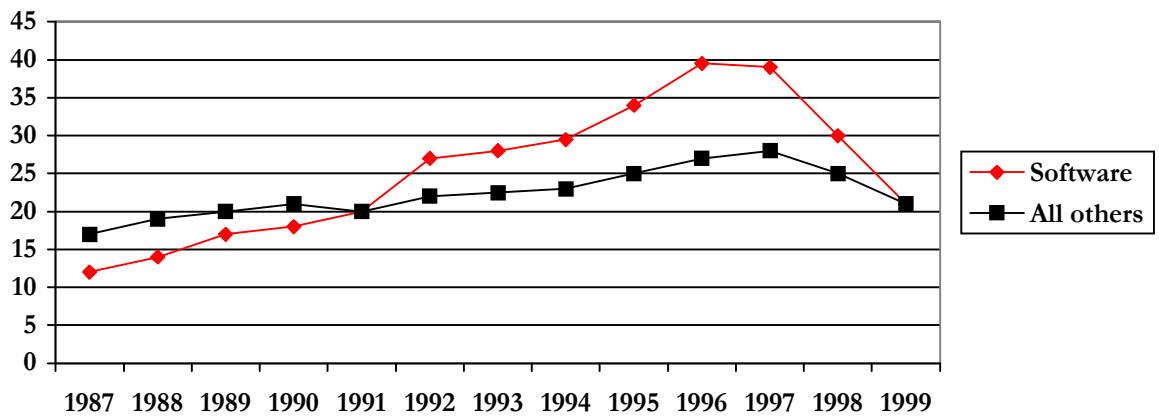



**FIGURE 1.** CONTINUATION PATENTS AS A PROPORTION OF ISSUED PATENTS: SOFTWARE PATENTS COMPARED WITH ALL OTHER PATENTS, 1987-1999 (GRAHAM & MOWERY, 2002)

It is clear from the statistics in Figure 1 that continuations are filed frequently. Nevertheless, submarine patents as defined earlier are rare. In many cases it is inefficiency in the patent office that causes long delays rather than intentional postponement on the patentee's part (Ferguson, 1999). Nonetheless, Jerome Lemelson's patents in particular, issued after decades of pendency at the patent office, have attracted a lot of public attention (Vanchaver, 2001; Stroyd, 2000). Lemelson, who was above all a visionary who anticipated where technology was heading, applied for patents for inventions that he did not himself implement, and amended his applications when necessary to prevent them from being issued. Some of his applications were continued half a dozen times, potentially adding years to the process each time (Varchaver, 2001). He claimed a total of more than 500 patents on basic technologies used nowadays in industrial robots and automated warehouses, as well as in fax machines, VCRs, bar-code scanners, camcorders and the

Sony Walkman. His "machine vision" patent No. 5,283,641 was issued after 42 years of pendency (Stroyd, 2000; Ferguson, 1999; The Lemelson Foundation, n.d.; Soininen, 2005).

Lemelson was active in enforcing his rights. Once someone had developed a product that had some relation to one of his patents, the potential violator was confronted and reasonable compensation was demanded. Aggressive enforcement continues even today, after the death of Lemelson himself. Although quite a few of his patents have been challenged in court, over 750 companies paid royalties for them in 2001 (Soininen, 2005; Stroyd, 2000; Varchaver, 2001). Lemelson is not the only one to have used submarine-patenting tactics, however. Another famous example is Gilbert Hyatt, whose patent for a single-chip microcontroller was issued in 1990 after 20 years of pendency. It was successfully challenged by Texas Instruments, but by that time Hyatt had already been able to collect approximately $70 million in royalties. Submarine patentees also include Olof Soderblom, whose patent for token-ring technology was pending in secrecy in the USPTO for 13 years until it was granted in 1981 (Heinze, 2002). While the application was pending, other companies developed token-ring technologies independently. This development took place in connection with a public-standard-setting process carried out by the Institute of Electrical and Electronic Engineers (IEEE). Since Soderblom's patent surfaced companies have been forced to pay him more than 100 million dollars in royalties (IPO, n.d.; Soininen, 2005).

### A. LEGAL CHANGES AND THE TACTICS OF SUBMARINE-PATENTING

Since Lemelson's, Hyatt's and Soderblom's times the U.S. Congress has taken action and amended patent laws in order to discourage submarine patenting. The change from the 17-year patent term counted from the day of issuance to a 20-year term starting from the application date took place in 1995 in accordance with the GATT agreement (Graham & Mowery, 2002). Consequently, a prolonged application period reduces the life of an issued patent. Another amendment made in 1999 was related to the publication of patent applications within 18 months from filing. Although there are exceptions to this rule, the change has reduced the prospect of surprising an industry -before 1999 all patent applications filed in the U.S. remained secret until the patent was issued (Graham & Mowery, 2002; Heinze, 2002; Soininen, 2005). A further modification to the Patents Act that would obligate disclosure of all patent applications within 18 months has also been proposed recently before Congress. The introduced bill, H.R. 2795: Patent reform Act of 2005, is currently in the committee hearing phase (GovTrack.us, n/d.).

Furthermore, the U.S. Court of Appeal for the Federal Circuit held some years ago in the Symbol Technologies et al. v. Lemelson case that the equitable doctrine of prosecution laches, which is one of the defenses that can be used in patent infringement cases in order to demonstrate that even though there was a patent infringement, the patent should be held unenforceable, can be applied when the patent is issued following an unreasonable and unexplained delay by the applicant during the patent prosecution. Here, it does not matter whether the patentee's practice of keeping the application pending for many years has been accomplished strictly in accordance with the rules or not (Calderone & Custer, 2005; Soininen, 2005; Symbol Technologies Inc. v. Lemelson Medical, Education & Research Foundation, 277 F.3d 1361 (Fed. Cir. 2002). *See also* Symbol Technologies, Inc et al. v. Lemelson Medical, Education & Research Foundation, LP et al., 422 F.3d 1378 (Fed. Cir. 2005)).

Thus, it has been confirmed that the doctrine of laches, a defense based on prolonged patent application period, can sometimes be used for protecting an infringer from the harmful effects of submarine patents. Moreover, it is not only after the patent has been granted that the doctrine of prosecution laches can be applied. The Federal Circuit made it clear in the In re Bogese case that it is possible for the USPTO to address the issue before the patent is granted, and to reject it on this basis (In re Bogese II, 303 F.3d 1362 (Fed.Cir. 2002)). As far as Europe is concerned, patent applications have traditionally been automatically published within 18 months from filing, and the 20-year patent term has begun from the filing date. Moreover, although it is possible to file divisional applications, continuations are not allowed (Graham & Mowery, 2002; Soininen, 2005).

## B. SUBMARINE PATENTS TODAY

If submarine patents are defined narrowly as meaning patents issued after a long, intentionally delayed, secret pendency at the patent office, they do not seem to exist. Nonetheless, despite the legal amendments, circumstances in which patent applications are concealed long enough for the industry to start using a technology without knowing about the lurking patent arise particularly in fields characterized by fast technological development. In some parts of the ICT industry, for example, 18 months of secrecy may already be too long, and prolonging the application phase intentionally is not required for achieving the intended result (Soininen, 2005). Furthermore, patent applicants filing only in the U.S. may currently opt out of the 18-month publication rule and file continuations in order to detect industry developments and to postpone the grant of the patent for five years or so. Since the U.S. is a large and relatively lucrative market, particularly in the computer and software sector (Mueller, 2001), many companies do not even seek international patent protection. Also, provided that the numbers of filed ICT patent applications and granted patents continue their upward trend (OECD, 2005; OECD, 2004), it is getting more and more difficult to be aware of all relevant patents and applications. Especially if inventions are systemic, and innovation is fast and cumulative, multiple patented or patentable inventions may be incorporated into one innovation (Bessen, 2003; FTC, 2003), and therefore infringement is not merely a coincidence that can be avoided but is likely no matter how well the patents and pending patent applications are screened (Interview data U.S., 2004; Watts & Baigent, 2002). For this reason, published patent applications and granted patents may, in reality, be hidden (Soininen, 2005).

Another issue that has to be taken into account is that the scope of a patent typically changes during prosecution. Patent examiners often come up with patentability bars during examination, and require that the scope is limited in some way. Furthermore, as mentioned, the applicant may be able to add and amend patent claims during prosecution so that the scope will better reflect developments in the industry. Here the original application sets the limits for such changes, as its claims must support the new claim and no new matter can be included (EPC, Art 123; Mueller, 2001). As a consequence, although patent application might have been deemed non-essential at the time it was first published, the situation may change before it is granted. Certainly, one element of surprise relates to claim interpretation. Although a patent is a relatively well-defined right, the boundaries are never exact. The scope is not clear until it has been tested in court.

The concept of the submarine patent is understood in this article as broadly referring to patent applications and patents that surface after the standard has been established and take the industry by surprise. Here it does not matter, whether the patent application has been secretly pending or not, even though this possibility certainly contributes to the problem.

Tensions between patents and standards are examined in the following, and the problem of submarine patents and its causes are identified and exemplified further. ICT companies' patent strategies and technology-licensing practices are analyzed briefly at first in order to place the dilemmas between patents and standards into a broader context and to find those practical elements that may contribute to them.

# III. PATENT STRATEGIES AND TECHNOLOGY LICENSING PRACTICES IN THE ICT SECTOR

## A. GENERAL DEVELOPMENTS

With the shift from an industrial economy toward an information economy, the importance of intellectual property rights (IPRs) has increased. Today, a large proportion of companies' assets constitute intangibles, and IPRs are used to protect and profit from certain of these. Patents, for instance, provide their holders with the right to forbid others from utilizing patented inventions. Holders may thus gain competitive advantage due to their ability to stand out from the competition, or they may use their position to choose their licensees, which is one of their core rights due to the exhaustion doctrine (Kipnis, 2000). Then again, if the patent holder issues a license, as a rule he is entitled to secure any monetary or other compensation he is able to extract from the licensee (Shurmer & Lea, 1995) as long as the licensing terms are coherent with relevant regulation. The objective of licensing is to generate more revenue for the undertaking than it would be able to produce if it manufactured the patented products or utilized patented methods only by itself. Indeed, a well-reasoned licensing program helps a company to position itself favorably in the market place (Megantz, 2002; Soininen, 2005).

Obviously, there are differences between industries with respect to licensing tendencies, but generally speaking, the markets for technology licensing the component of which patents are have grown. In fact, in a survey conducted by the OECD/BIAC, 60% of the responding companies reported increased inward and outward licensing, and 40% reported increased cross-licensing. Other types of knowledge sharing have become more common too, and collaboration takes place in the form of sponsored and collaborative research, strategic alliances, as well as in mergers and acquisitions. This has been said to stem from the growing technological complexity, increased technological opportunities, rapid technological change, intense competition, and the higher costs and risks of innovation. As a consequence, companies have namely become more focused on certain areas while they acquire complementary technologies increasingly from other undertakings and universities (OECD, 2004).

The features mentioned previously apply also to the ICT sector, and companies lean heavily on cooperation and networks. Contemporary academic literature refers to this type of innovation as the open innovation model, in contrast to the closed model that used to dominate. Companies applying the closed model seek ultimate control and do everything themselves, while those adopting open innovation realize that valuable ideas do not only originate within their firms, and that it does not have to be the company itself that releases these ideas in the market. Whereas making innovation proprietary and exclusive is a central feature of the closed innovation model, open innovation is characterized by the exploitation of intellectual property in order to create value. The boundary between the company and its environment is said to have become more permeable, enabling ideas and knowledge to flow more freely (Chesbrough, 2003).

One further characteristic of the competitive environment of the ICT sector is so-called coopetition that was pointed out by one of the U.S. interviewees. Coopetition basically means that companies may very well be business partners in some fields and compete aggressively in others (Interview data U.S., 2004). Naturally, all the elements mentioned before signaling the importance of networks, openness in innovation, and coopetition are reflected in ICT firms' patenting practices, the use of patents in their business, enforcement and infringement avoidance. Furthermore they affect the technology licensing tendencies and licensing terms. Similarly it is

possible to detect their implications on standardization and also on settling of disputes as some of the example cases discussed later on demonstrate.

### B. THE U.S. PATENT LANDSCAPE

The patent landscape of the U.S. ICT sector could be described as a thicket to the birth of which strong patent system, technological complexity and fast technological development have contributed. Thus, although a reading of the patent laws gives the impression that there is a correspondence between a product and a patent, this is not necessarily the case: patents may overlap, and the manufacture of one product may require access to hundreds or thousands of patents, or one patent may "read on" many types of products, not just one (FTC, 2003). Therefore, in order to avoid the resulting hold-up problem, many U.S. ICT companies employ defensive patent strategies, and if they have the resources to do so they build large patent portfolios in order to guarantee that others cannot prohibit them from innovating. This in turn increases the number of relevant patents in the industry. Naturally, in addition to the better negotiation position and increased ability to agree on the licensing and cross-licensing they facilitate, patents also provide the means to prevent outright imitation in these cases (FTC, 2003; Interview data U.S., 2004; Soininen, 2005).

In general, the significance of patents as protection mechanisms used to exclude others and thus to generate competitive advantage appears not to be very high in the ICT field, and it is rather competition that spurs innovation in this sector (FTC, 2003). This was reflected in the patent-enforcement activities of the U.S. companies that were interviewed, and which operated on the basis of a defensive patent strategy. Unlike the company that employed an offensive patent strategy and attempted to generate its revenues from technology and patent licensing, defensively operating firms focused more on their core businesses of making and selling products rather than devoting resources to detecting infringements (Interview data U.S., 2004). Similarly, Messerschmitt & Szyperski (2003) have observed that the exclusionary use of patents is less common in the software industry than in some other industries such as biotechnology and pharmaceuticals. In their opinion this is in part because patents tend to be less fundamental and they can be circumvented easily. Furthermore, according to a quantitative study of U.S. manufacturing firms conducted by Cohen, Nelson & Walsh (2000), compared to other appropriability mechanisms such as secrecy, other legal tools, lead time, complementary sales, services and manufacturing, patents ranked rather low in effectiveness in fields such as the manufacture of electrical equipment and electronic components, semiconductors and communications equipment, all of which are connected to the ICT sector. Moreover, there were substantial variations between industries: patents appeared to be most important in the chemical industry. This does not mean that they are not acquired for other purposes, such as those indicated earlier, and naturally all of their functions are based on the patent holder's ability to prevent others from utilizing the invention.

Since many ICT companies are dependent on one another as indicated earlier and patents are not vital for protection, they generally have no reason to complicate their business relationships by claiming patent infringement. However, while particularly large U.S. ICT firms seem to be aggressive in building patent portfolios mainly for defensive purposes, offensive patent strategies tend to predominate for individuals and small software companies (Messerschmitt & Szyperski, 2003). Indeed, various sources have reported an increase in companies that derive their revenue purely from patents. These companies, also called patent trolls, do not typically have any R&D of

their own, nor do they manufacture any products themselves: unlike most ICT companies therefore, they are not dependent on other firms. Their business is to force companies involved in manufacturing to license their patents by claiming patent infringement (FTC, 2003; Interview data U.S., 2004; Peterson, 2002b; Surowiecki, 2006). Patent trolls seek for direct licensing revenues and do not usually benefit from a cross-license. Therefore a defensive patent strategy that might otherwise help certain ICT companies to maintain their freedom-to-operate, and that has proven successful also in the context of standards as will be illustrated later has only minimal influence on them.

It is not only patent trolls that seek to make better use of their patent portfolios, however. The prevailing trend in the U.S. has been to found patent-licensing programs, sometimes by forming a separate patent-licensing unit, for the purpose of generating extra revenues mainly from inventions that are not considered core to the company's main operations (Rivette & Kline, 2000). This trend is likely to have an effect also on standardization as standards are becoming more and more vital for the ICT industry and thus they also carry a lot of economic significance. Consequently, having a patent that claims a broadly adopted standard may be a dream come true for a company seeking licensing revenues and not operating in that particular technology area.

Basically, patents are viewed as core elements of corporate business strategies in the U.S. ICT sector. They are employed for multiple purposes in different contexts. They may be used as protection measures and as components in joint ventures, in patent pools, and technology licensing arrangements. A license may also be a pure patent license or a broad cross-license providing a company with not-to-sue coverage. Furthermore, patents may be used to attract other types of resources to the company. They serve as indicators of innovativeness, and can be helpful in attracting financing: they can be used as collateral and are seen as a positive indication in the eyes of venture-capital investors and potential buyers. In fact, one trend that is detectable in the U.S. is the increased tendency of selling and buying patent portfolios and individual patents (FTC, 2003; Interview data U.S., 2004). This may happen in conjunction with the acquisition of an entire company, or patents may be bought from bankrupt firms. This follows that it is not easy to avoid patent infringement as patents may easily find their way to unknown parties meaning that a notification of potential patent infringement may practically come from anyone.

There is one further feature about the U.S. patent landscape that should be noted. It has been claimed that a substantive number of patents are being granted particularly in new areas such as software and the Internet that do not actually fulfill the patentability requirements. These so-called bad patents have contributed to various patent-related difficulties and they have been deemed to be one of the main reasons why the U.S. patent system is not in balance (FTC, 2003).

### C. THE EUROPEAN PATENT LANDSCAPE

So far Europe has not faced patent trolling on a large scale, which could be explained by the fact that the consequences of litigation and infringement are less severe: while the average cost of patent litigation in the U.S. amounts to more than $2 million per side (Vermont, 2002), in Finland the figure for hearing an infringement the case in the district court is closer to EUR 150 000 per side. Of course the total amount of litigation costs may be fundamentally higher if the case involves various phases such as a precautionary measure claim, and both infringement and annulment actions. Moreover, the damages issued are substantial in the U.S. For instance, in 1990 the Federal District Court awarded $910 million in damages to Polaroid in its patent-

infringement litigation against Kodak, Alpex Computers was awarded $260 million for patent infringement (litigation against Nintendo) in 1994, and in 2003 Microsoft was forced to pay Eolas $521 million for infringement of an Internet browser patent (PwC Advisory, 2006). By way of comparison, the largest amount of damages ever awarded in Finland by the Court of Appeals was EUR 252,282 (Labsystems Oy v. Biohit Oy, HO S 94/1922, The Helsinki Court of Appeals).

Furthermore, the patent web in the ICT sector appears to be less complex in Europe than in the U.S., although there are certainly variations between different technology areas. For instance, the European mobile-phone industry and the electronics field are areas in which large patent portfolios are common (OECD, 2004; Watts & Baigent, 2002). However, with the exception of the large telecommunications and electronics companies, patents seem to be regarded not so much as strategic assets, but rather as legal tools applied and used for protecting the results of the company's own R&D efforts, and occasionally for licensing (Interview data Finland, 2003; DLA, 2004).

It was evident, for instance, from the interviews with the Finnish companies that were not involved in the mobile-phone area as manufacturers, and had less than 70 issued patent families, that small-scale portfolio building was the preferred strategy for avoiding otherwise weak patent protection. There were no cross-licenses, however, and the companies appeared to be able to operate freely without paying much attention to the patents of others (Interview data Finland, 2003). In general, the patent application part of the patent strategy was well thought out, although it should be noted that the process was technology-oriented and lacked the type of business acumen that was present in the U.S. (Interview data Finland, 2003). In fact, this is a conclusion that has been shared also by others. For instance Kratzman (2005) pointed out in his research: "Finnish patents tend to be academic and not written to generate revenue. They are not commercial nor do they cover multiple applications, an essential element in generating licensing interest." (p. 14).

With respect to the utilization of the patents in the company's business transactions and the infringement surveillance, they could be described as incidental, perhaps because patents were not regarded as important contributors to the company's revenue stream, and most Finnish companies had so few of them. Lead time, constant innovation and, in the area of software, copyright protection, were considered more important (Interview data Finland, 2003). Furthermore, attitudes towards patents appear to be largely negative, even indifferent, in the software industry in particular (Interview data Finland, 2003), which, based on Blind et al. (2001), applies not only to Finland but also to the rest of the Europe as far as independent software developers are concerned. It should be noted, though, that even small and medium-sized companies are beginning to realize the importance of strategic patent management, perhaps partially as a response to the attention paid to patents by investors. Generally speaking, there is a steady increase in the propensity of filing patents in the European ICT sector (OECD, 2005), which in turn will probably increase the likelihood of patent-based conflicts, and make it more difficult to design around the patents when selecting a standard, for instance. Currently, however, European companies appear not to be employing their patents as aggressively as U.S. undertakings and therefore there is a chance that even though European companies had patents that could be characterized as submarines, this would not create substantial hindrances to the industry. On the other hand, markets for technology are international and as the case with GSM standard that will be discussed in the licensing section of this article illustrates, also patent strategies of U.S. companies tend to influence European standardization efforts.

## D. LICENSING PRACTICES IN THE ICT SECTOR

As regards to companies licensing practices, some companies tend to be more open in their operations than others. Usually it is rather easy to outsource the manufacturing of products, their distribution and marketing, but it is the development that R&D-intensive companies prefer to keep to themselves. This could be detected in the technology-licensing practices of the U.S. ICT companies, which, given the reported increase of 4000 % in licensing revenues from 1980 to 1990 (Vermont, 2002) and the recent fascination surrounding the success of open-source software licensing, were surprisingly closed, particularly in terms of licensing in external technologies.

One of the interviewees explained the situation by saying that it was difficult to find useful technologies, and counting on outside technologies was usually considered risky due to potential problems with third-party rights and quality issues, for example. In-house R&D was simply trusted more. When companies did rely on external technologies, they rather acquired the entire company than licensed-in the technology. If they did license-in it was largely limited to non-core elements and design tools. As for licensing-in open-source software, the companies were very careful, and typically had tools in place to make sure that they audited what came in (Interview data U.S., 2004).

When it comes to licensing out their technologies interviewed companies tended to be more open, and there was one company whose business model was based mainly on this. Furthermore, licensing out was used in order to integrate in-house technologies into other companies' products and to make them compatible so that the market for that technology would expand. The licensing models adopted in the interviewed software companies were basically very broad for distribution purposes, and they licensed software to their customers as a package and to other companies to be used as embedded in their products. However, with the exception of commonly established standards, other types of technology licensing that did not involve a complete product were limited (Interview data U.S., 2004).

The licensing terms companies follow naturally vary depending on the subject matter, the business model adopted for the particular product or technology, and the parties involved. Nevertheless, there are certain typical configurations that reflect the extent of control the licensor or the licensee has. The scope of the license is paramount: the licensor retains more control over the technology if he or she grants only non-exclusive rights, which appears to be the most common form in the ICT sector. The possibility to define the degree of exclusivity, e.g., in terms of geographic areas or certain uses, and the ability to assign and sublicense the rights are other key elements in determining the scope of a license (Poltorak & Lerner, 2004). Incorporating technical assistance also gives the licensor control over the licensed technology. In the case of trademarks in particular, the licensor has good reason to control the quality of the licensed products, and to put in place certain procedures for testing them and inspecting the licensee's production facilities (Megatz, 2002). It is also advisable to include a termination clause to enable either party to get out of the contractual relationship if necessary. One of the most intriguing termination clauses that reflects the atmosphere in the ICT industry relates to patent peace: such clauses are frequently used in open-source licenses, for instance, and in their broadest form they provide the licensor with the right to terminate the license in the face of claims by the licensee regarding infringement on any of its patents. Representations, warranties, and indemnification clauses related to risk allocation, as well as royalty rates, also affect the balance of the contractual relationship.

Most importantly, however, attention needs to focus on terms relating to modifications, improvements, and therefore also grant-backs. From the licensor's perspective, it is often advantageous to obtain the rights to any improvements developed by the licensee, preferably including the right to sublicense the improvements to other licensees. This would prevent the licensee from using a fundamental improvement or an extensive new development to gain control over the licensor's core technology. Then again, access to improvements developed by the licensor is important for the licensee in ensuring the continued viability of the licensed product or technology (Megantz, 2002).

Some of the companies interviewed had adopted a restrictive approach to modifications, allowing them rarely and even then often requiring grant-back terms. Control was maintained through the heavy involvement of the licensor's engineers in the implementation phase, and through quality control. The licensor also typically maintained the right to modify the license terms. Then again, in the context of software licenses, the licensees had very few rights, the source code was seldom provided, and reverse engineering was typically prohibited. Obviously, this depended on whether it was an end-user license, an OEM agreement or a VAP bundle agreement. On the other hand some companies had adopted a more open approach and operated on a more flexible and market-driven basis. Interfaces were opened up, for instance, and one of the companies even licensed out its software under various open-source agreements (Interview data U.S., 2004).

It could be concluded from the previous discussion that R&D intensive ICT companies have rather control-seeking licensing models, but they may be flexible too if it suits the company's business model. Thus, since standards are of crucial importance in this industry, exceptions are often made for the essential purpose of securing product compatibility, interoperability and interconnection (Interview data U.S., 2004). In fact, since many companies may be developing equipment or software for the same systems and platforms, for example, and there are inevitably huge numbers of relevant patents involved (Watts & Baigent, 2002), standardization may prove effective in providing access to essential patents held by various firms. On the other hand, it must be remembered that companies' prevailing licensing practices tend to show also in the standard-setting context, and although the patent policies of standards organizations typically give specified options to the patent holder, different licensing terms can be used to maintain control over the technology as indicated already in the background section of this article. Furthermore, it is only the essential patents which need to be licensed when a company participates in setting a standard. As one of the interviewees pointed out, this constitutes a fairly thin layer. Only patents that are technically or commercially necessary to ensure compliance with the standard must be licensed, and only to the extent that it is necessary. Therefore, if the patent holder has waived its rights, for instance, patents cannot be asserted for complying with the standard, but they can be asserted if something extra is being done (Interview data U.S., 2004). Then again those companies that do not benefit from a common standard or are after royalties have generally no interest in taking part in standard setting because doing so could require the licensing of their rights under royalty-free or RAND terms.

The licensing quandaries will be discussed later on, and I will now turn to a more detailed analysis of the submarine patent risk stemming from deficient identification of essential patents to which some of the factors presented in this and the earlier chapter clearly contribute. Generally speaking the highlighted importance of intellectual property rights and their substantial role as part of companies' business strategies has made it more difficult to avoid conflicts of interests.

## IV. STANDARDIZATION AND SUBMARINE PATENTS

Both patents providing their holders with exclusive rights, and open standards expected to be widely promulgated without exclusive control are important to the ICT sector. As they both want different things resolution is not always easy (Cunningham, 2005). From the perspective of this article the core element contributing to the tension between patents and standards, is that it is not always known in advance whether undertakings have patents or pending patent applications that might cover the standards technology. This complicates matters, since patents that surface after the adoption of the standard may, in the worst case, result in no other choice than abandoning it. Although both licensing and patent identification quandaries that were introduced briefly already in the background section may lead to significant economic losses, it is more difficult to anticipate the consequences and to avoid problems in the latter case. Therefore, submarine patents that surface after a standard has been elected and adopted are not only a practical dilemma but also a policy concern. Submarine patents may face the industry with unpredictable predicaments, and ultimately harm consumers. Cases in which unidentified patents of standard setters have caused concern and resulted in legal disputes include Dell and Rambus litigations. Third-party submarines contain the patents of Forgent Networks, Inc and Eolas Technologies, Inc among others.

The most effective way to reduce the possibility of hidden patents that have the potential to cause complications with respect to the adoption of a standard is to conduct a proper patent due diligence periodically and to agree upon the contravening issues beforehand. This is where the patent policies of standards organizations that are aimed at creating shared expectations among standardization participants with respect to licensing and disclosure rules come to the fore (Interview data U.S., 2004; Ohana, 2005). Indeed, if companies participate in setting a standard they usually do their best to follow the standardization organization's patent policies, and consider any deviation unethical (Interview data U.S., 2004; Ohana, 2005). Sometimes the rules are simply not very transparent, and since different standardization organizations have different types of policies it may be burdensome to be aware of and to comply with them all, particularly if the company is involved in many standards organizations. In fact, about 40% of companies in Blind et al. (2002) sample group reported that they had had problems due to the unclear IPR structure, resulting, for instance, in the late identification of the patent holders. There is a need for rules that hold as few surprises as possible (Interview data U.S., 2004; Ohana, 2005).

The standards organization's written patent policies and their shortcomings with respect to the disclosure obligation are examined below. Since companies adopting the standard ultimately bear the responsibility for patent infringement, there is then a brief glimpse into that part of companies' patent strategies that is aimed at reducing that risk. Combined with what has been said earlier about the patent system and the patent landscape in the ICT sector, these sections constitute the analysis of the causes contributing to the likelihood of infringing others' essential patents in the ICT sector and the challenges companies face in settling these disputes particularly due to the emergence of so-called patent trolls. Case studies illustrate the situation further and give examples of actualized disagreements. The fact that many disputes have been handled in court demonstrates that it has not been possible to settle the issues amicably and that there are significant economic interests involved.

## A. PATENT POLICIES

Many, although not all, standards bodies that are responsible or involved in coordinating the development of standards have implemented explicit IPR or patent policies for handling issues to do with standardization and patents. These policies aim at discouraging the manipulation of the process in order to gain market power, and at easing the tension between the open nature of standards and the proprietary nature of IPRs (Feldman & Rees, 2000; Kipnis, 2000; Soininen, 2005). The policies guide the participant's behavior, and from the legal point of view their nature and content affect the determination of whether a company participating in standard setting and failing to disclose its relevant rights has breached a contract, defrauded, competed unfairly or deceptively or abused its dominant position, for example. Therefore, if the patent policy is deficient, it is difficult to challenge the patent holder's right to prevent all others from using his invention, discriminate among licensees or to condition the license however he wants to as long as this is done in accordance with relevant laws. In the following attention is paid to the nature, extent, scope and timeframe of the prevailing disclosure obligations of different organizations such as ITU, ANSI, ETSI, W3C, OASIS and IETF and their ability to reduce the risk of submarine patents is assessed.

### (i) Nature of the Policy

It has been argued that without legally binding policies standards could easily become the subject of "hold-up" because once a standard has been established, all the patents necessary to comply with it become truly essential. The more widely the standard is adopted, the more power the patent holders gain (Shapiro, 2001). Nonetheless, not all standards organizations aspire to control their participants through imposing on them explicit contractual obligations, and many use their policies more as a "code of practice" (e.g. ITU-T Patent Policy, n.d.). ANSI, for example, has taken the position that it does not mandate disclosure or impose licensing obligations on patent holders because this would overburden the process. It relies more on its participants to voluntarily act in accordance with the policy. Nevertheless, according to Marasco (2003) it has not so far faced abuse of the process. Actually, even though the guideline-nature of the disclosure requirement may narrow down the possibilities to enforce it in court and to claim damages in case of an infringement, non-obligatory rules may also bear significance when it is determined whether a certain participant has operated in good faith under some other principle of law.

### (ii) The Duty to Disclose

The patent policies of standardization organizations differ in their approach to disclosure in terms of duty to disclose, the scope of the disclosure and its timing. For the most part, they tend to rely on their participants (submitters or members [Perens, n.d.]) to voluntarily disclose all patents that could influence the standard. This is by no means a simple task, and failing to disclose patents that are essential for using the standard may happen by accident. Searching the portfolio is time-consuming and expensive, and therefore companies may not want to make the expense of searching them. Also, it is not always easy to recognize all essential patents and patent applications. This follows that particularly in big companies with large portfolios a company's representative in a standard-setting process may not know whether a proposed standard incorporates a patent within his company's portfolio (Kipnis, 2000; Peterson, 2002b; Soininen, 2005).

It is probably for this reason that standards organizations generally take no responsibility for finding all relevant IPRs, or for verifying the information disclosed by the contributors (e.g. ANSI, 2003b; OASIS, 2005, IETF, 2005), and they are not keen on imposing such obligations on their participants. Thus, many of them do not require disclosure that goes beyond the personal knowledge of the discloser (e.g. OASIS, 2005; IETF, 2005), nor do they require their participants to carry out patent searches (e.g. ANSI, 2005a; OASIS, 2005; ETSI, 2005; W3C, 2004, ITU-T, 2005), which in turn increases the probability that relevant patents remain undisclosed (Soininen, 2005).

**(iii) Scope of the Disclosure Requirement**

Another contributing factor to the submarine patent risk is that it is not necessarily required for companies to disclose their pending, particularly unpublished, patent applications (e.g. ANSI, 2003b; ANSI, 2003a; Kipnis, 2000; Lemley, 2002). The W3C disclosure requirement is an exception, however. It also extends to the unpublished patent claims that were developed based on information from a W3C Working Group or W3C document (W3C, 2004). The OASIS policy also requires the disclosure of all patents and/or patent applications known to the technical committee member (OASIS, 2005). The problem with announcing pending patents is that, although the protection provided by a patent is always unclear until confirmed in court, the scope is even more ambiguous until the patent is issued, and it is therefore not possible to assess whether it will be essential in order to use the technology. It is also possible that it will never be granted. The problem is, however, that if there is no obligation to disclose pending patent applications, waiting until the standard has been agreed upon before allowing the patent to be issued does not constitute a policy breach. In fact, given the need to make informative decisions about standard "characteristics", there has been discussion on whether participants should also be obliged to disclose their potential patenting activity (Soininen, 2005). The U.S. patent system includes a so-called grace period, which allows the inventor to file for a patent up to one year after disclosing it in a printed publication. Thus, it is possible for a company that has submitted a technical proposal to the standards body to then file for a patent covering it after the standard has been elected.

Opinions on the scope of the disclosure obligation are divided. Some people feel that, although companies were required to state their possible interest in patenting their technology, it is never certain that they will apply these patents in reality, or that they will be granted or even essential. On the other hand, if companies had to announce their potential pending patents, other committee members could take them into account when decisions about standardized technology were made (Kipnis, 2000). At the same time, there might be a risk of "sham" announcements in these cases (Soininen, 2005).

**(iv) Timing of the Disclosure**

The timeframe of the disclosure requirement also bears significance in respect to the causes of the submarine-patent problem. Since standardization may be valid for years and companies' R&D development is definitely not frozen during that time, it is likely that pending patent applications will be modified and new applications filed during the process. Therefore, although a company may have no pending patent applications or granted patents at the beginning, it might have them when the standard is finally set. For this reason, some standards bodies, such as W3C,

have patent policies that incorporate an obligation to disclose essential patents throughout the entire process (W3C, 2004). The ETSI IPR Policy also partially requires and partially encourages each member to make reasonable efforts to inform the ETSI in good time about any essential patents, both its own and third-party, of which it becomes aware at any stage (ETSI, 2005). Then again, the IETF policy encourages contributors to update their disclosures if the claims are modified, or if a patent is granted or abandoned (IETF, 2005).

### B. THIRD-PARTY PATENTS

Standards organizations patent policies can never bind third parties and even though some patent policies do encourage also other interested parties as well as contributors to bring attention to potential third-party patents (e.g. IETF, 2005; ITU-T, n.d.; ITU-T, 2005; OASIS, 2005), this is not enough to record all of them. One option to increase the awareness of third-party rights would be to conduct a patent search. Standards bodies are not typically involved in such an activity, however (e.g. IETF, 2005; OASIS, 2005). On the other hand, ETSI is now considering an ex ante approach to declaring relevant patents with respect to the Long-term Evolution (LTE) standard (Informamedia.com, 2006). This would at least diminish the likelihood that new essential patents emerge after the standard has been elected and it remains to be seen whether this approach will be adopted on a broader scale.

It could be concluded that patent policies are helpful in reducing particularly the risk of standard setters' submarine patents and even though they could be strengthened in many ways to narrow down the possibility of manipulating the process in order to gain market power, some of the difficulties are mainly practical. Therefore it might not be possible to avoid them even if companies were posed an obligation to disclose their potential patenting activity, for instance. The only effect of doing so could be that companies are discouraged from participating which in turn would increase the risk that patents remain undisclosed and generate problems at a later stage.

### C. PATENT STRATEGIES TO AVOID INFRINGEMENT

There may be a room for improvement in standards bodies patent policies but it is not only loopholes in them but also deficiencies in companies' own patent strategies that contribute to the fact that relevant rights may remain unnoticed and standard adopters may face predicaments due to them. Obviously, it is the company incorporating a standard into its products and services that ultimately bears the risk of infringing others' patents, and therefore identifying relevant rights is not by any means only the responsibility of standards organizations. Indeed, in addition to enhancing a company's own patenting, licensing and enforcement activities, a proficient patent strategy also helps in avoiding patent infringements.

A major goal in managing corporate patent liability is to avoid being sued and paying substantial royalties to other patent holders. What is even more important is to avoid being prevented from using a particular technology, which could force the company out of a lucrative market (Miele, 2000). Furthermore, the costs of patent litigation, particularly in the U.S., could be substantial and a drain on financial and human resources (Knight, 2001). Thus, if it is necessary to prevent significant liability, the company should consider refraining from using technology that infringes others' rights. In some cases this is not possible, and the company has to employ such technology

that has been patented by others in order to operate in a particular market. Keeping both situations in mind, there are certain steps that could be taken in order to reduce the liability, the likelihood that patent holders will assert their rights against the company, and the amount of royalties that should be paid in cases in which patent liability cannot be avoided (Miele, 2000). One of these steps includes identifying patent problems early in the product cycles. For instance, a freedom-to-operate search conducted on the basis of patent classification numbers and certain keywords might be useful for identifying close references, which could then be examined in more detail (Knight, 2001) before the product is released onto the market. Another step is to monitor the patent activities of the company's closest and biggest competitors because companies are often particularly sensitive to infringing activities that originate from their competitors (Miele, 2000).

In practice avoiding infringements is not that easy and companies' patent strategies are not flawless. No patent search is or can be 100% thorough (Knight, 2001), and as many Finnish interviewees mentioned, it may be difficult to identify relevant rights and to make sense of the scope of patent rights (Interview data Finland, 2003). Sometimes, a company may not even have any specialized infringement surveillance. Indeed, in Finnish companies infringement checkpoints were rarely incorporated into R&D projects. This does not indicate, however, that there was no knowledge whatsoever about the patent landscape: information regarding other companies' patent position can be obtained as a side product when the company is considering patenting its own inventions and conducts prior art searches for that purpose (Interview data Finland, 2003). As far as the U.S. companies were concerned, the extent of due diligence with regard to others patents varied depending on the situation: some technology areas were more important, and some were known to be more heavily patented than others, thus requiring more thorough clarification. Nevertheless, these companies typically did not have any systematic patent clearance (Interview data U.S., 2004).

A further risk-reducing alternative to freedom-to-operate analysis and other types of patent surveillance is to use the porcupine approach discussed earlier in the section on patent strategy in the ICT sector. This means that a company builds a defensive patent portfolio aimed at reducing potential infringement allocations and making settlement easier. It may also have broad cross-licenses in place, thereby removing a huge block of patents from its surveillance list (Interview data Finland, 2003; Interview data U.S., 2004). This is a strategy that has been favored by large U.S. and multinational Finnish ICT companies, but unfortunately it does not work well against individual patent holders or so-called patent trolling companies. The fact that patents are being assigned more than before, further increases the risk that they find their way to such parties that do not come up in competitor surveillance and remain unnoticed for that reason.

In sum, companies may take certain precautions to prevent patent liability, but even if they do, the risk of patent infringement remains particularly high in areas in which it is simply not possible to keep track of new filed applications and issued patents. As one of the U.S. interviewees stated, there is always a risk that others' patents will read on your product. You can do all the clearance work and look at all the patents that are out there, but the next week a new patent may be granted (Interview data U.S., 2004). Nevertheless, there are many improvements that could be made in order to strengthen the infringement surveillance, and instead of fighting only their own battles during the standard-adoption phase, companies could pool their expertise and resources and help to limit the submarine patent risk already before the standard is established.

## D. CASE STUDIES OF STANDARD-SETTERS' SUBMARINE PATENTS

Standards organizations' IPR policies related to disclosure do not cover every situation, which is understandable, since weight must also be given to the flexibility of the process. Also the means ICT companies have currently implemented in order to avoid infringement of other companies' patents do not help much in identifying relevant rights. The unfortunate consequences are that despite the efforts there still is a high risk that patents surface after the establishment of the standard, and these (essential) patents are much more valuable then than they would have been previously: it gets more difficult to change the specification as time passes and the technology becomes adopted. Therefore, particularly if they are not breaching IPR policy, some patent holders may seize the opportunity and seek to hide the fact that they have essential patents, or pending applications - otherwise the standard could be modified so that it no longer covers them.

The problem with standard-setters' submarine patents is not only theoretical, because the risk has actualized also in reality. Cases that have involved undisclosed patenting activities and have resulted in legal disputes include Dell, Rambus and Unocal from which Dell and Rambus cases are discussed in the following. These examples demonstrate further the importance and role of a proficient patent policy since it does not merely help to reduce the submarine-patent risk beforehand but it also influences the possibilities to solve the problem later on. The previously-mentioned example cases indicate, for instance, that competition authorities do not take misbehavior during standard setting lightly and are keen on examining doubtful situations even though the merits of the case may not be sufficient in order to find fault from the defendant's side. In the end the result is dependent on the wording of the policy and proof of misbehavior. In a way legal tools that are available provide the last means to solve actualized conflicts. Luckily, litigation is not always needed. For instance IBM's behavior in relation to ebXML standard implies that consequences of the failure to disclose are not always detrimental. Since many ICT companies are largely dependent on one another it may be possible to reach an amicable solution rather easily in some situations.

### (i) Federal Trade Commission v. Dell Computer Corp. (1995)

In the Dell (1995) case the Federal Trade Commission (FTC) accused Dell Computer Corporation, on the basis of Section 5 of the FTC Act which prohibits unfair or deceptive business practices, of intentionally concealing its patent during the Video Electronics Standards Association (VESA) VL-bus technology standardization process. Although VESA's IPR policy required that its members disclose any potentially conflicting patents, Dell certified that it did not have such patents. After the standard had been widely adopted in the marketplace, Dell sought to enforce its patent against VESA members. The Commission found that Dell's actions could not be deemed inadvertent, and that the company had failed to act in good faith. It also stated that had Dell disclosed its patents properly, VESA would have incorporated different technology into the standard. Dell's misrepresentation therefore caused restraints on competition resulting in the hindrance of industry acceptance and increased costs in terms of implementing the bus design (In the Matter of Dell Computer Corp., Complaint, Docket No. C-3658 (FTC, 2 November 1995); Soininen, 2005).

In the end, a consent decree was agreed upon and Dell promised not to assert its patents against computer manufacturers that complied with the standard (Balto & Wolman, 2003; Hemphill, 2005; In the Matter of Dell Computer Corporation, Decision and Order, Docket No. C-3658 (FTC, 20 May 1996); Lemley, 2002). It should be noted, however, that even though a satisfactory

result was reached through a settlement the case was not decided in court leaving the industry with ambivalence about the proper interpretation. In fact, the Rambus litigation discussed below indicates that the conclusion could have been different if the case had been litigated further.

**(ii) Rambus, Inc v. Infineon Technologies AG (Fed. Cir. 2003) and Federal Trade Commission v. Rambus, Inc**

Rambus has faced two litigations due to its actions in the Joint Electronics Devices Engineering Council (JEDEC). The first one, Rambus, Inc v. Infineon Technologies AG (2003), arose when Rambus sued Infineon for synchronous dynamic random access memory (SDRAM) patent infringement. Infineon counter-claimed that Rambus had defrauded it when it failed to disclose patents and pending patent applications during its membership of JEDEC and while JEDEC was developing the industry standard for SDRAM. More specifically, Rambus had filed for a patent '898 for Rambus DRAM technology in 1990, it cooperated in forming the standard from 1992 until 1996 when it resigned from the standards body just before the final vote, and both during and after its participation it had filed continuation and multiple divisional applications based on the original '898 application, and by doing so it amended its patent protection to cover the SDRAM technology. Later, it allowed these patents to be issued, and began to defend its own patents aggressively, requiring companies to pay royalties. Nonetheless, the Federal Circuit came to the conclusion that Rambus had not fraudulently failed to disclose its patent applications, but held that its duty to disclose as a JEDEC participant applied only to those containing claims that could reasonably be considered necessary in order to practice the proposed standard, and that this obligation arose only when the work had formally begun. The court held further that the duty to disclose did not cover the participant's future plans or intentions, *i.e.* filing or amending patent applications, and criticized JEDEC's patent policy for its staggering lack of defining details. It thereby left its members with vaguely defined expectations as to what they believed the policy required (Rambus, Inc v. Infineon Technologies AG, 318 F.3d 1081, 65 U.S.P.Q.2d 1705 (Fed. Cir., 2003); Soininen, 2005).

The second litigation, FTC v. Rambus, Inc was based on Section 5 of the FTC Act, and it is still pending. The FTC has accused Rambus of a series of anti-competitive acts and practices, claiming that through deliberate and intentional means it has illegally monopolized, attempted to monopolize, or otherwise engaged in unfair methods of competition in certain markets related to the technological features necessary for the design and manufacture of a common form of digital computer memory. It further claims that Rambus's anti-competitive behavior has, among other things, increased the royalties associated with the manufacture, sale, or use of synchronous DRAM technology, and has reduced the incentive to produce memory using it and to participate in JEDEC or other industry standard-setting organizations or activities (In the Matter of Rambus Incorporated, Complaint, Docket No. 9391 (FTC, 18 June 2002); Soininen, 2005).

The difference between FTC v. Rambus and the Dell case is that in the former the FTC is attempting to demonstrate that Rambus gained market power through its misbehavior, and thus that the industry is locked into the JEDEC's SDRAM standard. According to the FTC, "It is not economically feasible for the industry to attempt to alter or work around the JEDEC standards in order to avoid payment of royalties to Rambus" (In the Matter of Rambus Incorporated, Complaint, Docket No. 9391 (FTC, 18 June 2002)). In its initial decision released on 24 February 2004, Judge MacGuire stated that the FTC "failed to sustain their burden of establishing liability for the violations alleged", and dismissed the complaint. In her opinion there was no evidence, for example, that Rambus had violated JEDEC patent policy, or that the challenged conduct had

had anti-competitive effects (In the Matter of Rambus Incorporated, Initial Decision, Docket No. 9391 (FTC, 23 February 2004); Soininen, 2005). To conclude, even though a standard setter has operated unethically and the other participants disapprove his conduct, it may be difficult to challenge it in on legal merits particularly if proper guidelines are lacking.

### (iii) IBM and the ebXML Standard

Even though Dell and Rambus attempted to enforce their rights against those who had adopted the standard, patent holders do not always seek royalties although a patent emerges after the standard has been established. One reason for a submarine-patent holder to comply with the standards organization's policy is the bad publicity, which may result in the loss of credibility as a fair standardization participant (Sarvas & Soininen, 2002). For example, IBM claimed in April 2002 that it had one patent and one patent application that were relevant for implementing the open, royalty-free ebXML standard developed by OASIS in cooperation with the United Nations, and that it was willing to license them on RAND terms. IBM's announcement caused strong reactions in the public and in the industry, particularly because IBM had participated in the design of the standard. Furthermore, IBM had previously announced that it was willing to contribute to the standard without any restrictions, but had nevertheless made comments regarding the licensing terms and conditions of the two patents. However, soon after the news reached the public, IBM agreed to license the patents royalty-free (Berlind, 2002a; Berlind, 2000b; Wong, 2002).

## E. CASE STUDIES OF THIRD-PARTY SUBMARINES

Those companies that do not benefit from a specific standard simply do not participate in setting it and therefore it may happen that third parties who are not covered by patent policies have patents that "read on" the standard, and do not appear before its adoption. If the patent holder then decides to enforce his rights, the benefits of the standard may be lost. In fact, many businesses that received patents during the technology boom were either purchased by other companies or landed in holding companies. Thus, in some cases a standards organization may adopt a standard believing it is royalty-free, and then find out that the new owner, which did not participate in the standard-setting process, is aggressively trying to enforce its IPRs (Clark, 2002). For instance, the director of intellectual property at Jupiter Networks Inc has observed a sudden surge in these types of third-party patent-infringement assertions, some of which are valid and some are not. This surge is understandable in his opinion, because patent holders hope to profit from the wide deployment of products that must implement Internet standards. He described a typical patent-assertion scenario in which a patent holder dusts off issued patents directed to old but related technologies or modifies claims in pending patent applications to read on published standards, and then targets standards-compliant networking-equipment manufacturers (Lo, 2002). The case studies presented below illustrate the type of legal disputes that may arise if a third-party patent holder attempts to enforce his rights. Basically, the accused infringer can defend itself by claiming non-infringement or unenforceability, or by attempting to invalidate the patent. These are the strategies followed also in the case studies presented.

### (i) Forgent Networks and the JPEG Standard

A third-party claim arose in 2002 when Forgent Networks Inc searched its portfolio of 40 patents and found that it had a patent (US Patent 4,698,672) related to the implementation of a baseline version of the ISO/IEC 1098-1 standard, i.e. the JPEG image standard that is one of the most popular formats for compressing and sharing files on the Internet, and is also used in various industries in products such as digital cameras, personal digital assistants, cellular phones, printers and scanners. In its desperate search for profits, Forgent estimated the solidness of its infringement claim and entered into a multi-million-dollar licensing agreement with the Japanese companies Sony and Sanyo before making a public announcement in July 2002 of potential JPEG patent infringement and starting to pursue licensing fees from a range of companies. Forgent had, in fact, obtained the patent in question through the acquisition of Compression Albs Inc. in 1997. Since the inventors who originally filed for the patent in 1986 had not participated in the JPEG standardization process that was going on around that time, according to Forgent, no abuse of the standardization process had taken place (Clark, 2002; Lemos, 2002; Markoff, 2002; Reingold, 2006).

As a result of Forgent's aggressive patent enforcement, many U.S., European and Asian companies agreed to license the '672 patent, and by April 2004 it had generated approximately $90 million in licensing fees. Those who did not agree to license willingly were sued for patent infringement. Indeed, on 22 April 2004 Forgent's subsidiary Compression Labs, Inc sued 31 major hardware and software vendors, including Dell and Apple Computers, for patent infringement, and on 6 August 2004 it initiated litigation against 11 companies (Asaravala, 2004; Forgent Networks, 2006).

Professionals in the field of compression technology and representatives of the JPEG committee doubted the validity of the patent and stated that there could be prior art available that would render it invalid. These doubts have been manifested in legal actions, such as those taken by 24 companies that filed a counter-complaint against Forgent and its subsidiary in the Delaware District Court seeking declaratory relief as to non-infringement, invalidity, and unenforceability of the patent. Even Microsoft, which had not been sued by Forgent at that time, filed a complaint against it on 15 April 2005, claiming that the patent had been obtained fraudulently. Furthermore, the non-profit Public Patent Foundation has filed a request for re-examination of the '627 patent in November 2005. In late January 2006 the U.S. Patent and Trademark Office (USPTO) made a decision to review the patent, which will in any case expire in October 2006 (Forgent Networks, 2006; Lemos, 2002; Reingold, 2006; Red Herring, 2006).

### (ii) EOLAS and HTML Specification

Another third-party submarine example is the EOLAS case. Here, the dispute arose when Eolas Technologies Inc, which had licensed a patent from the University of California, sued Microsoft for the use of the patented invention, *i.e.* the widely used feature of HTML, the format that describes the format of web pages. After a long stream of litigation the Federal Circuit (2005) also found the patent valid and infringed (Eolas Technologies Incorporated and the Regents of the University of California v. Microsoft Corporation, 399 F.3d 1325, 73 U.S.P.Q.2d 1782 (Fed. Cir., 2005)), and the Supreme Court refused to hear the case (Malone, 2005). At the request of W3C the Eolas patent was also re-examined by the USPTO, which released two preliminary

findings claiming that it was invalid. Ultimately, the patent office kept the patent in force, however (Perens, n.d.).

Although a patent holder has a very strong negotiating position if the patent accidentally "surfaces" after the adoption of the standard and those who are accused of patent infringement can mainly defend themselves by trying to invalidate the patent, third-party patents do not always create problems. In many cases reasonable licensing terms can be agreed upon. As with the cases in which the patent holder had participated in the standard setting, business relationships and bad publicity may also be reasons why third-party patent holders comply with a standardization organization's policy and license the patents royalty-free, for instance, although they may have no obligation to do so.

## F. THE RISK OF PATENT PROBLEMS AND HOW TO REDUCE IT?

It could be concluded from previous discussion that it is important to implement proficient patent policies that are clear, concise and transparent and hold as few surprises as possible. These policies should be drafted with an intention of influencing companies' behavior both during and after standard setting so that misconduct could be diminished and potential problems solved. The nature, extent, scope and the timeframe of the disclosure requirements are examples of such disclosure terms that could be clarified in order to reduce the submarine-patent problem, which taking into account the recent litigations and the fact that 40% of companies in Blind et al.'s (2002) sample group reported problems regarding unclear IPR structure is not only theoretical. Furthermore, one way of reducing the problems that may result when not all patents are known prior to the establishment of a standard could be to require that essential patents granted in the future will be identified and potentially licensed under the same terms as the disclosed patents. In fact, it is a common requirement in patent pools for essential future patents to be subject to grant-back and thus to contribute to the pool. This requirement may occasionally have anti-competitive effects, however, (Balto & Wolman, 2003) and patent holders would probably consider this type of requirement too restrictive.

As regards to third-party patents that are becoming a more and more relevant concern there is a lot that could be done in order to reduce the risk they may pose to the adoption of a standard. First of all, the standard-setting participants could be encouraged to conduct more thorough patent searches already during the standardization procedure, and to let the standards organizations know about potential third-party claims. Secondly, third parties could be reserved an opportunity to make a patent statement early on, and thirdly, standards organizations could take a more active role in finding relevant patents themselves. Otherwise, if dealing with the increasing number of third-party patents was only left to companies implementing the standard, they would be in different positions and the openness of the standard could be endangered: only those companies that already have cross-licensing agreements in place, have enough leverage in order to negotiate a good deal with the patent holder, or have the resources to fight the patent in court might be able to adopt the standard.

A further way to limit the risk of submarine patent-related troubles arising from both standard-setters and third parties, and to help companies to solve the conflicts better and therefore to reduce the harmful consequences of such patents would be to renovate the legal framework. The possibilities and the need to do so have not been estimated in this article, however. Obviously, when considering the actions needed, the advantages and disadvantages should be estimated and

balanced carefully. Therefore, it is in place to examine also the other patent and standard related quandary that has to do with licensing. These problems are similar to those experienced with submarine-patents, and in fact, the GSM example presented below is in essence a submarine-patent case. What basically differentiates submarine-patent cases and those in which a patent has been properly disclosed is, however, the possibility to make informative decisions about the adoption of a standard, and to design around it or agree upon licensing terms in advance, and thus avoid great societal losses that would occur had the standard been already broadly adopted and if the parties were not able to solve the conflicts.

## V. LICENSING OF PATENTS AND STANDARDIZATION

In case a patent holder has disclosed that it may have patents or pending patent applications that are essential for using a standard, standards bodies typically pose certain licensing alternatives for that company. The patent holder's options are usually the following: 1) the patent holder may state that it is willing to license its essential patents on royalty-free terms, 2) the patent holder may refuse from licensing altogether, 3) the patent holder may promise to license, but make no promise of the licensing conditions, or 4) the patent folder may make a statement of licensing on fair, reasonable and non-discriminatory terms (RAND). These alternatives are discussed further in subsequent paragraphs, and case studies are used to illustrate the licensing perplexities. The necessity and effects of addressing the submarine-patent problem are estimated on this basis.

### A. ROYALTY-FREE LICENSING

Royalty-free standards often have more chances of being broadly accepted and widely used than standards requiring licensing payments. For instance, the Internet has been said to require freely available standards in order to work effectively. Patent-based standards requiring royalty payments have been claimed to inhibit its development because they slow down or discourage the adoption of new technologies (Clark, 2002). One reason for this is that it is considerably more difficult to estimate the risks and costs of using such standards than those intended to be royalty-free. As a consequence, companies frequently agree to make their patented technology available on a royalty-free basis, and hope to generate more profits by selling products that use their standardized technology (Interview data U.S., 2004).

As mentioned, given the benefits, standardization participants are often willing to license their patents on a royalty-free basis for the specific purpose of using the standard. This holds true particularly if they are able to make sure that the patents could nevertheless be utilized for defensive purposes if the need arose. (Interview data U.S., 2004) Naturally, participation and agreement to license to everyone require that such conduct is in accordance with the firm's commercial interests: having its superior technology chosen for a standard may provide it with a head start in incorporating that technology into its products, for example. Then again, companies seeking licensing revenues through incorporating their proprietary inventions into a standard do not typically have a business motivation to participate in designing royalty-free standards (Soininen, 2005).

### B. REFUSAL TO LICENSE

If a royalty-free licensing scheme cannot be negotiated, and the patented technology cannot be designed around, it may nevertheless be in the interests of the public to get the patent holder to agree to license it at least on RAND terms. If the patent holder refuses to license on these vague terms, the standardization process is halted and other solutions are sought (Hjelm, 2000). Refusing to license at all is rare, however, although it is the most influential form of leveraging one's patent rights (Rahnasto, 2003). As the following case study demonstrates it has nevertheless played a major role in making the ETSI Wideband Code Division Multiple Access (WCDMA) standard backward compatible with the IS-95 standard favored by Qualcomm Inc, for instance (Soininen, 2005).

What happened in the WCDMA dispute was that Qualcomm accused ETSI of intentionally excluding Qualcomm's technology from its standards, thereby creating an unfavorable position for Qualcomm in the European third-generation telecommunications market. In order to make its voice better heard, the company claimed that the key technologies needed for WCDMA infringed its patents, and refused to license this technology unless the WCDMA was made backward compatible with the IS-95 standard. It seems that Qualcomm expected that a harmonized standard would increase its licensing revenues fundamentally (Hjelm, 2000; Soininen, 2005; Westman, 1999).

Ericsson, who was another key patent holder in the technology involved, was of the opinion that Qualcomm's patents were not infringed, and to gain a better negotiation position it also sued Qualcomm for the infringement of Ericsson's CDMA patents (one of the U.S. standards) Qualcomm was employing. Finally, consensus was reached as a result of cooperation between Qualcomm and Ericsson. The companies entered into a series of definitive agreements that resolved all disputes relating to CDMA technology, and as a part of the settlement Ericsson acquired Qualcomm's terrestrial CDMA wireless infrastructure business, including its R&D facilities. Furthermore, the companies gave a promise to license essential WCDMA patents (Hjelm, 2000; Westman, 1999). The standardization process was practically frozen during this period, which lasted roughly a year (Sarvas & Soininen, 2002).

Indeed, as the previous example demonstrates companies operating in the ICT sector are dependent on each other and therefore conflicts in one area may result in complex legal battles in another. Nevertheless refusing to license may, according to Rahnasto (2003) be a feasible strategy for a company that opposes a certain standard. A firm may also wish to delay the acceptance of a standard to give it more time to develop products that incorporate it.

### C. BLANK PROMISE TO LICENSE

Firms typically agree to license their patents royalty-free, or on RAND terms, or they may merely agree to license but make no statement of the terms and conditions. Particularly if the last-mentioned option is available and chosen, there is likely to be a fight over the proper licensing conditions. One example of a disagreement over proper licensing terms was the one that arose during the formation of the European GSM standard in the 1980s, which was first coordinated by CEPT (Conference Europeenne des Administrations des Postes et des Telecommunications) and later by ETSI. In fact, this particular licensing dilemma, which involved Motorola, contributed to the change in patent culture that took place in the European telecommunications sector in which patenting had until that time been regarded as a secondary issue - specifically among the national telecommunications service providers whose markets had previously been monopolized but were now deregulated (Granstrand, 1999; Bekkers, Verspagen & Smits, 2002).

What basically has been presented in literature to have happened in the context of the GSM standard was that a U.S. company, Motorola, for which patenting was a natural and integral part of doing business, entered the European scene and employed the aggressive patent strategy it was used to. While other standard setters operated in accordance with a "gentleman's agreement", shared their ideas and specifications during the standardization process in an open atmosphere, and refrained from patenting once the basic technical decisions had been made, Motorola pursued patent protection in the course of the process (Granstrand, 1999). Furthermore, Bekkers, Verspagen & Smiths (2002) have argued that while most other companies agreed on

licensing their essential rights on fair, reasonable and non-discriminatory terms or at no cost, Motorola refused to make general declarations. It declined monetary compensation and was only willing to cross-license its patents to certain companies. Although Siemens, Alcatel, Nokia and Ericsson were able to negotiate cross-licenses, Motorola's licensing strategy effectively prevented various other companies from entering the market. When a number of non-European companies finally managed to obtain all the necessary licenses to built GSM terminals in the late 1990s, the cross-licensees had already built up a strong market position. Moreover, since the cumulative licensing fee paid for a GSM handset was very high as confirmed by studies of Bekkers, Duysters and Verspagen (2002), the price made it difficult to compete if the company was not part of a cross-licensing agreement. In fact it has been argued that the licensing fees have totaled as much as 29% of the costs of a GSM handset (Bekkers, Verspagen & Smits, 2002; Bekkers, Duysters & Verspagen, 2002).

### D. RAND-LICENSING

Even under the RAND system, specific, commercial licensing terms are typically not agreed upon during the standard setting. Revealing the terms after adoption can generate conflicts and hamper the parties' ability to compete in the affected market. Peterson (2002b) lists the following situations that could arise in this context: 1) the patent holder seeks a broad grant-back that appears non-discriminatory but has different effects on different parties; 2) the patentee requires a minimum annual royalty based on "administrative costs", which may have the effect of excluding smaller rivals and new entrants; 3) the patentee seeks royalties from downstream providers such as manufacturers of finished goods, and refuses to license to suppliers of upstream inputs such as IC vendors, and thus to increase its income, which however may increase competitors' costs and time to market; 4) the patent holder acquires admissions of infringement and validity, and/or retains the right to immediately terminate a license if the licensor challenges infringement or validity; 5) the patentee requires acceptance of venue, which might constitute a major problem for small companies or foreign competitors; and 6) the patent holder seeks a royalty that it considers "fair" but that exceeds the average profit margin of all the parties who need licenses. For instance, one of the U.S. interviewees mentioned that his company had been approached with a royalty requirement as high as 10% (Interview data U.S., 2004).

Furthermore, even though the company may have made it clear in its licensing statement that the license was only available under certain conditions it considered as fair, reasonable and non-discriminatory, these terms may come as a surprise to some and cause disputes. For instance, the Townshend v. Rockwell International Corp. and Conexant Systems (N.D.Cal.2000) litigation arose when Townshend, whose patents "read on" the V.90 standard for 56K chipset modems and who had promised to license them on certain terms, filed a patent-infringement suit against Rockwell and its successor Conexant. In response Rockwell and Conexant asserted two antitrust counterclaims based on the Sherman Act Sections 1 (conspiracy) and 2 (monopolization and its attempt) among others, and claimed that Townshend and 3Com had conspired to restrain trade by deceiving the ITU into incorporating Townshend's patent into the industry standard, denying competitors access to the technology, and filing a patent-infringement lawsuit to prevent Conexant from using Townshend's technology. Furthermore, Townshend and 3Com were accused of having attempted to monopolize the market for 56K modem chipset products (Kirsch, 2000; Townshend v. Rockwell International Corp. and Conexant Systems, Inc., 55 U.S.P.Q.2d 1011 (N.D.Cal.2000)).

I am not going to go into the legal specialties of the case here, but the Court found all Rockwell's and Conexant's counterclaims unfounded. With regard to the antitrust-based claims it noted, among other things, that there had been no collusion, and since 3Com - to which Townshend had non-exclusively licensed its essential patent prior to the setting of the ITU V.90 standard - had declared during the standardization procedure that Townshend had relevant patents pending, ITU had not been deceived. Since 3Com had also made a proposition prior to the acceptance of the standard to license those patents for a per-unit royalty fee, or to cross-license them in return for technologies that were specified in the standard, or related to it and were otherwise practically necessary or desirable for technical or economic reasons in order to make a commercially viable product compliant with the standard, and further that it had not been shown that Rockwell and Conexant could not have obtained a license under those terms, Townshend's actions could not be held anticompetitive (Kirsch, 2000; Townshend v. Rockwell International Corp. and Conexant Systems, Inc., 55 U.S.P.Q.2d 1011 (N.D.Cal.2000)).

The previous case illustrates that it is particularly difficult to defend oneself against such patent holders that have disclosed their patents properly and declared their licensing terms during the standard-setting procedure. Indeed, due to the flexibility in the interpretation of RAND, having patents in standardized technology could also become a valuable source of royalties or other resources. For instance, Qualcomm relies on a royalty stream resulting from others utilizing its patented technology incorporated into various standards. In fact, the pricing of Qualcomm's licenses has led to huge disagreement between Qualcomm and six other companies involved in the WCDMA 3G standard. Basically, Broadcom, Ericsson, NEX, Nokia, Panasonic Mobile Communications and Texas Instruments have all claimed that Qualcomm, who promised to license its essential WCDMA patents on RAND terms, is charging excessive and disproportionate royalties for them. Qualcomm has been claimed to charge the same royalty rate on the WCDMA 3G standard as it does for the CDMA2000 standard adopted in the U.S., although it has fewer essential patents in it. Furthermore, it offers lower royalty rates to handset customers who buy chipsets exclusively from Qualcomm than to manufacturers of chipsets for mobile phones, making entry into the market more difficult for chip makers (Nokia, 2005a; Nokia, 2005b; Out-law.com, 2005).

As a result of this disagreement, all six of the previously-mentioned companies filed complaints to the European Commission in October 2005 requesting it to investigate and to put an end to Qualcomm's anticompetitive conduct (Nokia, 2005a; 2005 b; Out-law.com, 2005). Qualcomm has responded to the allocations stating that they are legally without merit, and appear to be nothing more than an attempt by these licensees to renegotiate their license agreements. In a separate move, Qualcomm then filed a patent-infringement action against Nokia claiming that Nokia was infringing 12 of its patents that related to GSM, GPRS and EDGE standards (Jacobs, 2005; Nokia, 2005c; Wireless Watch, 2005b).

This is not the end of Qualcomm's legal disputes, however. Previously, in July and again in October, the company had filed infringement suits based on the previously-mentioned patents against Broadcom. These actions were a follow-up of Broadcom's claims that included a patent-infringement action filed against Qualcomm in May 2005, a complaint with the U.S. International Trade Commission (ITC) suggesting that Qualcomm was unfairly importing products that infringed Broadcom's patents and requesting that the ITC investigate Qualcomm's imports, and a separate antitrust suit raised in July. This U.S. antitrust claim was based on similar grounds as the complaint made to the European Commission. In its antitrust complaint Broadcom charged Qualcomm with abuse of the wireless technology standards-setting process, failure to meet its

commitments to license technology for cellular wireless standards on RAND terms, and various anticompetitive activities in the sales and marketing of chipsets based on CDMA technology (Gohring, 2005a; 2005b; Regan, 2005).

As can be seen from the volume of suits and counter-suits discussed earlier, Qualcomm's strategy of using its essential patents as revenue generators is challenging and particularly litigation-sensitive, and it is not considered viable by all technology/patent-licensing firms even though their business model would support such activity. One of the U.S. interviewees stated, for example, that taking into consideration the current legal situation and the IPR policies adopted by many standards bodies, it was not beneficial for it to take any part in the standardization. Its business was based on technology and patent licensing, not on manufacturing products, and there was simply not enough monetary compensation involved in standards (Interview data U.S., 2004).

### E. CROSS-LICENSING

As mentioned earlier, agreeing upon exact licensing terms is not part of the standard-setting procedure, and negotiations are held between the companies interested in using the standard. This follows that another reason beyond the technological benefits for promoting the selection of patented technology for a standard is the possibility to cross-license patents with those of other participants that also "read on" the standard. The more patents companies have, the less they have to pay others for using the standard. Cumulative royalties might otherwise reach the point of unprofitable manufacture (Alkio, 2003; Soininen, 2005). For this reason, companies have an incentive to obtain patents that are essential for using the standardized technology. They may therefore amend their pending patent applications and file for new ones during the standardization process and thereafter in order to make sure that if a certain technology is chosen for a standard, their patents cover some of its elements. For example, with regard to the CDMA2000 standard, Qualcomm held 28%, Nokia 16%, NTT DoCoMo 13%, Ericsson 8%, Motorola 7% and Hitachi 5% of the essential patents involved. Then again, Ericsson has 30%, Nokia 21%, Qualcomm 20% and Motorola 14% of the essential patents included in the WCDMA standard (Alkio, 2003). In fact, it has been estimated that some of these major patent holders will end up with a total royalty of 7% of costs or less, while a non-patent holder could pay 25% of the wholesale price in GSM and WCDMA royalties (Wireless Watch, 2005a).

In order to diminish the problem with too high royalties, some manufacturing firms and operators have declared that they would prefer to agree upon cumulative royalty caps beforehand (Wireless Watch, 2005a). For instance, Nokia was behind such a proposal in respect of 3G patents (Naraine, 2002a). Nevertheless, there are different views on whether agreeing on licensing terms is the job of the standards organization at all, and Qualcomm, in particular, has opposed the royalty-cap proposition actively (Naraine, 2002b). Also one of the U.S. interviewees pointed out during the interview, that in the end, the markets determined whether a product was feasible at a certain price or not. This was not the licensor's responsibility. He further noted that the game in the industry seems to have turned into a price competition rather than the building up of value to customers and communicating that value to them (Interview data U.S., 2004). However, as far as the next version of the 3GPP-based radio standard, Long Term Evolution (LTE), is concerned, ETSI is considering getting all relevant patent holders to sign up to a pre-agreed cumulative cap of approximately 5% for royalties on the cost of LTE equipment (Informamedia.com, 2006).

## F. LICENSING AND SUBMARINE-PATENTS

As explained earlier, standardization participants have diverging business interests that, combined with control over certain aspects of technology, complicate the standardization process and the adoption of standards particularly if monetary or other licensing compensation is pending. In fact, quantitative research conducted by Blind et al. (2002) has indicated that the dilemma is not rare at all: over 30% of European companies reported that they had faced dilemmas involving the high licensing fees demanded by the IPR/patent holders, and approximately 25% had had problems with cross-licensing (Blind et al., 2002). However, if there were no compensation, fewer patent holders might be inclined to allow anyone to utilize their patented inventions, and technologically inferior technology might be chosen for the standard. In fact, it has been suggested that incentives offered to patent holders are not sufficient given the positive effects of standardization. Another quantitative study also conducted by Blind et al. (2002) demonstrated that the tendency to join standardization processes is lower if an undertaking has intense patent activity than if it does not. It is suggested that this could be an indicator that the use of IPRs, reflecting the success of the company's own R&D activities, and participation in standardization are, to certain extent, alternative innovation strategies (Blind at al., 2002; Soininen, 2005). Unfortunately this finding also indicates that a large chunk of patents may fall into the category of third-party patents that have a high likelihood to remain unnoticed.

What basically differentiates submarine-patent cases and those in which a patent has been properly disclosed is the possibility to make informative decisions about the adoption of a standard, design around it or to agree upon licensing terms in advance. However, standards organization's patent policies only require a general promise to license on RF or RAND terms. Exact licensing conditions are negotiated separately between the parties and this is often done after the standard has been elected. Therefore, with an exception of the fact that a licensing statement has been given and therefore there are more chances of challenging the company's licensing terms, these situations bear a lot of similarities to submarine-patent cases. Obviously, if licensing terms were specified better and RAND terms were determined in accordance with the situation that has prevailed prior to the establishment of the standard, there would be less room for interpretation, and the patent holder would not be in such a good negotiation position. This follows that, even though it was possible to diminish the dilemma with submarine-patents discussed earlier, licensing perplexities would probably continue to prevail. On the other hand early disclosure could at least diminish those significant economic losses that would occur if the submarine patent surfaced after the standard had been used broadly and various complementary products and services had been based on it. It should be pointed out, however, that the advantages of clearing all relevant patents beforehand also depends on whether the standard is such that it is constantly evolving as new features are incorporated into the system after the original standard has been set, or whether it remains unchanged after its establishment. In the former situations it would be important to be able to gain information also on those rights, which are essential for the purposes of implementing the standard in its amended form, while those rights that were initially essential may no longer be relevant at this phase.

## VI. DISCUSSION

In the previous chapters I have identified multiple situations in which patents have caused concern during and after cooperative standard setting. These situations could basically be divided into those in which the holder of the disputed patent has participated in setting the standard and those in which the patent holder is a third party. Furthermore, a distinction could be made between patents that have been properly disclosed to the other participants, and the rights that come as a surprise either because the patent policy has not required their disclosure and no attention has been drawn to them, the patent holder has intentionally concealed them despite the patent policy, or the rights holder has accidentally neglected to disclose them.

The number-one reason for the disputes that have arisen in the previously-mentioned situations is that patent holders use their position of being able to prevent others from using an invention that is essential for operating the standard to require licensing fees or other terms that are unacceptable to companies operating in the industry. When talking about properly disclosed patents, the patent holder may have made a declaration prior to the publication of the standard specification to the effect that it was willing to license its essential patents royalty-free, or that it was willing to license them on fair, reasonable and non-discriminatory terms. Here, the patent holder may have posed certain limitations, or the patent holder may have made only a blank promise of RF or RAND licensing, and a dispute may arise afterwards over what the correct interpretation of such a promise is. Sometimes, there may not be any kind of a promise.

The consequences of the patent holder refusing to license at all, or on terms accepted by most companies, depend on when the dilemma comes to light. The longer it takes for the dispute to arise the worse are the consequences from a societal perspective. Before the standard is set it may well be possible to design around the patents or to choose other technologies over heavily patented ones, and even after the standard specifications have been published, the abandoning of the standard altogether, or its modification, may not be detrimental as companies may have alternative standards to choose from. Of course, the time and the money invested in setting a standard would be lost. On the other hand, if the standard has already been broadly adopted it may be difficult and very costly to change the specifications without losing the network benefits. Ultimately, doing so would harm consumers who are already using a system in which various products are interchangeable and interoperable. Obviously, from the patent holder's perspective, the situation is reversed: the later his patent comes to the surface, the more leverage he gains.

I posed the question in the title of this article whether especially the submarine-patent problem truly existed or whether it was a red herring. Although the evidence is largely anecdotal and further quantitative research is needed, I have to conclude that problems to do with unidentified patents do come to the surface after the standard has been established. Obviously, even though there is a high likelihood that plenty of relevant patents remain unnoticed, it is only a minor aspect of the variety of conflicts that patents give rise to during or after standardization, and plenty of standards can be adopted without actually having to face troubles with submarine patents. Particularly those situations in which it can be proven that a standard-setting participant breached the patent policy and purposefully concealed the existence of relevant patents or patent applications and thus misled the industry and manipulated the process in order to gain market power, appear to be rare. Companies typically try to do their best to comply with the patent policy.

Avoiding problems with submarine patents seems to be getting more challenging all the time, however. This is because ICT patents, some of which are valid and some of which are not, are increasing in number making it more difficult to avoid infringement. Furthermore, patents are being assigned more often than before and therefore they may end up in companies that did not participate in setting the standard. Patents are also utilized more aggressively in the field, and the more patent-holding companies are seeking to extract as high royalties as they can get from those implementing a standard the less likely it is that an amicable solution can be reached. As a consequence, particularly the U.S. red herring population seems to be growing quickly in number, even though certain legal provisions such as the U.S. Sherman Act, sections 1 and 2, which prohibit conspiracy and monopolization or its attempt, and the FTC Act, section 5, which prohibits the use of unfair and deceptive business practices, have been and could be used in an attempt to wipe out the most colorful individuals. Other legal tools include fraud, equitable estoppel that prevents a party that has not operated fairly from enforcing his rights, the doctrine of prosecution laches applicable to patents that have been issued following an unreasonable and unexplained delay during patent prosecution phase, and the implied-license and patent-misuse doctrines (Lemley, 2002; Mueller, 2001). Furthermore, non-infringement clarification and patent invalidation either in court or as an opposition (EPO) or re-examination (USPTO) procedure in the patent office could be attempted. In Europe the EC treaty, Art 81 (prohibits agreements and concerted practices that prevent, distort or restrict competition) and 82 (prohibits the abuse of dominant position) could offer limited help as well. Unfortunately, the legal means have not appeared to be very effective so far. The fact that legal disputes have arisen demonstrates that the dilemmas are serious and that they bear significant economic weight, however.

What makes particularly the submarine-patent problem interesting from the societal and patent policy perspective is that in this case companies implementing the standard have not, for some reason or other, been able to identify the relevant rights or to plan their operations so as to avoid infringement. Moreover, the consequences of not being able to continue to use a specific standard may have far-reaching effects not only on the competition in a certain field but also on consumers. Therefore, the purpose of the patent system - to promote innovation and facilitate technology transfer through granting the inventor an exclusive right in return for publishing his invention - may not merely restrain trade in the traditional sense, *i.e.* legal monopoly versus free competition, but may also contravene the public interest in a way that is no longer reasonable given the role of patents in enhancing innovation. This, incidentally, has been seriously questioned in areas such as software and semiconductors. In fact, patents and standards are a policy concern linked to a more general concern regarding IPR protection and the possibility of using it in order to control product interoperability.

This article suggests that further attention should be paid to analyze the efficacy of the legal framework and the need for legislative amendments particularly in the context of standards and so-called submarine patents that come to surface after the standard has been established and adopted. As a practical matter for diminishing potential conflicts, clarifying patent policies in respect to disclosure and licensing obligations, conducting more thorough patent due diligence, and developing guidelines on how to determine RAND terms are recommended. It is further noted that limiting only the risk of submarine patents will not get us far in reducing the conflicts between patents and standards.

## References


Alkio, M. (2003, March 9). Kovaa peliä patenteilla. *Helsingin Sanomat*, E3.

ANSI. (2003a). *Guidelines for implementation of the ANSI patent policy.*

ANSI. (2003b). *Patent policy.*

Asaravala, A. (2004, April 24). Forgent sues over JPEG patent. *Wired News.* Retrieved August 29, 2006, from http://www.wired.com/news/business/0,1367,63200,00.html.

Balto, D.A., & Wolman, A.M. (2003). Intellectual property and antitrust: General principles. *IDEA The Journal of Law and Technology*, 43(3), 396-474.

Bekkers, R., Duysters, G., & Verspagen, B. (2002). Intellectual property rights, strategic technology agreements and market structure. The case of GSM. *Research Policy,* 31, 1141-1161.

Bekkers, R., Verspagen, B., & Smits, J. (2002). Intellectual property rights and standardization: the case of GSM. *Telecommunications Policy*, 26(3-4), 171-188.

Berlind, D. (2002a, April 16) IBM drops Internet patent bombshell. *Tech Update.*

Berlind, D. (2002b, 25 April). The hidden toll of patents on standards. *Tech News on ZDNet.* Retrieved August 29, 2006, from http://news.zdnet.com/2100-9595_22-891852.html.

Berman, V. (2005, January-February). Is it time to reexamine patent policy for standards?. *IEEE Design & Test of Computers*, 71-73.

Bessen, J. (2003). *Strategic patenting of complex technologies* (Working Paper). Research on Innovation.

Blind, K. (2004). *The economics of standards.* Edward Elgar.

Blind, K., Bierhals, R., Thumm, N., Hossain, K., Sillwood, J., Iverser, E., van Reekum, R., & Rixius, B. (2002). *Study on the interaction between standardisation and intellectual property rights* (EC Contract No G6MA-CT-2000-02001).

Blind, K., Edler, J., Nack, R., Strauß, J., (2001). *Micro- and Macroeconomic Implications of the Patentability of Software Innovations. Intellectual Property Rights in Information Technologies between Competition and Innovation* (Study on Behalf of German Federal Ministry of Economics and Technology).

Calderone, L.L. & Custer, T.L. (2005, November). *Prosecution laches as a defense in patent cases.*Flaster Greenberg Attorneys at Law. Retrieved August 29, 2006, from http://www.flastergreenberg.com/pdf/PatentArtic_prf3.pdf.

Caplan, P. (2003). *Patents and open standards* (White paper prepared for the National Information Standards Organization).

Chesbrough, H. (2003). *Open innovation.* Harvard Business School Press.

Clark, D. (2002, October). Do Web Standards and Patents mix?. *Computer*, 19-22.

Clark, R. (2002, July 19). *Concerning recent patent claims.* Retrieved August 29, 2006, from http://www.jpeg.org/newsrel1.html.

Cohen, W.M., Nelson, R.R., & Walsh, J.P. (2000, February*). Protecting their intellectual assets: Appropriability conditions and why U.S. manufacturing firms patent (or not).* (NBER Working Paper Series).

Cunningham, A. (2005). Telecommunications, intellectual property, and standards. In I. Walden & J. Angel, *Telecommunications law and regulation*, Oxford.

DLA. (2004). *European intellectual property survey.*

Eolas Technologies Incorporated and the Regents of the University of California v. Microsoft Corporation, 399 F.3d 1325, 73 U.S.P.Q.2d 1782 (Fed. Cir., 2005).

ETSI. (2005). *IPR policy*.

Farrell, J. (1996). *Choosing the rules for formal standardization*. UC Berkeley.

Feldman, R.P., & Rees, M.R. (2000, July). The effect of industry standard setting on patent licensing and enforcement. *IEEE Communications magazine*, 112-116.

Ferguson, K., (1999, April 19). 20/20 foresight. *Forbes.com*. Retrieved August 29, 2006, from http://www.forbes.com/1999/04/19/feat.html.

Forgent Networks. (2006). Intellectual property, '672 patent cases. Retrieved August 29, 2006, from http://www.forgent.com/ip/672cases.shtml.

Frank, S.J. (2002, March). Can you patent an industry standard?. *IEEE Spectrum*.

FTC. (2003). *To promote innovation: The proper balance of competition and patent law and policy*.

Graham, S.J.H., & Mowery, D.C. (2002, June 6-8). *Submarines in software? Continuations in U.S. software patenting in the 1980s and 1990s*. Paper presented at the DRUID Summer Conference on Industrial Dynamics of the New and Old Economy – who is embracing whom?, Copenhagen/Elsinore.

Granstrand, O. (1999). *The economics and management of intellectual property*. Edward Elgar Publishing.

Grindley, P. (2002). *Standards, strategy and policy*. Oxford.

Gohring, N. (2005a, October 21). Qualcomm files a second suit against Broadcom. *InfoWorld*. Retrieved August 29, 2006, from http://www.infoworld.com/article/05/10/21/HNqualcommsecondsuit_1.html.

Gohring, N. (2005b, November 7). Qualcomm files patent infringement suit against Nokia. *InfoWorld*. Retrieved August 29, 2006, from http://www.infoworld.com/article/05/11/07/hnqualcommsuit_1.html.

GovTrack.us. 109th Congress, H.R. 2795: Patent Act of 2005. Retrieved August 29, 2006, from http://www.govtrack.us/congress/bill.xpd?bill=h109-2795.

Hahn, R.W. (2001, March). Competition policy and the new Economy. *Milken Institute Review*, 34-41.

Heinze, W.F. (2002, May). Dead Patents Walking. *IEEE Spectrum*, 52-54.

Hemphill, T.A. (2005, January). Technology standards development, patent ambush, and US antitrust policy. *Technology in Society* 27(1), 55-67.

Hjelm, B. (2000). Standards and intellectual property rights in the age of global communication – A review of the international standardization of third-generation mobile system.

IETF. (2005). *Intellectual property rights in IETF technology*.

In the Matter of Dell Computer Corp., Complaint, Docket No. C-3658 (FTC, 2 November 1995).

In the Matter of Dell Computer Corporation, Decision and Order, Docket No. C-3658 (FTC, 20 May 1996).

In the Matter of Rambus Incorporated, Complaint, Docket No. 9391 (FTC, 18 June 2002).

In the Matter of Rambus Incorporated, Initial Decision, Docket No. 9391 (FTC, 23 February 2004).

In re Bogese II, 303 F.3d 1362 (Fed. Cir., 2002).

Informamedia.com. (2006, March 1). ETSI acts on unfair, unreasonable and discriminatory IPRs. *Informamedia.com*.

IPO. (n.d.). *21st Century Patent Coalition, "Submarine patents" ARE a significant problem*. Retrieved August 29, 2006, from http://www.ipo.org/contentmanagement/contentdisplay.cfm?contentid=7334>.

ITU-T. (n.d.). *Patent policy*.

ITU-T. (2005). *Patent policy implementation guidelines*.

Jacobs, P., (2005, December). Qualcomm defends patent licensing programme. *wirelessweb*. Retrieved August 29, 2006, from <http://wireless.iop.org/articles/news/6/12/6/1>.

Kipnis, J. (2000, July). Beating the system: Abuses of the standards adoption process. *IEEE Communications Magazine*, 102-105.

Kirsch, E.D. (2000). International standards participation: Lessons from Townshend & Dell. *International lawyers network. The bullet"iln",* 1(2). Retrieved August 29, 2006, from http://www.ag-internet.com/push_news_one_two/internationalstandards.htm.

Knight, H.J. (2001). *Patent strategy for researchers and research managers*. John Wiley & Sons, Inc.

Kratzman, V.A. (2005). *Technology transfer mid-term report next step recommendations*. FINPRO.

Krechmer, K. (2005, January). *Communications standards and patent rights: Conflict or coordination?*. Paper presented at the Economics of the Software and Internet Industries Conference, Tolouse, France.

Labsystems Oy v. Biohit Oy. HO S 94/1922 (Helsinki Court of Appeal, 27 April 1995).

The Lemelson Foundation (n.d.). Jerome H. Lemelson. Retrieved August 29, 2006, from http://www.lemelson.org/about/bio_jerry.php.

Lemley, M.A. (2002). *Intellectual property rights and standard setting organizations* (UC Berkeley Public Law and Legal Theory Research Paper Series, Research Paper 84).

Lemos, R. (2002, July 23). Finding patent truth in JPEG claims. *CNET News.com*. Retrieved August 29, 2006, from http://news.com.com/Finding+patent+truth+in+JPEG+claim/2100-1001_3-945686.html.

Lo, A. M. (Jupiter Networks, Inc) (2002). *A need for intervention: Keeping competition alive in the networking industry in the face of increasing patent assertions against standards*. FTC/DOJ Hearings on Competition and Intellectual Property Law and Policy In the Knowledge-Based Economy–Standard Setting and Intellectual Property, 18 April 2002.

Malone, S. (2005, November 1). Microsoft loses Eolas Supreme Court appeal. *PC Pro*, Retrieved August 29, 2006, from http://www.pcpro.co.uk/news/news/79431.

Marasco, A. (ANSI, October 30) (2003). *IPR and standards*. Presentation at AIPLA.

Markoff, J. (2002, July 29). Patent claim strikes an electronics nerve. *The New York Times*.

Megantz, R.C. (2002). *Technology management. Developing and implementing effective licensing programs*. John Wiley & Sons.

Messerschmitt, D.G. & Szyperski, C. (2003). *Software ecosystem*. The MIT press.

Miele, A.L. (2000). *Patent Strategy: the manger's guide to profiting from patent portfolios*. John Wiley & Sons, Inc.

Mueller, J.M. (2001). Patenting Industry Standards. *John Marshall Law Review,* 34.

Naraine, R. (2002a, May 8). Nokia calls for 5% cap on 3G patent royalties. *Internetnews.com*. Retrieved August 29, 2006, from http://internetnews.com/wireless/article.php/1041561.

Naraine, R. (2002b, May 10). Qualcomm rejects Nokia patent cap proposal. *Internetnews.com*. Retrieved August 29, 2006, from http://www.interetnews.com/wireless/article.php/1116381.

Nokia. (2005a, October 28*). Leading mobile wireless technology companies call on European Commission to investigate Qualcomm's anti-competitive conduct*. Retrieved August 29, 2006, from http://press.nokia.com/PR/200510/1018639_5.html.

Nokia. (2005b, October 28). *Leading mobile wireless technology companies call on European commission to investigate Qualcomm's anti-competitive conduct*. Retrieved August 29, 2006, from http://europe.nokia.com/BaseProject/Sites/NokiaCom_CAMPAIGNS_57710/CDA/Categories/PressEvents/_Content/_Static_Files/transcript.pdf.

Nokia. (2005c, November 7). *Nokia responds to reports of Qualcomm GSM Patent Infringement Suit*. Retrieved August 29, 2006, from http://press.nokia.com/PR/200511/1019958_5.html.

OASIS. (2005). *IPR policy*.

OECD. (2004). *Patents and innovation: Trends and policy challenges*. Retrieved August 29, 2006, from http://www.oecd.org/dataoecd/48/12/24508541.pdf.

OECD. (2005). *Compendium of patent statistics*. Retrieved August 29, 2006, from http://www.oecd.org/dataoecd/60/24/8208325.pdf.

Ohana, G. (Cisco Systems, Inc). (2005, October 6). Intellectual property rights: Policies in standard-setting: Areas of debate. In Proceedings From A to Veeck: Standardization and the Law, 2005 ANSI Annual Conference. Retrieved August 29, 2006, from http://public.ansi.org/ansionline/Documents/Meetings%20and%20Events/2005%20Annual%20Conference/Legal%20Conference/Ohana-Panel%20I.pdf.

Out-law.com. (2005, November 31). Mobile-makers say 3G patent licensing breaks antitrust laws. Retrieved August 29, 2006, from http://www.out-law.com/page-6280.

Peterson, S.K. (Hewlett-Packard Company). (2002a). *Consideration of patents during the setting of standards*. For FTC and DOJ Roundtable, Standard setting Organizations: Evaluating the Anticompetitive Risks of Negotiating IP Licensing Terms and Conditions Before A Standard Is Set, 6 November 2002.

Peterson, S.K. (Hewlett-Packard Company). (2002b). *Patents and standard-setting processes*. FTC/DOJ Hearings on Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy, 18 April 2002.

Perens, B. (n.d.). *The problem of software patents in standards*. Retrieved August 29, 2006, from http://perens.com/Articles/PatentFarming.html.

Poltorak, A.I. & Lerner, P.J. (2004). *Essentials of licensing intellectual property*. John Wiley & Sons, Inc.

PwC Advisory. (2006). *2006 Patent and trademark damages study*.

Rahnasto, I. (2003). *Intellectual property rights, external effects, and anti-trust law*. Oxford University Press.

Rambus, Inc v. Infineon Technologies AG, 318 F.3d 1081, 65 U.S.P.Q.2d 1705 (Fed. Cir., 2003).

*Red Herring*. (2006, February 3). JPEG patent reexamined. Retrieved August 29, 2006, from http://www.redherring.com/Article.aspx?a=15582&hed=JPEG+Patent+Reexamined&sector=Industries&subsector=Computing.

Regan, K. (2005, July 5). Broadcom suit accuses Qualcomm of antitrust tactics. *Ecommerce Times*. Retrieved August 29, 2006, from http://www.ecommercetimes.com/story/44395.html.

Reingold, J. (2006, January). Patently aggressive. 102. Retrieved August 29, 2006, from http://www.fastcompany.com/magazine/102/patents.html.

Rivette, K., & Kline, D. (2000). *Rembrandts in the attic*. Harvard Business School Press.

Sarvas, R.., & Soininen, A. (2002, October). Differences in European and U.S. patent regulation affecting wireless standardization. Paper presented at International Workshop on Wireless Strategy in the Enterprise, Berkeley, California.

Shapiro, C. (2001). *Navigating the patent thicket: Cross licenses, patent pools and standard setting*.

Shapiro, C., & Varian, H.R. (1999). *Information rules*. Harvard Business School Press.

Shurmer, M., & Lea, G. (1995, June). Telecommunications standardization and intellectual property rights: a fundamental dilemma?. *Standardview* 3(2).

Soininen, A. H. (2005, September 21-23).Open standards and the problem with submarine patents. *In proceedings of SIIT 2005, 4th International conference on standardization and innovation in information technology*, Geneve, 231-244.

Stroyd, A.H. (2000). Lemelson bar coding patents: Attempting to sink the submariner. Retrieved August 29, 2006, from http://www.mhia.org/PSC/pdf/Lemelson.PDF.

Surowiecki, J. (2006, December 26/January 2)). Blackberry picking. *The New Yorker*, Financial Page.

Symbol Technologies Inc. v. Lemelson Medical, Education & Research Foundation, 277 F.3d 1361, 61 U.S.P.Q.2D (BNA) 1515 (Fed. Cir., 2002).

Symbol Technologies, Inc et al. v. Lemelson Medical, Education & Research Foundation, LP et al., 422 F.3d 1378, 76 U.S.P.Q.2d 1354 (Fed. Cir., 2005).

Teece, D.J. (2000). *Managing intellectual capital*. Oxford University Press.

Townshend v. Rockwell International Corp. and Conexant Systems, Inc., Not Reported in F.Supp.2d, 2000 WL 433505, 2000-1 Trade Cases P 72,890, 55 U.S.P.Q.2d 1011 (N.D. Cal., 28 March 2000).

Varchaver, N. (2001, May 3). *Jerome Lemelson the patent king*. Retrieved August 29, 2006, from http://www.engin.brown.edu/courses/en90/fall/2003/Lemelson%20Fortune%20may%2014%202001%20article.pdf.

Vermont, S. (2002). The economics of patent litigation. In B. Berman (Ed.). *From ideas to assets. Investing wisely in intellectual property*. John Wiley & Sons, Inc.

Watts, J.J.S. & Baigent, D.R. (2002). Intellectual Property, Standards and Competition Law: Navigating a Minefield. *IEEE*, 837-842.

Westman, R. (1999, October). The Battle of Standards – and the road to peace. *On – The New World of Communication*, 26-30.

Wireless Watch (2005a, November 29). Mobile patents war shifts to email. *The Register*. Retrieved August 29, 2006, from http://www.theregister.co.uk/2005/11/29/mobile_email_patents_war/.

Wireless Watch (2005b, November 15), Qualcomm IP battle hots up. *The Register*. Retrieved August 29, 2006, from http://www.theregister.co.uk/2005/11/15/qualcomm_ip_battle/.

Wong, W. (2002, April 18). IBM ebMXL patent plan royalty-free. *Tech Update*.

W3C. (2004). *Patent policy*.

# PUBLICATION 3

Aura Soininen

**Is Our Legal Framework Sufficient for Handling the Problems with Submarine Patents and (Open) Standards in the ICT Sector?**

Submitted for review to IPR University Center Publications, IPR Series B

# IS OUR LEGAL FRAMEWORK SUFFICIENT FOR HANDLING THE PROBLEMS WITH SUBMARINE PATENTS AND (OPEN) STANDARDS IN THE ICT SECTOR?

Aura Soininen*

**Abstract**

*Both open standards and patents carry a lot of economic significance in ICT companies' business operations, and both of them have become more necessary over time, resulting in an increased number of conflicts. Indeed, disputes over licensing terms have been rather common during the last few years. Furthermore, submarine patents that have emerged after the adoption of a standard have caused delay and friction in the market place, and litigation has resulted particularly when there has been a reason to suspect that the patent holder has purposefully captured the standard by concealing the existence of his rights during the standardization process.*

*This paper assesses whether the legal framework is sufficient for addressing the problems with submarine patents so as to avoid societal losses resulting from the need to abandon a standard due to patents, especially in situations in which interoperability is at stake.*

---

 Aura Soininen (LL.M.) is a Ph.D candidate at the University of Lappeenranta (LUT), Dept. of Business Administration, and she works as a lawyer at Attorneys at Law Borenius & Kemppinen, Ltd. The views and opinions expressed in this paper do not represent those of the associated organizations, but are the author's alone.

## CONTENTS

# I. INTRODUCTION

## A. BACKGROUND: ABOUT STANDARDS AND STANDARDIZATION IN GENERAL

Standards are important for health, safety and environmental reasons but their existence also makes it possible for competitors to develop compatible and interoperable products[1]. Indeed, interoperability standards are paramount particularly in industries in which network effects are strong and product compatibility has comprehensive benefits. The information and communications technology (ICT) sector is one of these industries, and the volume and pace of cooperative standard setting has grown substantially in this area. Moreover, the types of organization developing industry standards have expanded in both number and type.[2] While many companies aim to attract the critical mass that would make their products or services market-based standards, *i.e.* so-called de facto standards that typically start out as proprietary interfaces or protocols, but as time goes by become so commonly adopted that they become factual standards[3], achieving that position in the marketplace is challenging. Thus, cooperation in setting interoperability standards is often needed in order to generate the positive network externalities that are present when a product or a service becomes more valuable to users as more people use it[4].

The development of a standard may be coordinated by the government or an official or semi-official standards organization that is open to anyone to join, or it may originate from consortia or an industry group[5]. Companies participating in standard setting benefit as they have the opportunity to influence the selection, and thus to shape future markets, which in turn may contribute to their time-to-market advantage.[6] Basically, companies that control and influence industry standards may be capable of generating returns unmatched by any other type of competitive advantage[7].

### (i) De Jure and De Facto Standardization

Both de jure and de facto standards are common in the ICT sector, and their importance has only increased over time even though the most preferable form of setting standards has shifted. De facto standards have been favored so far in the software industry because de jure standardization has been considered cumbersome and too slow given the fast development cycle

---

[1] WIPO, *Standards, Intellectual Property Rights and Standards-setting Process,* <http://www.wipo.int/sme/en/documents/ip_standards.htm> (last visited 6/12/2006).

[2] Richard S. Taffet, *Patented Technology and Standard Setting: A Standards Development Organization View*, at 11 (In *A Year in the Life of a High Tech Standard Setting Organization, Section of Antitrust Law*, 2002, 5-29).

[3] David G. Messerschmitt & Clemens Szyperski, *Software Ecosystem*, at 235 (The MIT press 2003); Carl Shapiro & Hal R. Varian, *Information Rules*, at 13 - 16, 228 (Harvard Business School Press 1999).

[4] Shapiro & Varian, at 229 (1999); Suzanne Scotchmer, *Innovation and Incentives,* at 289 (The MIT Press 2004).

[5] *See e.g.,* Ilkka Rahnasto, *Intellectual Property Rights, External Effects, and Anti-trust Law,* at 186-187 (Oxford University Press 2003); Knut Blind, *The Economics of Standards, Theory, Evidence, Policy*, at 2 (Edward Elgar 2004).

[6] ETSI, *Why should I join ETSI?* (2004) <http://www.etsi.org/about_etsi/membership/home.htm> (last visited 27/12/2006); WIPO (year n/a).

[7] Roger E. Grant, *Contemporary Strategy Analysis*, at 345 (Blackwell Publishing, 5th edition, 2005).

that is characteristic of the industry[8]. In view of the rapid technological developments, the inherent flexibility of software and the rapid distribution mechanisms it is possible to frequently introduce new products exploring new technologies and applications, and formal standardization has been said to cause delay and friction in this process. However, the Internet has fundamentally increased the importance of commonly agreed standards, and given the urgent need for them, there is a call for more facile and rapid standardization processes. In fact, the trend is toward research-integrated standardization, in which the standard is allowed to evolve and expand in scope over time based on feedback from research and real-world experience.[9] In contrast, de facto standards have traditionally had only a minimal role in the telecommunications industry. In the early days governments set the standards, but as a result of the market liberalization that took place during the 1980s, international coordination via standards bodies became the accepted starting point. Indeed, standardization managed by official and semi-official bodies is also a necessity today. It should be noted, however, that the number of standardization consortia and patent pools are rapidly increasing in the industry, and de facto standards originating from one or more companies working together are also gaining ground.[10]

The difference between traditional organizations and consortia lies mainly in their regulatory duties and market orientation. Consortia are market- and vendor-driven, and have been claimed to be able to develop standards at a quicker rate than official standards bodies.[11] Furthermore, the solutions adopted do not have the status of a formal standard, but rather serve as recommendations to the industry, and this allows the market to adopt certain of them at a faster pace[12]. Consortia could be characterized as semi-public or semi-private, depending on whether they are open for everyone to join or whether participation is limited[13]. The focus in this paper is mainly on standards in the selection of which interested companies, users and other interested groups have been able to participate following certain procedures and principles such as transparency, openness and consensus, and that are for general use, meaning that the details of the underlying technology have been made available to third parties so that they can freely develop complementary products and services[14]. These standards are commonly referred to as open, as distinct from proprietary or closed standards for which the technical details are not made available outside the company, or are made available only on a restricted basis.[15] Moreover, attention is mainly paid to voluntary standards, and not to mandatory standards regulated by governmental bodies. These mandatory standards often receive an obligatory status in the form of regulation[16].[17]

---

[8] M. Howard Morse, *Standard Setting and Antitrust: The Intersection Between IP Rights and the Antitrust Laws,* at 21 (IP Litigator, May/June 2003, 17-25).

[9] Messerschmitt & Szyperski, at 239 (2003).

[10] Alan Cunningham, *Telecommunications, Intellectual Property, and Standards,* at 348-352 (In Ian Walden & John Angel, *Telecommunications Law and Regulation,* Oxford 2005, 341-375); Ian Walden, *The International Regulatory Regime*, at 463-464 (In Ian Walden & John Angel, *Telecommunications Law and Regulation*, Oxford 2005, 463-500).

[11] Cunningham, at 352 (2005); Taffet, at 12, 14 (2002); G. M. Peter Swann, *The Economics of Standardization,* at 14 (Final report for Standards and Technical Regulations, Directorate Department of Trade and Industry, University of Manchester 2000), <http://www.dti.gov.uk/files/file11312.pdf> (last visited 3/1/07).

[12] Messerschmitt & Szyperski, at 240 (2003).

[13] Rahnasto, at 186 (2003).

[14] *See e.g.,* Blind, at 2 (2004).

[15] Grant, at 347 (2005).

[16] Blind, at 2 (2004).

### (ii) Intellectual Property Rights

As could be concluded from the previous chapter, standard setting is a heterogeneous area, and the importance of standards and the processes through which they are established have changed in the course of time. This heterogeneity is also reflected in practices applicable to the management of intellectual property rights (IPRs), and standards bodies have adopted differing policies. In fact, since at least the mid-1980s the effects of using patented technology in standards has been subject to discussion and controversy, and there has been a pressing need to balance the interests of various parties.[18] In particular the strengthening of the patent system and the highlighted importance of intellectual property as a corporate strategic asset appear to have contributed to the controversy. In sum, it is the augmentations within the regulatory and legal frameworks combined with the technological and market developments of the ICT sector that have given increasing importance to both commonly established open standards and intellectual property rights.

The aim of this paper is to examine whether the legal framework applicable to solving potential patent-related conflicts that may arise, particularly in the context of open, interoperability standards, is proficient, or whether amendments need to be made in order to avoid the societal losses that may result if patents are employed to prevent the use of commonly established standards after their adoption. Particular focus is on so-called submarine patents which could be defined broadly as patents that remain unnoticed during the standardization process and then take the industry by surprise when the patentee begins to assert his proprietary rights over an open standard[19]. These patents could be held by companies that took part in the standard setting, or by third parties. The basic dilemma between patents and standards is illustrated further below.

---

[17] Standards may also be categorized on the basis of their economic effects. For instance Swann (2000) and Blind (2004) have used a four-category grouping in their studies. These categories consist of 1) compatibility and interface standards, 2) minimum quality and safety standards, 3) variety-reducing standards, and 4) information, product description and measurement standards. While compatibility and interface standards foster network effects, minimum quality and safety standards allow consumers to be better informed of product characteristics and thus provide correction for adverse selection meaning that the buyer has the ability to confidently distinguish high quality from low quality before purchase and hence the high quality seller is able to sustain higher price for its superior product. Quality and safety standards have also been found to reduce transaction costs. Furthermore, they can protect third parties from negative externalities generated in the production and consumption of goods. This is the case with environmental standards for instance. Then again variety-reducing standards such as size and quality standards which lead to the economics of scale, and ultimately through mass sourcing of input materials, mass production and mass distribution to lower costs per unit. Paper formats A4 and A3 are examples of these standards. When it comes to information, product description and measurement standards, they could be described as a combination of the other three types of standards, and therefore they also have similar economic effects. They facilitate trade and reduce transaction costs. For instance, different grades of petrol could be said to belong to this category. (Swann, at 4-8 (2000) and references mentioned therein; Blind, at 14-22 (2004) and references mentioned therein; Philip Jones & John Hudson, *Standardization and the Costs of Assessing Quality,* at 360-361(European Journal of Political Economy, Vol 12, Issue 2, 1996, 355-361); John Hudson & Philip Jones, *Measuring the Efficiency of Stochastic Signals of Product Quality,* at 46 (Information Economics and Policy, Vol 13, Issue 1, 2001, 35-49).

[18] Taffet, at 9-10 (2002).

[19] The term "submarine patent" has originally been used for U.S. patents which have been issued after a long, intentionally delayed patent prosecution phase. *See e.g.,* Ronald J. Riley, *Pressure on the American Patent System, Part 2: The Real Cause of Submarine Patents* (About.com) <http://inventors.about.com/library/weekly/aa072897.htm> (last visited 27/12/06); Aura Soininen, *Open Standards and the Problem with Submarine Patents,* at 233 (Proceedings of the 4th International Conference on Standardization and Innovation in Information Technology (SIIT2005), 21-23 September 2005, Geneva, Switzerland, 2005a, 231-244); Ove Granstrand, *The Economics and Management of Intellectual Property, Towards Intellectual Capitalism,* at 143 (Edward Elgar 1999).

## B. THE PROBLEM WITH SUBMARINE PATENTS AND STANDARDS IN A NUTSHELL

### (i) The Fundamental Dilemma

The objective of standardization is to promote industry-wide acceptance of new technologies through the creation of common technical standards and specifications that are well documented and available for everyone to implement. Even though commonly established standards may be used by anyone, it is nowadays generally accepted that proprietary technology may be involved in their implementation. Particularly in high-technology sectors, the inclusion of patented technology is not an anomaly but is often unavoidable[20]. This is natural since, as indicated above, the development of standards more and more frequently anticipates technology rather than follows it, meaning that patentable inventions may very well be generated during the process[21]. As a consequence, many standards organizations allow patented or patentable technology to be submitted if it is justifiable on technical grounds. Furthermore, many, although not all, have explicit IPR/Patent Policies aimed to help in establishing the proper balance between openness and control by guiding their members and other participants to disclose and promise to license their essential rights at least on fair, reasonable and non-discriminatory terms (RAND). If the member or other participant refuses to license, the standard is abandoned, or if alternative solutions exist, technical specifications are rewritten in order to design around the patents.[22]

Although it is possible for proprietary rights and open standards to exist in harmony, current patent policies have not proven proficient in preventing patent-based dilemmas in practice, and various documented disputes have arisen with respect to patents and standards[23]. In fact, the quantitative study conducted by Blind et al. (2002) indicates that they are more common than generally assumed, as over 30% of the 159 investigated companies situated in Europe reported that they had had problems with their own patents and over 40% reported having problems with the patents of others. Particularly large companies, and patent- and R&D-intensive companies were most often found to attest problems.[24] It appears that dilemmas in Europe accumulate mostly with regard to international standards, however. National reports submitted for the Comparative Report on "Legal aspects of standardisation in the Member States of the EC and EFTA" (2000) showed only few controversies: there had been a need to cancel three standards

---

[20] Harm Schepel & Josef Falke, *Legal Aspects of Standardisation in the Member States of the EC and EFTA,* at 176 (Vol 1, Comparative report, European Communities 2000).

[21] WIPO (year n/a).

[22] Schepel & Falke, at 178 (2000); ETSI, *ETSI Rules of Procedure / ETSI IPR Policy* (2006a), <http://www.etsi.org/legal/documents/ETSI_IPRPolicy.pdf> (last visited 14/1/07). *See also* DOJ/FTC, *Hearings on: Competition and Intellectual Property Law and Policy in the Knowledge Based Economy, Standard Setting* (18 April 2002).

[23] Eric Iversen, *The Relationship between IPR and Standard Development Organisations,* at 46-47 (In Knut Blind, Rainer Bierhals, Nikolaus Thumm, Kamal Hossain, John Sillwood, Eric Iverser, Rik van Reekum, & Bruno Rixius, *Study on the Interaction between Standardisation and Intellectual Property Rights*, EC Contract No G6MA-CT-2000-02001, 2002, 40-55); Aura Soininen, *Patents and Standardization in the ICT Sector: Are Submarine Patents a Substantive Problem or a Red Herring?* (International Journal of IT Standards & Standardization Research, Vol 5, Issue 1, January-June 2007, 41-83).

[24] Blind, at 129-130 (2004); Knut Blind & Nikolaus Thumm, *Survey of the Relationship between IPR and Standardisation and Contractual Problems in RTD Projects,* at 73-74 (In Knut Blind, Rainer Bierhals, Nikolaus Thumm, Kamal Hossain, John Sillwood, Eric Iverser, Rik van Reekum, & Bruno Rixius, *Study on the Interaction between Standardisation and Intellectual Property Rights*, EC Contract No G6MA-CT-2000-02001, 2002, 59-82).

because IPRs had been included by mistake in Finland[25], and a few court cases had been filed in France[26] and Germany[27].[28] Meanwhile, various litigations and reported incidents touching upon the issue have been reported in the U.S., and it could be said that, without a doubt, this is an area of turmoil.

Some of the problems with patents and standards relate to proper licensing terms and conditions, and some to so-called submarine patents the existence of which makes it difficult for those implementing a standard to estimate the associated costs and risks. Disputes that have been vividly discussed in the media and that have included disagreement over licensing terms encompass, inter alia, GSM[29], CDMA, WCDMA[30] and V.90 modem standards[31]. Then again, problems with the submarine patents of standard-setters and third parties have been present with respect to VL-bus technology[32], synchronous DRAM technology[33], dual inline memory module

---

[25] Marja-Leena Mansala, *Legal Aspects of Standardisation in Finland,* at 219 (in Harm Schepel & Josef Falke, *Legal Aspects of Standardisation in the Member States of the EC and EFTA*, Vol 2 Country Reports, European Communities 2000, 175-229). Of Finnish standardization organizations, the Finnish Standards Board (SFS) has no IPR Policy, nor does it find it necessary. Then again the Telecommunications Administration Centre (TAC) follows the ETSI IPR Policy, but, according to Mansala (2000) there have been discussion about the need for national IPR Policy. Only few companies have thought that to be necessary, however. (Mansala, at 219 (2000)).

[26] Jeanne Champigneulle Mihailov, *Les aspects juridiques de la normalisation en droit francais,* at 305 (in Harm Schepel & Josef Falke, *Legal Aspects of Standardisation in the Member States of the EC and EFTA*, Vol 2 Country Reports, European Communities 2000, 231-322).

[27] Josef Falke, *Rechtliche Aspecte der Normung in der EG-Mitgeliedstaatedn und der EFTA,* at 394-395 (Band 3: Deutchland, European Communities 2000).

[28] Schepel & Falke, at 179-180 (2000).

[29] GSM is an abbreviation of Global System for Mobile Communications. On patent-related disputes, *see e.g.,* Granstrand, at 203-204 (1999).

[30] CDMA is an abbreviation of Code Division Multiple Access, and WCDMA is an abbreviation of Wideband Code Division Multiple Access. On patent-related disputes, *see e.g.,* Nokia, *Leading Mobile Wireless Technology Companies Call on European Commission to Investigate Qualcomm's Anti-competitive Conduct* (Press releases, 28 October 2005a), <http://www.nokia.com/NOKIA_COM_1/Press/sidebars_new_concept/Press_releases/281005_tp_leading_mobile_wireless_technology_companies.pdf> (last visited 28/12/06); Nokia, *Leading Mobile Wireless Technology Companies Call on European Commission to Investigate Qualcomm's Anti-competitive Conduct* (Conference call, 28 October 2005b), <http://europe.nokia.com/BaseProject/Sites/NokiaCom_CAMPAIGNS_57710/CDA/Categories/PressEvents/_Content/_Static_Files/transcript.pdf> (last visited 28/12/06); Nancy Gohring, *Qualcomm Files a Second Suit against Broadcom* (InfoWorld, 21 October 2005). <http://www.infoworld.com/article/05/10/21/HNqualcommsecondsuit_1.html> (last visited 8/3/06); Broadcom Corporation v. Qualcomm Incorporated, Slip Copy, 2006 WL 2528545, Civil Action No. 05-3350 (D.N.J., 31 August 2006).

[31] *See e.g.,* Townshend v. Rockwell International Corp. and Conexant Systems, Inc., Not Reported in F.Supp.2d, 2000 WL 433505, 2000-1 Trade Cases P 72,890, 55 U.S.P.Q.2d 1011 (N.D. Cal., 28 March 2000); Eric D. Kirsch, *International Standards Participation: Lessons from Townshend & Dell* (International lawyers network, The bullet"iln", Vol 1, Issue 2, 2000), <http://www.ag-internet.com/push_news_one_two/internationalstandards.htm> (last visited 28/12/06).

[32] *See e.g.,* In the Matter of Dell Computer Corporation. Decision and Order, Docket No. C-3658 (FTC, 20 May 1996.

[33] *See e.g.,* Rambus, Inc v. Infineon Technologies *AG*, 318 F.3d 1081, 65 U.S.P.Q.2d 1705 (Fed. Cir., 2003); In the Matter of Rambus Incorporated, Complaint, Docket No. 9391 (FTC, 18 June 2002); In the Matter of Rambus Incorporated, Initial Decision, Docket No. 9391 (FTC, 23 February 2004); In the Matter of Rambus Incorpoted, Opinion of the Commission, Docket No. 9302, (FTC, 2 August 2006).

(DIMM) interface[34], CARB-compliant summertime reformulated gasoline[35], HTML specification[36], JPEG image technology[37], ebMXL[38], GIF Image Format[39], certain W3C metadata technologies[40] and single in-line memory module design[41].[42]

The problem with submarine patents is that unless the patent holders have committed to something else they can, in principle, do whatever they like with their legal rights as long as they

---

[34] *See e.g.*, Sun Microsystems Inc, File No. 011-0006, (FTC, 9 November 2001).

[35] *See e.g.,* In the matter of Union Oil Company of California, Opinion of the Commission, Docket No. 9305 (FTC, 27 July 2005).

[36] *See e.g.,* Eolas Technologies Incorporated and the Regents of the University of California v. Microsoft Corporation, 399 F.3d 1325, 73 U.S.P.Q.2d 1782 (Fed. Cir., 2005); Steve Malone, *Microsoft Loses Eolas Supreme Court Appeal* (PC Pro, 1 November 2005), <http://www.pcpro.co.uk/news/news/79431> (last visited 28/12/06). Bruce Perens, *The Problem of Software Patents in Standards*, <http://perens.com/Articles/PatentFarming.html> (last visited 28/12/06); W3C, *World Wide Web Consortium Presents US Patent Office with Evidence Invalidating Eolas Patent* (29 October 2003), <http://www.w3.org/2003/10/28-906-briefing.html.en> (last visited 1/1/2007), Paul Festa, *Web Patent Critics Spotlight Old Technology* (CNET News.com. 31 October 2003), <http://news.com.com/Web+patent+critics+spotlight+old+technology/2100-1028_3-5100693.html?tag=nl> (last visited 28/12/06); Steve Malone, *US Patent Office Upholds Eolas Patent* (PCPRO, 30 September 2005), <http://www.macuser.co.uk/macuser/news/hot-topics/news/78163> (last visited 1/1/07).

[37] *See e.g.,* Richard Clark, *Concerning Recent Patent Claims* (JPEG, 19 July 2002), <http://www.jpeg.org/newsrel1.html> (last visited 28/12/06); Robert Lemos, *Finding Patent Truth in JPEG Claims* (CNET News.com, 23 July 2002), <http://news.com.com/Finding+patent+truth+in+JPEG+claim/2100-1001_3-945686.html> (last visited 28/12/06); John Markoff, *Patent Claim Strikes an Electronics Nerve* (The New York Times, 29 July 2002); Amit Asaravala, *Forgent Sues Over JPEG Patent* (Wired News, 24 April 2004), <http://www.wired.com/news/business/0,1367,63200,00.html> (last visited 28/12/06); Matthew Hicks, *JPEG Hits New Patent-Infringement Snag* (Eweek.com 22 April 2004). <http://www.eweek.com/article2/0,1759,1572323,00.asp> (last visited 6/9/06); Jennifer Reingold, *Patently Aggressive* (Fast Company, Issue 102, January 2006), <http://www.fastcompany.com/magazine/102/patents.html> (last visited 28/12/06); Red Herring, *JPEG Patent Reexamined* (Red Herring, 3 February 2006), <http://www.redherring.com/Article.aspx?a=15582&hed=JPEG+Patent+Reexamined&sector=Industries&subsector=Computing> (last visited 28/12/06); Forgent Networks, *Intellectual property, '672 patent cases* (2006), <http://www.forgent.com/ip/672cases.shtml> (last visited 28/12/06); James Niccolai, *Patent Office Rejects Forgent's JPEG Claims, Forgent to Appeal USPTO's Decision to Reject 19 of the 47 Claims in a JPEG-related Patent* (IDG News Service, InfoWorld, 30 May 2006), <http://www.infoworld.com/article/06/05/30/78731_HNjpegpatents_1.html> (last visited 1/1/07); PUBPAT (a), *JPEG Patent Claim Surrendered: Forgent Networks Ends Assertion of Patent Challenged by PUBPAT,* <http://www.pubpat.org/jpegsurrendered.htm> (last visited 2/1/07).

[38] *See e.g.,* David Berlind, *IBM Drops Internet Patent Bombshell* (ZDNet.com, 16 April 2002a), <http://techupdate.zdnet.com/techupdate/stories/main/0,14179,2861528,00.html> (last visited 28/12/06); David Berlind, *The Hidden Toll of Patents on Standards* (ZDNet.com, 25 April 2002b), <http://news.zdnet.com/2100-9595_22-891852.html> (last visited 28/12/06); Wylie Wong, *IBM ebXML Patent Plan Royalty-free* (ZDNet.com, 18 April 2002), <http://techupdate.zdnet.com/techupdate/stories/main/0,14179,2861940,00.html> (last visited 28/12/06).

[39] *See e.g.,* Adrian Mello, *Will Patent Disputes Spoil the Web's Success?* (ZDNet, 11 April 2002) <http://techupdate.zdnet.com/techupdate/stories/main/0,14179,2861091,00.html> (last visited 28/12/06).

[40] *See e.g.*, Lisa Rein, *The W3C, P3P and the Intermind Patent* (XML.com 3 November 1999), <http://www.xml.com/pub/a/1999/11/p3p/index.html> (last visited 28/12/06); W3C, *World Wide Web Consortium Clears Patent Hurdle for Web Privacy* (28 October 1999), <http://www.w3.org/1999/10/28-P3P-IntermindPatentAnalysis-PressRelease.html> (last visited 28/12/06).

[41] *See e.g.,* Wang Laboratories Inc. v. Mitsubishi Electronics America Inc and Mitsubishi Electric Corporation, 103 F.3d 1571, 41 U.S.P.Q.2d 1263 (Fed. Cir., 1997).

[42] Soininen, at 58 (2007); Robin Cover (Ed), *Patents and Open Standards* (Cover Pages, 2006 <http://xml.coverpages.org/patents.html#examples> (last visited 27/7/06).

do it in accordance with relevant legislation, such as competition (Europe)/antitrust (U.S.) laws. When the patent happens to read on a standard that is broadly used, the leverage of the patent holders is substantial. They may, for example, prohibit others from using the invention altogether, thereby preventing their competitors from achieving interoperability and capturing established markets[43]. Then again, if they choose to license, as a general rule, they are under the prevailing legal regime free to select the most lucrative licensees and to negotiate a price and terms that are as favorable to them as possible. If the patent holders then refuse to license, or ask for licensing terms or fees companies are not able to agree to, they may in the worse case cause not only economic losses to the other companies already operating in the industry and employing the standard, but also and most importantly, harm consumers who are already using a system in which various products are interchangeable and interoperable.

The magnitude of the above losses depends on the standard and the technology in question, the market penetration, and the timing of the patent-infringement action. The longer it takes for the dispute to arise, the worse the consequences may be from the societal perspective. Before the standard is set it may well be possible to design around the patents or to choose other competing technologies, and even after the standard specifications have been published, abandoning or modifying it may not cause such huge losses if the companies have not yet invested in designing, testing and producing goods that comply with the standard, and if they have alternative technologies to choose from. Furthermore, the standard may be of evolving nature meaning that new features may be added to it over the years and thus patents that were essential right after the original standard was set may become obsolete later on. Hence rights that did not exist in the beginning may become relevant at a later stage and vice versa providing the standard setters with the possibility to influence the standard continuously. In any case, if the standard has already been widely adopted it may be difficult and very costly to change the specifications without losing the network benefits, and thus the industry could be said to have become locked-in to the standard. Obviously, from the patent holders' perspective the situation is the reverse: the more commonly used the technology is, the more difficult it is to design around it, and the higher the switching costs, the better the business opportunities. The patentee has the potential of holding up the industry and charging supracompetitive rates.[44]

### (ii) The Economic Effects of Interoperability Standards

What, then are the economic benefits of interoperability standards that make the holding of a submarine patent that reads on them so attractive and also so detrimental from the societal perspective? First of all, standards benefit producers by enhancing the value of their products through compatibility, which is often a required element for products to succeed in industries that benefit from direct and indirect network effects[45]. For example, the number of users that are connected to a telephone network directly affect its utility, while indirect network effects are present when the popularity of a system influences the possibilities of accessing complementary products and services such as maintenance, which in turn carries weight at the time the purchasing decision is made[46]. In sum, the value of a product increases as other products related

---

[43] Rahnasto, at 151-152 (2003).

[44] Soininen (2007). This argumentation was adopted for instance by the FTC in the Rambus, Inc case (In the Matter of Rambus Incorpoted, Opinion of the Commission, Docket no. 9302 (FTC, 2 August 2006)).

[45] *See e.g.,* Morse, at 19 (2003); Swann, at 5 (2000).

[46] Blind, at 16-17 (2004); David J. Teece, *Managing Intellectual Capital,* at 167 (Oxford University Press 2000).

to it are developed. For instance, operating systems such as Mac and Windows become more useful to users as more software applications are written for them[47], and the designing of such complementary applications would not be possible without access to the interface. Software interfaces that are a frequent target for standardization tell the other software module users more or less all they need to know about that particular module. For instance, Microsoft Word XP products supplied by Microsoft include modules and content acquired from other suppliers, such as the equation editor, the document version comparer, parts of the spelling-correction system, thesaurus, hyphenators, and dictionaries, as well as some of the templates and fonts.[48]

In setting a standard producers also gain access to a larger customer base than they would have without it[49]. Standards enlarge the market for complementary goods and services, which by increasing the scale of production, makes complements cheaper to produce and available in greater variety. Without commonly agreed standards companies might have to manufacture to a number of different ones, resulting in smaller production runs.[50] In other words, standards encourage market entry by defining what is required to serve that market, allowing competition on the implementation level[51]. In many cases, therefore, standardization promotes competition and innovation among producers, and lowers barriers to international trade[52]. Most importantly, cooperative standard setting profits consumers by diminishing the risk of choosing the "wrong" technology and providing them with reasonably priced products that are interoperable and interchangeable, thereby accelerating the acceptance of new technologies[53].

As indicated above, interoperability standards may yield substantial benefits and therefore their control may be desired. For the sake of clarity, it should be pointed out, however, that standardization may sometimes also have anti-competitive effects, and for this reason the societal losses resulting from the need to give up a standard are not always substantial. Standardization may restrict competition by reducing variety, and it has been criticized for retarding innovation: the processes may take several years, and by the time the standard has been established the technology involved may be outdated and inferior in the light of the latest inventions. The users

---

[47] Robert W. Hahn, *A Primer on Competition Policy and the New Economy,* at 3 (AEI-Brookings Joint Center for Regulatory Studies, Working paper No 01-3, 2001), <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=286918> (last visited 28/12/06); Scotchmer, at 304-305 (2004); Teece, at 167 (2000).

[48] Messerschmitt & Szyperski, at 232 (2003).

[49] Teece, at 167 (2000).

[50] Peter Grindley, *Standards, Strategy and Policy,* at 25-26 (Oxford 1995, reprinted 2002); Mark Shurmer & Gary Lea, *Telecommunications Standardization and Intellectual Property Rights: a Fundamental Dilemma?,* at 51 (StandardView, Vol 3, No 2, June 1995); Morse, at 19 (2003).

[51] Scott. K Peterson (Hewlett-Packard Company), *Consideration of Patents during the Setting of Standards,* at 1 (for FTC and DOJ Roundtable, *Standard setting Organizations: Evaluating the Anticompetitive Risks of Negotiating IP Licensing Terms and Conditions Before A Standard Is Set*, 6 November 2002) <http://www.ftc.gov/opp/intellect/021106peterson.pdf> (last visited 28/12/06); Knut Blind, Rainer Bierhals, Nikolaus Thumm, Kamal Hossain, John Sillwood, Eric Iverser, Rik van Reekum, & Bruno Rixius, *Study on the Interaction between Standardisation and Intellectual Property Rights*, at 4 (EC Contract No G6MA-CT-2000-02001, 2002), <http://www.isi.fraunhofer.de/p/Downloads/kb_final_report.pdf> (last visited 28/12/06).

[52] Björn Hjelm, *Standards and Intellectual Property Rights in Age of Global Communications – A Review of the International Standardization of Third Generation Mobile System* (Fifth IEEE Symposium Computers and Communications, Antibus-Juan Les Pins, France, 3-6 July 2000), <http://arxiv.org/ftp/cs/papers/0109/0109105.pdf> (last visited 18/9/06); Morse, at 19 (2003).

[53] Shapiro & Varian, at 233 (1999); Soininen, at 232 (2005a).

then face the dilemma of choosing between the benefits of compatibility provided by the standard and the benefits of a new technology. Thus, the standardized technology may become obsolete, but it may persist in holding up further development of the product. It is difficult to displace established standards due to learning effects and collective lock-in.[54] Nevertheless, it could be said that de jure standards have significant efficiency and welfare benefits compared to de facto standards, which are aimed at empowering one's position in the market place and creating barriers to entry. Such benefits include the avoidance of a standards war that could result in a single proprietary product, and the instigation of cooperation that might allow multiple companies to produce products implementing the standard.[55] Examples of standards wars include those between Apple Computer and IBM/Microsoft in personal computer operating systems, and the Matsushita VHS format and Sony's Betamax format[56].

### (iii) Potential Ways of Overcoming the Conflicts

As suggested earlier, interoperability standards generate substantial economic benefits, and from the perspective of an individual submarine-patent holder the situation is basically the following: to the extent that patents claim interoperability standards, considerable market power may be attributed to them, and therefore the leverage gained could be substantial. On the other hand, the acquisition and utilization of these rights might not always be in line with patent and competition/antitrust laws, or the patentees' actions or inactions during the standardization process and thereafter may constitute a violation under some other regime of law. Thus, it might be possible to restore the equilibrium in individual cases by employing legal means if the parties have been unable to reach an amicable solution through private negotiations. The patent holder may sometimes be compelled to license, the patent may be invalidated or held unenforceable, or the patentee may be obliged to pay damages. Indeed, one of the questions addressed in this paper concerns whether and in what kind of circumstances the U.S. Sherman Act, Section 2, the Federal Trade Commission Act, Section 5, and the European Community Treaty, Article 82, have been and could be applied in order to resolve conflicts that have to do with hidden patents of standard setters and third parties. Other options that may be applicable in the U.S. in specific situations include fraud, the doctrine of laches, equitable estoppel, and the implied-license and patent-misuse doctrines.[57] Tools appear to be more limited in variety in Europe, but they contain patent-law-based compulsory licensing, and national legislations regarding unfair and deceptive business practices. Contract-based remedies could also be issued in both the U.S. and Europe,

---

[54] Grindley, at 27 (2002); Shurmer & Lea, at 51 (1995); Hjelm (2000); Morse, at 20 (2003); Grant, at 349 (2005).

[55] Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools and Standard Setting*, at 23 (2001), <http://faculty.haas.berkeley.edu/shapiro/thicket.pdf> (last visited 28/12/06); Soininen, at 232 (2005a).

[56] In both cases, the company that did not restrict access to its technology was successful in setting the standard. Microsoft's product specifications were openly available to "clone makers" and its suppliers were free to supply them with microprocessors and the MS-DOS operating system, and in VCRs Matsushita's VHS format won because Matsushita did not insist such tight ownership, and the technology was therefore more efficient in gaining acceptability in the market than Sony's Betamax format. (Grant, at 351 (2005)).

[57] *See e.g.,* Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations* (Boalt Hall Working Papers in Public Law, Paper 24, 2002) <http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1027&context=boaltwp> (last visited 28/12/06); Janice M. Mueller, *Patent Misuse Through the Capture of Industry Standards* (Berkeley Technology Law Journal, Volume 17, Issue 2, Spring 2002), <http://btlj.boalt.org/data/articles/17-2_spring-2002_mueller.pdf>(last visited 28/1/07).

and obviously the regular routes of patent invalidation and claiming non-infringement are at use in both continents.[58]

Whatever the legal means available for resolving the submarine-patent dilemma in court are, they are not fixed: the interpretation of the statutes evolves over time, new sections may be incorporated into pre-existing laws, and new regulations may be enacted. Indeed, there is a continuous balancing act with respect to the patent and competition regimes, which are the two main areas of law having to do with problems regarding patents and standards. Due to the mainly pro-competitive nature of standards, the perplexities with patents namely fall right in the middle of the prevailing policy discussion: it has been broadly questioned whether the patent system fulfils its goal of promoting innovation when the granting of such rights has the potential of causing impediments to the standard setting that is fundamental to the development and marketing of new, interoperable and compatible products and services for the benefit of consumers. The discussion has been particularly heated and the problem acute in the computer, semiconductors and telecommunications industries, which are heavily involved in patents, and in which there are a lot of standardization activities.[59]

## C. RESEARCH OBJECTIVE AND METHODOLOGY

The various legal options that are available to standard users upon notice of patent infringement are analyzed in this paper. The appropriate legal framework for solving actualized disagreement over submarine patents, its efficiency and flexibility are considered, and the need for legislative amendments to avoid widespread societal loss is assessed. The focus is on U.S. and European legislation. As far as Europe is concerned, the primary source of law is EU-level regulation, in the absence of which the national laws of Finland are considered. International agreements are also taken into account if applicable.

The methodology followed in the paper is mainly adopted from jurisprudence. In accordance with the doctrines of the sources of law characteristic of civil-law systems (e.g. Finland) on the one hand, and common-law systems (e.g. U.S.) on the other, statutes, preparatory work, case law and legal writings are used to define and interpret the potentially applicable laws. Thus, the discussion largely follows the logic of legal argumentation. However, the legal provisions are mainly viewed from the perspective of a company that uses a standard and later becomes aware of a potential patent infringement, and therefore the study also entails litigation strategy and practical aspects that have to do with certain features present in the ICT sector. These practical aspects are also relevant when considering the need for legislative changes.

Before the legal options are examined in more detail, the reader is briefly reminded of the main causes of the submarine-patent problem, and certain practical and legislative alternatives for addressing the dilemma are identified. This discussion is linked to a more general policy concern having to do with interoperability, intellectual property rights and antitrust/competition regulation. It is to this policy discourse that the paper at hand contributes. To this end the study

---

[58] Soininen, at 77 (2007).

[59] *See e.g.,* DOJ/FTC (2002).

leans partially on normative regulation theory, which characteristically entails analyzing what kind of legal framework would be optimal in order to achieve the objectives set[60].

[60] Kalle Määttä, *Oikeustaloustieteen aakkoset,* at 13-15 (Helsingin yliopiston oikeustieteellisen tiedekunnan julkaisut 1999).

# II. THE MAIN CAUSES OF SUBMARINE-PATENT PROBLEMS AND WAYS OF REDUCING THEM

## A. CAUSES OF THE PROBLEMS

Why is it that submarine patents pose problems in terms of standard setting? The bottom line is, as mentioned in the background section, that both industry standards and patents carry a lot of economic significance in the ICT sector, and both of them have become more and more vital over time. This obviously increases the conflict potential as the interests of patent holders and standard setters and users may not be the same. Furthermore, there are four elements that could be deemed to constitute the main factors contributing to the risk and existence of the submarine-patent dilemma in the ICT sector: 1) strong patent rights and certain other aspects of patent law concerning secrecy and patent prosecution, combined with 2) certain industry characteristics, 3) deficient risk management, and 4) potential inefficiencies in the legal framework applicable to solving actualized disagreements. Of these, the first three are mainly concerned with the difficulty of being able to estimate the attached risks and avoid patent-infringement accusations beforehand, as well as the highlighted risk of being confronted without the ability to resolve the issues amicably through cross-licensing, for instance[61]. The last element, which is studied more thoroughly in this paper, has to do with what can be done judicially after the problem is actualized. Obviously, the first and the last factors overlap as they both concern the legal framework, the division being based on the situation present prior to the election and implementation of a standard versus the situation thereafter. These main factors are presented briefly below, as they matter in the assessment of whether legal amendments are needed.

### (i) Patent Strength and Certain Other Features of the Patent System

The patent system has gained new strength during the last few decades: the ability of patent holders to exercise and enforce their rights irrespective of antitrust (U.S.) and competition regulation (Europe) has improved, and particularly in the U.S. the courts have tended to be patent-holder-minded[62]. The patent invalidation rate has fallen and the courts have been rather willing to grant preliminary injunctions, and to award substantial damages.[63] All this has naturally

---

[61] Other means include the purchase of a license, circumvention of the protected technology, joining of a patent pool, merger with or acquisition of the patent-holding company. (Blind & Thumm, at 76 (2002)).

[62] In contrast to the developments that have taken place in the U.S., no indication of patent-holder friendly interpretation in the context of patent infringement and invalidation matters may currently be detected in Finland when the practice of the Helsinki Court of Appeals is concerned. Actually, the non-obviousness criteria applied by the Finnish courts could also be considered rather high in comparison to the standard adopted by the EPO Board's of appeal (Keijo Heinonen, *Innovaatio-oikeus*, at 23-24 (Edita 1999). If those decisions of the Helsinki Court of Appeals which have legal force and which have been referred to in Heinonen's book (1999), its updates and IPR University Center's case law database are taken into account, in years 1981 - 1995 the Court of Appeals found patent infringement in 47,6 % of all infringement matters (altogether 21 cases (10 inf./11 non-inf.)), while in years 1996 - 2006 infringement rate was only 14,3 % (altogether 7 cases none of which is recent (1 inf./6 non-infringing)). Then again, in annulment matters, the Helsinki Court of Appeals invalidated the entire patent in 63,6 % of all available cases dating back to years 1981-1995, and a patent was invalidated in part in 4,5 % of the cases (altogether 22 cases (14 inv./1 part. inv./7 valid)). In years 1996 - 2006 the court declared the patent invalid in 73 % of all available cases. (altogether 11 cases (8 inv./3 valid)). It should be noted that this information carries only referential value as it is likely that some relevant cases are missing from the data.

[63] *See e.g.,* Kimberly A. Moore, *Judges, Juries and Patent Cases - An Empirical Peek Inside the Black Box* (Michican Law Review, Vol. 99, 2000, 365-409); FTC, *To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy,*

increased the holders' leverage and thus their ability to extract more money out of their patents. New areas such as software and Internet business methods have also entered to the sphere of patent protection with certain limitations in both the U.S. and Europe. Indeed, it has been said to have been rather easy to obtain patents in these new areas because the patent offices have not been properly equipped to conduct thorough patentability examinations, and the number of patents applied for and granted has skyrocketed.[64] The problem with "bad patents" has not been considered as serious in Europe as in the U.S., and since a technical character is needed for an invention to be patentable in Europe[65], pure business-method inventions have so far remained beyond the reach of the legislation[66].

---

at Chapter 1, 20 (2003), <http://www.ftc.gov/os/2003/10/innovationrpt.pdf> (last visited 29/12/06); Granstrand, at 8 (1999); Bronwyn H. Hall & Rosemarie Ham Ziedonis, *The Patent Paradox Revisited: An Empirical Study of patenting in the U.S. Semiconductor Industry, 1979-1995,* at 105 (RAND Journal of Economics, Vol 32, Number 1, Spring 2001, 101-128); Adam B. Jaffe & Josh Lerner, *Innovation and Its Discontents, How Our Broken Patent System Is Endangering Innovation And Progress, And What to Do about It,* at 10, 110-115, 121 (Princeton University Press 2004); Robert P. Merges & John F. Duffy, *Patent Law and Policy: Cases and Materials*, at 11 (LexisNexis, 3rd edition, 2002).

[64] *See e.g.,* Julie E. Cohen & Mark A. Lemley, *Patent Scope and Innovation in the Software Industry,* at 11-12 (California Law Review, Vol 89, Number 1, 2001); FTC, at Chapter 1, 34, Chapter 3, 20-21 (2003); Jaffe & Lerner, at 11-13 (2004); Samuel Kortum & Josh Lerner, *What is Behind the Recent Surge in Patenting*, at 6 (Research Policy Vol 28, Number 1, 1999, 1-22); Robert P. Merges, *As Many as Six Impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform,* at 589-591 (Berkeley Technology Law Journal, Vol 14, 1999, 577-615); OECD, *Compendum of Patent Statistics* (2005), <http://www.oecd.org/dataoecd/60/24/8208325.pdf> (last visited 13/6/06); Scotchmer, at 74-75 (2004); Aura Soininen, *The Software and Business-Method Patent Ecosystem: Academic, Political, Legal and Business Developments in Europe and the U.S.,* at 27 (IPR Series B, Number 1, 2005b).

[65] According to the European Patent Convention (EPC), Article 52 (1) European patents shall be granted for any inventions which are susceptible of industrial application, which are new and which involve an inventive step. In accordance with Articles 52 (2) and (3), (a) discoveries, scientific theories and mathematical methods; (b) aesthetic creations; (c) schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers and (d) presentations of information shall not be regarded as inventions to the extent to which a European patent application or European patent relates to such subject-matter or activities as such. An invention needs to be concrete and have technical character in order to be patentable. (*See e.g.,* EPO, *Guidelines for Examination in the European Patent Office*, at Part C, Chapter IV (2005), <http://www.european-patent-office.org/legal/gui_lines/e/index.htm> (last visited 14/1/07).

In Finland (and other Scandinavian countries) the requirement for industrial applicability has traditionally been interpreted to imply that an invention needs to be of technical nature in order to be patentable. (Hallituksen esitys Eduskunnalle patenttilainsäädännön uudistamisesta (HE 101/1966 vp.), at 8; Hallituksen esitys Eduskunnalle laiksi patenttilain muuttamisesta (HE 139/1979 vp), at 7; Betenkning angående Nordisk patentlovgivning (NU 1963:6), at 102) However, after the example list of unpatentable subject-matter was incorporated into the Scandinavian patent laws between late 1970s and early 1980s, and particularly after these countries became the members of the EPC, the systematization of technicality requirement appears to have gradually shifted under the concept "patentable invention". (*See e.g.,* Lennarth Törnroth, *Datorprogram och patentskydd - utvecklingen av svensk rättspraxis i belysning av främst EPO-praxis*, at 95-96 (Nordiskt Immateriellt Rättskydd, Number 1, 1999, 86-98); Morgens Koktvedgaard & Marianne Levin, *Lärobok i Immaterialrätt*, at 202-203 (Norstedts Juridik AB, 6th edition, 2002); Pirkko-Liisa Haarmann, *Immateriaalioikeus*, at 128-129 (Talentum 2006).

[66] Soininen, at 49-50 (2005b); Robert Hart, Peter Holmes & John Reid, *The Economic Impact of Patentability of Computer Programs* (Report to the European Commission, Study Contract ETD/99/B5-3000/E/106, 2000). Relevant decisions of the EPO Boards of Appeal (BOA) having to do with the patentability of business-methods include *e.g.*, the following:

Electronic auctions/ARIBA (T 0872/04): In this case the BOA found the method and system for conducting electronic auctions to be of technical nature because it comprised technical activities such as setting parameters and time intervals within a computer network, displaying data, and starting a clock. The use of conventional means to conduct an electronic auction was not held inventive.

Undeliverable mail/PITNEY BOWES (T 0388/04): In this case the BOA came to the conclusion that "subject-matter or activities that are excluded from patentability under Article 52(2) and (3) EPC remain so even where they

imply the possibility of making use of unspecified technical means". Since none of the claims explicitly mentioned any technical means that might be used to carry out the claimed method for responding to a mail returned to a sender as undeliverable, the invention was held unpatentable.

Auction method/HITACHI (T 0258/03): In this case the BOA reasoned that a method involving technical means is an invention within the meaning of EPC Article 52 (1), and therefore also the claimed automated auction method executed in a server computer was considered to have technical character. The invention was found to lack inventive step, however. This was because according to the BOA the invention could not be regarded as anything more than a mere automation of the non-technical activity of performing a Dutch auction in the absence of bidders.

Controlling pension benefits system/PBS PARTNERSHIP (T 0981/95): In this case the BOA noted that while an apparatus constituting a physical entity or concrete product, suitable for performing or supporting an economic activity, is an invention within the meaning of EPC Article 52(1), a method involving economic concepts and practices of doing business is not. Thus, a feature of a method which concerns the use of technical means for a purely non-technical purpose and/or for processing purely non-technical information does not necessarily confer a technical character to such a method. In the present case, the BOA thus concluded that the apparatus claims directed to controlling a pension benefits system fulfil the requirement of technical character. Since the improvement envisaged by the invention was essentially in the field of economy and such improvements cannot be taken into consideration when assessing inventive step, the invention could not be considered as inventive.

General-purpose management system/SOHEI (T 0769/92): In this case the BOA noted that an invention comprising functional features implemented by software is not excluded from patentability under Article 52 (2)(c), (3) if technical considerations concerning particulars of the solution of the problem the invention solves are required in order to carry out the invention. Furthermore, BOA noted that the patentability cannot be destroyed by an additional feature which would itself be excluded, as in this case features referring to management systems and methods potentially falling to the category of "methods for doing business".

In Europe, also the national courts in Germany and UK have addressed the patentability of business methods. In Germany the Federal Patents Court, Bundespatentgerich (BPatG), applied in its decision dated 6 May 2003 (Rentabilität eines medizinischen Geräts, 21W (pat) 12/02) the argumentation adopted by the BOA in the Controlling pension benefits system/PBS PARTNERSHIP (T 0981/95) case and came to the conclusion that the method for determining the profitability of a medical apparatus lacked technical character. Nevertheless, since a concrete apparatus, in the sense of a physical entity made for specific purpose, is technical per se, the claim directed to a device for determining whether, for an operator of at least one medical apparatus, the acquisition of a further medical apparatus for a replacement for the first is economically profitable, was acceptable (*See also* Sprachanalyseeinrichtung, X ZB 15/98, Bundesgerichtshof (BGH), 11 May 2000). Then again the German Federal Court, BGH, supposedly declined to follow the EPO Board of Appeal's Hitachi decision in the matter *Jesco Schwarzer* (17 W (pat) 31/03, 28 September 2004) (as cited in Aerotel Ltd v. Telco Holdings Ltd, Telco Global Distribution Ltd and Telco Global Ltd (EWCA Civ 1371, Court of Appeals (UK) 2006)).

In UK, the most recent case law entails the Court of Appeals decision delivered on 17 October 2006 in the matter Aerotel Ltd v. Telco Holdings Ltd, Telco Global Distribution Ltd and Telco Global Ltd (EWCA Civ 1371). In its reasoning the Court of Appeals criticised heavily the EPO Boards of Appeal decisions finding them contradictory. It stated that the "any hardware" approach adopted in the Pension Benefits, Hitachi and Microsoft/Data transfer decisions was particularly ill-advised. In the end the Court of Appeals applied a modified "technical effect test" accepting the practice adopted by the UK Patent office. This patentability test included four steps: 1) construe the claim properly; 2) identify the actual contribution; 3) ask whether it falls solely within the excluded subject matter; 4) check whether the actual or alleged contribution is actually technical in nature. When the Court of Appeals applied the above test to the Aerotel invention which related to a method of making a telephone call and to a telephone system, it came to the conclusion that the system claim was actually a claim to a physical device consisting of various components, and that this system as a whole was new. Therefore the actual contribution was a new system, and not a method of doing business as such. The method claims were considered to relate essentially to the use of the new system, and therefore the invention was regarded as technical in nature. With respect to assessing the patentability of the Macrossan invention which involved an automated method of acquiring the documents necessary to incorporate a company the Court found the contribution to reside in providing a computer program which can be used to carry out a method which could be categorised as a business method, while the hardware used was standard and not part of the contribution. Since the contribution was only a devised program up and running, and this contribution was not technical, the invention could not be held as patentable.

In addition to the above on the advantages of holding patents, and the increase in the number of applied for and granted patents that has followed[67], there are certain other aspects of patent law that have set the scene for surprising the industry and thus extracting more value out of one's rights. One of these is that even though patents are public documents, patent applications can be held in secrecy for 18 months starting from the priority date, and if it is filed only for the U.S. it may remain secret until its granting years later. Therefore, it is difficult to be aware of all relevant rights and to avoid using proprietary technologies: standards that are being adopted are new technological innovations and thus they are often covered not by old patents, but by applications that have not yet matured.[68]

A second contributing factor is that it is possible to file so-called continuation applications in the U.S. in accordance with Section 120 of the Patents Act (35 U.S.C). This means that applicants who are not satisfied with the course of the patent prosecution may decide to abandon the original application after they receive the letter of "final rejection" and file a continuation application that maintains the original priority date. Alternatively, the patentee may allow one or two patents to be issued and keep a continuation application pending in the hope of being issued with a better patent in the future. When a continuation application is filed, the patent prosecution starts over providing the applicant with another chance to persuade the examiner to allow the claims. This in turn delays the patent application phase significantly. Continuations represent as high percent as 23 of all patent applications.[69] Moreover, it is possible to modify patent claims to some extent during the prosecution process in both the U.S. and Europe[70]. This gives the patentee the opportunity to direct its patenting activities based on the information it gains about the market developments, and to purposefully aim to capture an industry standard, for example. Also, even though patents are a fairly well defined right, it is not easy to determine their exact scope, and it is not possible to know for sure whether an infringement has factually taken place until the court has determined the correct interpretation of the claims. Furthermore, definition of the patent scope varies in each jurisdiction[71], as some countries (*e.g.,* Germany) have adopted a

---

[67] *See e.g.*, OECD (2005); Jaffe & Lerner, at 11-12 (2004).

[68] DOJ/FTC (2002).

[69] Mark A. Lemley & Kimberly A. Moore, *Ending Abuse of Patent Continuations,* at 8 (Law and Economics Working Paper Series, Paper No. 03-52, George Mason University School of Law, 2003).

[70] As to the European patents, EPC Article 123 sets out the boundaries for amending patent applications during patent prosecution.

[71] Minor harmonization work has taken place in Europe with respect to the interpretation of patent scope. It has been stated in Article 69, paragraph 1 of the European Patent Convention, which largely corresponds to Section 39 of the Finnish Patents Act, that the extent of the protection conferred by a European patent or a European patent application shall be determined by the terms of the claims. Nevertheless, the description and drawings shall be used to interpret the claims. In diplomatic conference of 2000 the interpretation protocol of Article 69 was amended and it now provides as follows:

"Article 69 should not be interpreted in the sense that the extent of the protection conferred by a European patent is to be understood as that defined by the strict, literal meaning of the wording used in the claims, the description and drawings being employed only for the purpose of resolving an ambiguity found in the claims. Neither should it be interpreted in the sense that the claims serve only as a guideline and that the actual protection conferred may extend to what, from a consideration of the description and drawings by a person skilled in the art, the patentee has contemplated. On the contrary, it is to be interpreted as defining a position between these extremes which combines a fair protection for the patentee with a reasonable degree of certainty for third parties.

For the purpose of determining the extent of protection conferred by a European patent, due account shall be taken of any element which is equivalent to an element specified in the claims."

more literal interpretation while others (*e.g.,* UK) are more keen on applying the doctrine of equivalents.[72] There may also be variations when it comes to the interpretation of patent scope of different types of inventions[73].

### (ii) Industry Characteristics

As mentioned earlier, strong rights and the ease of obtaining a patent have boosted the willingness of companies to acquire more rights particularly in the U.S., and in fact, ICT patents are on the increase[74]. This, combined with certain industry characteristics such as fast technological development and cumulative innovation, has generated a "patent thicket"

---

Finland ratified the interpretation protocol on 29 November 2005.

[72] Soininen, at 51 (2007). On interpretation of patent scope in different countries s*ee e.g.,* Jechen Pagenberg & William R. Cornish (ed), *Interpretation of Patents in Europe, Application of Article 69 EPC* (Carl Heymanns Verlag 2006); Kati Lassila, *Ekvivalenssiselvitys Suomessa ja muissa maissa* (KTM Julkaisuja, 22/2004 Elinkeino-osasto, 2004), <http://ktm.elinar.fi/ktm_jur/ktmjur.nsf/0/D8904795875D9F1DC2256ECB0030C75B/$file/jul22elo_2004.pdf> (last visited 29/12/06).

In Finland the interpretation of patent scope is not strictly limited to the literal wording of the claims and in addition to the patent description other interpretation material can be taken into account when the scope of the claims is determined. This material contains the documents presented during patent prosecution as well as relevant prior art, for instance. What is peculiar about the Finnish case law is, however, that the courts have been rather hesitant to explicitly refer to the doctrine of equivalents in their reasoning even though the argumentation has often been used by the parties in their writs, and the doctrine clearly underlies their decisions. In their reasoning, the courts have rather estimated whether the difference between the patented invention and the allegedly infringing product or method is only insignificant or not. Irrespective of what was said earlier, the Finnish government came to the conclusion that the current court practice largely corresponds with the teaching of amended Interpretation protocol of EPC Article 69, and no amendments to the Patents Act were therefore needed (Hallituksen esitys Eduskunnalle Eurooppapatenttien myöntämisestä tehdyn yleissopimuksen uudistamiskirjan ja patenttilakisopimuksen hyväksymisestä ja laeiksi sopimusten lainsäädännön alaan kuuluvien määräysten voimaansaattamisesta sekä patenttilain muuttamisesta (HE 92/2005 vp.)).

Relevant Finnish case law entails particularly the Supreme Court car wing decision KKO 1981 II 184 (Docket No. S 80/1146, Supreme Court, 29 December 1981). The Helsinki Court of Appeals has interpreted patent scope in cases such as Veli Reijonen Oy v. Punkaharjun kunta, Docket No. S 1984/793 (Helsinki Court of Appeals, 3 December 1986), Kone Oy v. Labsystems Oy, Docket No. S 88/612 (Helsinki Court of Appeals, 9 May 1990), Mursula Oy v. Metsäpuu Oy, Docket No. S 88/1414 (Helsinki Court of Appeals, 30 May 1990), Raute Oy and Durand-Raute Industries Ltd v. Plymachine Oy, Docket No. S 91/565 (Helsinki Court of Appeals, 27 November 1991), Oy Lars Lundin Patent Ab, MacGregor-Navire Oy v. Oy Larsen Marin Ab, Docket No. S 91/747 (Helsinki Court of Appeals, 25 November 1992), Lännen Tehtaat Oy v. Growmet Oy, Docket No. S 92/1558 (Helsinki Court of Appeals, 20 January 1993), Swep Oy v. Moppi Oy, Docket No. S 93/9 (Helsinki Court of Appeals, 22 November 1994), Thomesto Oy v. Sunit Oy, Docket No. S 92/2394 (Helsinki Court of Appeals, 4 April 1995) and Thomesto Oy v. Sunit Oy, Docket No. S 94/1417 (Helsinki Court of Appeals, 4 April 1995), Oy Kyro Ab v. Valotila Oy, Docket No. S 94/868 (Helsinki Court of Appeals, 27 June 1996), Oy Kyro Ab v. V.E. Lipponen, Docket No. S 94/869 (Helsinki Court of Appeals, 27 June 1996), and Oy Kyro Ab v. Jaakko-Tuote Oy, Docket No. S 95/451 (Helsinki Court of Appeals, 8 August 1996), Molok Oy v. Mr. Keski-Liikala, Docket No. S 99/79 (Supreme Court, 31 August 2000, case was handed back to the Court of Appeal), Vierumäen Teollisuus Oy v. Metsäliitto SW Oy, Docket No. S 00/1619 (Helsinki Court of Appeals 28 December 2000), Scüco International KG v. Purso Oy, Docket No. S 01/277 (Helsinki Court of Appeals, 4 September 2001).

[73] It is a well-accepted principle in Finland that for instance ground-breaking inventions deserve broader patent protection that other types of inventions, particularly improvement patents. Hexal A/S v. Pfizer, Inc (S 04/4418) decision delivered by the district court of Helsinki on 22 September 2006 represents one of the latest district court decisions and is also worth mentioning in this context as it concerns the interpretation of the scope of so-called analogy-method patents.

[74] OECD (2005).

consisting of multiple overlapping patents held by various parties[75], and has thus increased the risk of being unaware of others' rights. Moreover, the fact that patents nowadays change hands more frequently than they used to fuels the challenge of infringement avoidance because surveillance conducted by companies is often focused on competitors who are usually most keen to react in cases of infringement[76]. Patents have become a currency to be used to extract revenue and external resources to a company or exchanged with, or without fundamental connection to the products or processes they cover. Obviously, in the end their relevance is tied to the importance of the technology they claim, and to the fact that they impinge on someone's value chain, although their value may also reside in future expectations, as is the case with the stock exchange.

The prevailing trend in the ICT industry is away from the defensive use of patents to protect the company's own products and processes from imitation and to guarantee its ability to design new products and to position itself profitably in the value network irrespective of the web of relevant patents[77]. Aggressive patent enforcement and revenue generation through licensing have become more widespread[78]. In fact, there are more and more patent-holding companies that do not factually manufacture any products but are seeking to extract royalties from those that do, and for these companies having a patent that reads on a broadly used standard would be propitious. What makes this type of business model of "patent trolling" attractive is that restitution for patent infringement and legal costs may be overwhelming, particularly in the U.S. There are also many prospective licensees since there are so many patents that overlap in various segments of the ICT sector, which, as indicated above, makes it very difficult to avoid patent infringement[79]. The situation in Europe does not yet appear to be so alarming, and it should be remembered that there are plenty of technological areas that are not crowded with patents[80].

### (iii) Inadequate Risk Management

At the same time as intellectual property rights that define the exclusive boundaries of companies' intellectual assets by providing their holders with the right to exclude others from certain economic activities have become the new mantra for surviving competition in the information economy, openness in terms of bringing in external knowledge and expertise to the company and giving out internally developed technologies for others to utilize has also become the watchword. Indeed, balancing the benefits of control on the one hand and openness on the other is a challenge companies are facing today when they manage their intellectual property

---

[75] *See e.g.,* Wesley M. Cohen, Richard R. Nelson & John P. Walsh, *Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not*), at 25-26 (NBER Working Paper Series, Working Paper 7552, 2000); FTC, at Chapter 3, 34, 39, 49, 52 (2003); Hall & Ham Ziedonis, at 107, (2001); Shapiro, at 1-3 (2001).

[76] *See e.g.,* Anthony Miele, *Patent Strategy: The Manager's Guide to Profiting from Patent Portfolios,* at 21 (John Wiley & Sons, Inc 2000).

[77] On defensive patent strategies *see e.g.*, Granstrand, at 214 (1999); Hall & Ham Ziedonis (2001); Cohen, Nelson & Walsh (2000); Miele, at 17-34 (2000); FTC, at Chapter 3, 35-36, 52-53 (2003); Rahnasto, at 7 (2003).

[78] Kevin G. Rivette & David Kline, *Rembrants in the Attic, Unlocking the Hidden Value of Patents* (Harvard Business School Press 2000).

[79] *See e.g.,* FTC, at Chapter 3, 38-39 (2003); J.J.S Watts & B. Baigent, *Intellectual Property, Standards and Competition Law: Navigating a Minefield*, at 837 (IEEE, 2002, 837-842).

[80] Soininen, at 55-56 (2007).

rights.[81] For instance, the standard wars between IBM and Apple and VHS and Betamax, illustrate this dilemma: in both cases the tactic that focused on maximizing market advantage by giving away innovation instead of maximizing profit appropriation by enforcing intellectual property rights proved to be more successful[82]. Striking a proper balance between proprietary rights and openness is the challenge that is also faced by standards organizations, which attempt to concur it by drafting IPR and patent policies that help to keep standards open but are not considered too restrictive so as to discourage companies from participating or to cause problems with respect to antitrust/competition laws. Indeed, patent policies have proven essential in helping to identify relevant rights and thus to avoid dilemmas. For instance, in November 1999 the IPR database of the European Telecommunications Standards Institute (ETSI) contained 911 IPRs of 51 companies. Of these, more than half belonged to the GSM standardization project.[83] In December 2006 the ETSI database entailed as many as 18 014 IPR declarations from which those belonging to the GSM project totalled approximately 26%.

Patent policies are not without faults, and loopholes make the manipulation of the standardization process possible and also attractive from the business perspective. Furthermore, these policies do not cover many situations and thus leave a lot of room for the passing over of essential patents and even abuse of the process. In fact, it could be said that deficiencies in patent policies are one of the contributing factors to the submarine-patent dilemma that originate to some extent from the standard setters. Third parties cannot be bound by the patent policies.

Another factor affecting the risk level of submarine patents, and connected with inadequate risk management, is that companies' patent-infringement clearance actions are not necessarily very effective. It is the company, large or small, planning to incorporate a standard into its products, processes or services that is responsible for verifying whether there are any "essential" patents for which a license would be required. As indicated before, some of this information is generally available from the standards organizations[84], but there may also be other rights that are relevant, and it is not always possible to identify beforehand whether there is an infringement or not. Sometimes this is not because it is not feasible to obtain that information, but because companies do not have proficient procedures in place, or because they simply do not want to find out about essential rights because they fear the risk of willful infringement that might result in treble damages in the U.S. (35 U.S.C. § 284).[85]

In addition to the above, companies' ability to resolve the issues amicably among themselves may be insufficient to iron out the problem because the defensive patent strategies in use in many ICT companies do not work well against so-called patent-trolling companies. The purpose of such strategies is to discourage patent-infringement assertions, and to ease the settling of disputes through cross-licensing, among other things.[86] In a way, the existence of patent trolls levels the

---

[81] Henry Chesbrough, *Open Innovation, The New Imperative for Creating and Profiting from Technology* (Harvard Business School Press 2003); Pia Hurmelinna-Laukkanen, *Dynamics of Appropriability – Finding a Balance between Efficiency and Strength in the Appropriability Regime* (Acta Universitatis Lappeenrantaensis 228, 2005); Soininen, at 23-25 (2005b).

[82] Grant, at 351 (2005).

[83] Schepel & Falke, at 178 (2000).

[84] WIPO (year n/a).

[85] DOJ/FTC (2002); Soininen, at 62-63 (2007).

[86] *See e.g.*, Miele, at 23 (2000); Hall & Ham Ziedonis, at 121 (2001); Granstrand, at 214 (1999); Rahnasto, at 7 (2003); Soininen (2007); FTC, at Chapter 3, 35-36, 52-53 (2003).

playing field for large and small companies: small companies are not necessarily in a position to trade their rights.

### (iv) A Legal Framework that Is Applicable in the Solving of Actualized Disagreements

Thus, the patent system as it exists today, combined with certain industry characteristics, the economic importance of standards, and inefficient risk management, could be mentioned as sources of the rather high-level risk of submarine patents. It is this combination that makes it both desirable and possible for companies to acquire and enforce rights that read on an industry standard. A further factor that could be said to have an effect on the emergence of various disputes is that the legal means of resolving the realized problems in court appear to be insufficient. These means affect the parties' negotiation power and thus their ability to settle the issues amicably, for example, and they also influence the ways in which companies operate during and after the standard setting.

Basically, it is well known that patent holders may be charged and found guilty of some form of unfair competition, and in exceptional cases of violation of antitrust/competition laws, if they have encouraged the selection of a standard and purposefully neglected to notify the standard-setting body of their rights. Other types of submarine-patent scenarios appear to be more challenging to contest, however. These might include situations in which the patentee is a third party or has participated in the standard setting, but the patent rights come as a surprise because the policy has not required their disclosure and no attention has been drawn to them, or the patentee has accidentally neglected to disclose its essential rights.[87] In particular, third-party patent holders have a strong legal position, and these types of patent-infringement scenarios could be said to have become more probable in recent years. Indeed, standards adopters have reported that they have faced a sudden surge of third-party patent-infringement assertions, some of which are valid and some of which are not.[88]

## B. WAYS OF DIMINISHING THE PROBLEMS

There are many ways of limiting the problem with submarine patents. These include legal and practical means, such as specifying and clarifying the patent policies with respect to disclosure and licensing rules, and conducting more thorough third-party patent due diligence. Indeed, drafting better contracts is probably the first thing that comes to the mind of any lawyer. It should be noted, however, that antitrust and competition laws may reduce the possibilities of imposing extensive disclosure and licensing obligations on standard setters in practice, and it is within these limits that standard-setting organizations must operate. If they were to require their members or other participants to share some of their trade secrets, such as the contents of secretly pending patent applications, and to discuss their future plans with one another, it could be considered collusion, which might run their members and participants into trouble with the

[87] Soininen, at 45 (2007).

[88] Allen M. Lo (Jupiter Networks, Inc), *A Need for Intervention: Keeping Competition Alive in the Networking Industry in the Face of Increasing Patent Assertions Against Standards* (FTC/DOJ Hearings on Competition and Intellectual Property Law and Policy In the Knowledge-based Economy – Standard Setting and Intellectual Property, 18 April 2002).

competition authorities.[89] Furthermore, price setting is per se a violation of antitrust/competition law, and it is for this reason that standards organizations typically do not take any active role in the licensing negotiations but leave it to the contracting parties[90]. In essence, due to the nature of standard setting as an activity through which competitors collaborate[91], the standards organizations and the participants are constantly walking a fine line, and agreements between the parties could easily make the activity that is generally considered pro-competitive subject to antitrust scrutiny[92]. Indeed, in 1992 the European Commission reviewed the ETSI draft patent policy according to which ETSI members would have been, as a default rule, required to grant licenses to any of their IPRs that were deemed "essential" by ETSI. If the rights holders were not willing to grant such a license, they would have the option of not doing so by providing ETSI with a written statement within 90 days of ETSI approving its first work program for the creation of product standards. In the end, these original documents were withdrawn as a result of considerable debate and controversy, and they have subsequently been altered.[93]

It is possible to make legal amendments either by implementing new or modifying the old rules, or by means of interpretation. The legal framework is not fixed in the sense that there is always room for rectifying and supplementing interpretation that takes the prevailing needs of society into account.

In principle, there are two juridical options for diminishing the submarine-patent dilemma. The first is by influencing the existence of submarine patents in the first place, and the other is by patching up the safety net through reinforcing the possibilities of solving the actualized conflicts in court, particularly when interoperability is at stake. Basically, the relevant question for policy makers concerns how far patents should be overridden in the interests of establishing common interoperability standards. The protection of inventions has namely been regarded as necessary in order to provide incentives to innovate. The economic rationale behind the granting of patents is to reward those who invest in research and development (R&D) and commercialize their inventions, as this is inherently risky. R&D expenditures represent sunk costs, which once incurred are irrecoverable, and in order to make such investments there must be the possibility to maintain post-innovation prices at a high enough level to enable these initial expenditures to be recouped. In the absence of patents, competitors could copy the inventions without incurring those initial costs, and thus enjoy a cost advantage that might lead to a fall in the market price.[94] Furthermore, patents provide the means to transfer the technology to parties that have the means to commercialize it, and they benefit the public also because in them the invention must be

---

[89] DOJ/FTC (2002). *See also* Maurits Dolmans, *Standards for Standards,* at 4-5, 7-9 (Paper for American Bar Association, Section of Antitrust Law, Spring meeting 2002), <http://www.ftc.gov/opp/intellect/020522dolmans.pdf> (last visited 28/1/07).

[90] Morse, at 20 (2003).

[91] Morse, at 20 (2003); Lemley, at 15 (2002).

[92] *See e.g.,* DOJ/FTC (2002).

[93] Diana Good, *How Far Should IP Rights Give Way to Standardisation: The Policy Positions of ETSI and the EC* (European Intellectual Property Review, Vol 14, Number 9, 1992, 295-297); Cunningham, at 364 (2005); Schepel & Falke, at 176 (2000); Roger Tuckett, *Access to Public Standards: Interoperability Revisited* (European Intellectual Property Review, Vol 14, Number 12, 1992, 423-427); Dolmans, at 14-15 (2002).

[94] Shurmer & Lea, at 50 (1995); William M. Landes & Richard A. Posner, *The Economic Structure of Intellectual Property Law* (The Bellknap Press of Harvard University Press 2003); Granstrand, at 83 (1999).

disclosed in detailed enough manner for the man in the art to reproduce it[95]. On the other hand, once a new product or process emerges, the socially optimal outcome is its widespread diffusion through the economy.[96]

Patents and standards are not a new policy concern, and the discussion is linked to more general concerns about IPR protection and the possibility of using it in order to control product interoperability, particularly with respect to software. A closer look at the issues that have been under discussion in recent years is taken in the next section. The aim is to provide the reader with a view of the dynamics of the legal system and to highlight the most prominent possibilities for rectifying the situation.

[95] Schotchmer, at 82-83 (2004); Landes & Posner, at 295 (2003); Granstrand, at 83 (1999).

[96] Shurmer & Lea, at 50 (1995); DOJ/FTC (2002).

## III. RECENT POLICY CONSIDERATIONS WITH RESPECT TO INTELLECTUAL PROPERTY RIGHTS AND INTEROPERABILITY

As outlined above, the potential of IPRs to restrict product interoperability is not a new concern, particularly with respect to software, the designing and integration of which inherently require access to interfaces. Indeed, in the copyright area these worries are already taken into account in the legislation. Issues concerning interoperability and copyrights, interoperability and patents, and interoperability and antitrust/competition laws are addressed briefly below, and general trends in the area of patent and antitrust/competition regimes are discussed.

### A. SOFTWARE COPYRIGHTS AND INTEROPERABILITY

In Europe, issues revolving around interoperability and copyright protection are taken into consideration in the EU directive on the Legal Protection of Computer Programs (91/250/EEC), which has been implemented in the national copyright laws of the member states. According to the directive, only the expression of a computer program can be protected and the ideas and principles, that underlie any element of it, including those underlying its interfaces, do not enjoy copyright protection[97]. Naturally, the implementation of particular interfaces may fall under copyright protection on condition that the program is original, meaning in compliance with Finnish case law that it is possible to design the program in more ways than one and the expression has not merely been dictated by external factors[98]. Furthermore, if the reproduction of a protected code and the translation of its form is indispensable in order to obtain the necessary information to achieve the interoperability of an independently created program with other programs, performance of the acts of reproduction and translation by or on behalf of a person having the right to use a copy of the program is legitimate and compatible with fair practice. Decompilation/reverse-engineering, which involves working backwards from the object code to produce a simulacrum of the original source code[99], does not therefore require the authorization of the copyright holder. The objective is to make it possible to connect all components of a computer system, including those of different manufacturers, so that they can work together.[100]

U.S. case law also indicates that copyright protection does not extend to the program attributes that dictate interoperability requirements because these are functional elements and fall beyond its scope. Furthermore, expressions that are process-driven and dictated by efficiency or external

---

[97] Council Directive 91/250/EEC of 14 May 1991 on the legal protection of computer programs.

[98] *See e.g.,* Sonera Systems Oy v. Harjuvaara, Juselius, Saivosalmi, Salojää and VF Partner Oy, Docket No. R 99/661 (Helsinki Court of Appeals, 28 December 1999). On other relevant Finnish case law *see e.g.,* Kristiina Harenko, Valtteri Niirainen & Pekka Tarkela, *Tekijänoikeus -kommentaari ja käsikirja*, at 223-224 (WSOYpro 2006). *See also* Ulla-Maija Mylly, *Yhteentoimivuus – yhteinen päämäärä? Näkökohtia edesmenneestä ohjelmistopatenttidirektiiviehdotuksesta,* at 49-50 (In Ari Saarnilehto (ed.). *Teollisoikeudellisia kirjoituksia VII*, Turun yliopiston oikeustieteellisen tiedekunnan julkaisuja, Yksityisoikeuden sarja A:115, 2006, 35-78).

[99] Cohen & Lemley, at 16 (2001).

[100] Council Directive 91/250/EEC of 14 May 1991 on the legal protection of computer programs. In Finland these principles have been implemented particularly in Sections 25 j and 25 k of the Copyright Act. *See also* Hallituksen esitys Eduskunnalle laiksi tekijänoikeuslain ja tekijänoikeuslain muuttamisesta annetun lain voimaantulosäännöksen 2 momentin muuttamisesta (HE 211/1992 vp.), and commentaries, such as, Harenko, Niirainen & Tarkela, at 219-238 (2006).

factors, such as compatibility and industry demands, cannot enjoy copyright protection[101]. Moreover, even though there is no express statutory provision in the U.S. Copyright Act, it has been established in case law that reverse-engineering is typically allowed as fair use even though copying of the program is required if there are no other ways of gaining access to the functional requirements for interoperability[102]. It should be realized, however, that even though the provisions regarding reverse-engineering are compulsive in the EU member states, and also in the U.S. the enforcement of conflicting contract terms is contentious, the situation is uncertain, and it may thus be possible to legitimately prevent reverse-engineering on a contractual basis in the U.S.[103]. Indeed, the use of contract terms that prohibit it is well established in software licenses. Basically, what this implies is that even though copyright laws enable the use of interface information and access thereof through reverse engineering, the parties may have entered into a contract that prohibits such actions, and violation of these provisions may result to contract breach. Furthermore, such actions could be held as improper means to obtain trade secrets embedded in the program[104].

## B. SOFTWARE PATENTS AND INTEROPERABILITY

While copyright laws have particularly in Europe taken interoperability issues into account, patent laws do not currently incorporate such provisions, and there are no juridically developed exceptions either. This could undermine the efforts to reverse-engineer copyrighted software in practice. Patent protection entails, inter alia, the making and using of patented products, and reverse engineering could be deemed to constitute "a use" of the patented computer program. Furthermore, decompilation could be thought to constitute "the making" of the patented program by generating a copy of it in RAM or a more permanent memory.[105] For this reason, Cohen and Lemley (2001) have argued for the inclusion of a reverse-engineering privilege in U.S. patent law since the fact that patented inventions are published does not remove the urge to gain

---

[101] Relevant case law and commentaries include *e.g.,* Computer Associates International Inc v. Altai Inc, 982 F.2d 693, 61 USLW 2434, 119 A.L.R. Fed. 741, 37 Fed. R. Evid. Serv. 348 (2nd Cir., 17 December 1992) (in contrast to Whelan); Whelan Associates, Inc v. Jaslow Dental Lab, Inc, 797 F.2d 1222, 55 USLW 2094, 230 U.S.P.Q. 481, 1986 Copr.L.Dec. P 25,978, 21 Fed. R. Evid. Serv. 571 (3rd Cir., 4 August 1986); Julie E. Cohen, *Reverse Engineering and the Rise of Electronic Vigilantism: Intellectual Property Implications of "Lock-Out" Programs*, at 1136-1152 (Southern California Law Review, Vol 68, 1995, 1091-1202); Roger E. Schechter & John R. Thomas*, Intellectual Property, The Law of Copyrights, Patents and Trademarks*, at 47-48 (Handbook Series, Thomson West 2003).

[102] Relevant case law and commentaries include *e.g.,* Sega Enterprises Ltd v. Accolade, Inc., 977 F.2d 1510, 61 USLW 2254, 1992 Copr.L.Dec. P 27,001, 24 U.S.P.Q.2d 1561 (9th Cir., 20 October 1992); Atari Games, Corp. v. Nintendo of America, Inc., 975 F.2d 832, 61 USLW 2203, 1992-2 Trade Cases P 69,969, 1992 Copr.L.Dec. P 26,978, 24 U.S.P.Q.2d 1015 (Fed. Cir., 1992); Sony Computer Entertainment, Inc. v. Connectix Corp, 203 F.3d 596, 180 A.L.R. Fed. 655, 2000 Copr.L.Dec. P 28,022, 53 U.S.P.Q.2d 1705, 00 Cal. Daily Op. Serv. 1106, 2000 Daily Journal D.A.R. 1601 (9th Cir., 10 February 2000); Cohen, at 1098-1134 (1995); Pamela Samuelson & Suzanne Scotchmer, *The Law and Economics of Reverse Engineering*, at 30-35 (Yale Law Journal, Vol 111, 2002); Cohen & Lemley, at 16-18 (2001); Schechter & Thomas*,* at 239-240 (2003).

[103] Relevant case law and commentaries include *e.g.,* Harold R. Bowers v. Baystate Technologies, Inc, 302 F.3d 1334, 2002 Copr.L.Dec. P 28,479, 64 U.S.P.Q.2d 1065 (Fed.Cir., 2002); Vault Corp. v. Quad Software Ltd., 847 F.2d 255, 57 USLW 2016, 1988 Copr.L.Dec. P 26,293, 7 U.S.P.Q.2d 1281 (5th Cir., 20 June 1988); Robert P. Merges, Peter S. Menell & Mark A. Lemley, *Intellectual Property in the New Technological Age,* at 932 (Aspen Publishers 2003); Samuelson & Scotchmer, at 46-49 (2002) and references mentioned therein.

[104] *See e.g.,* Samuelson & Scotchmer, at 31, 46 (2002) and references mentioned therein.

[105] Cohen & Lemley, at 19 (2001); Samuelson & Scotchmer, at 31 (2002).

knowledge of the unpatented parts and also a better understanding of the patented program because there is no need to attach the source code to the patent application. In their opinion, such privilege could be established under the experimental use defense, which allows experiments on the patented invention, or the exhaustion of rights defense, which provides that the first sale by the patentee of an article embodying the invention exhausts the patent rights to that article and therefore the patentee can no longer control further sale and use of that product. Furthermore, it could be argued that the patent holder has granted an implied license to such use, and that preventing access particularly to unpatented elements constitutes a patent misuse. If the courts refuse to extend such exceptions to reverse engineering, legislation should, according to Cohen and Lemley (2001), be enacted to permit it.[106] Obviously, the possibility to reverse-engineer under patent law would not legalize the use of the patented invention in order to design interoperable products if the new product still employed such an invention. Thus, even though it is possible to overcome copyright protection by designing a new implementation, the use of patented interfaces would essentially require a license from the patent holder.

Similarly, in Europe where private and non-commercial use is typically beyond the scope of patent protection[107], it could be deemed that decompilation is also allowable if done by commercial organizations if it falls into the category of experimental use[108] or, if the patented invention has been legally put on the market, under the exhaustion of rights principle[109]. Furthermore, it could be argued that an implied license has been granted for practicing the method. Moreover, there has been heated discussion in Europe in the context of the European Commission's directive proposal on the patentability of computer-implemented inventions concerning whether patent holders should be able to restrict interoperability between computer systems at all. In fact, the European Parliament proposed the implementation of Article 6 a, which would have read as follows: "Member States shall ensure that wherever the use of a patented technique is needed for the sole purpose of ensuring conversion of the conventions used in two different computer systems or network so as to allow communication and exchange of data content between them, such use is not considered to be a patent infringement."[110]

The position adopted by The Council of Ministers was, however, that unenforceability of patents that restrict interoperability is too far-fetched, but that patents should not contravene the decompilation right provided in copyright law. Furthermore, it was stated that the directive was without prejudice to the application of EC Treaty Articles 81 and 82 in particular, where a

---

[106] Cohen & Lemley (2001).

[107] This principle has been set out also in Article 27 of the Community Patent Convention (1989) which never became ratified.

[108] The scope of the experimental use exemption varies in different European countries.

According to the Finnish Patents Act, Section 3 the exclusive right shall not apply to "use in experiments relating to the invention as such". Therefore also commercial organization may also conduct experiments concerning the feasibility of the invention and the possibilities for its further development (*See e.g.,* Koktvedgaard & Levin, at 254 (2002)). However, it has been stated in the Government's proposal for the inclusion of so-called "Bolar-exemption" to the Finnish Patents Act that research that is not executed for scientific purposes, but is done in order to advance commercial interests cannot generally be considered to fall within the scope of the exception. (Hallituksen esitys Eduskunnalle patenttilain 3 §:n muuttamisesta (HE 225/2005 vp.)).

[109] *See e.g.,* Koktvedgaard & Levin, at 254 (2002).

[110] European Parliament, *Report on the Proposal for a Directive of the European Parliament and of the Council on the Patentability of Computer-implemented Inventions* (COM (2002)92 – 5C-0082/2000 – 2002/0047 (COD), F<RefStatINAL, </RefSta<NoDocSe>A5-0238/2003, 18 June 2003).<RefStatus></RefStatus><

dominant supplier refuses to allow the use of a patented technique that is needed for the sole purpose of ensuring conversion of the conventions used in two different computer systems or networks so as to allow communication and exchange of data content between them.[111]

The directive proposal was heard for the second time in the European Parliament after the Council of Ministers common opinion had been released. Before that, various propositions supporting the granting of a compulsory license to permit the use of a patented computer-implemented invention on reasonable and non-discriminatory terms when such use is indispensable for achieving interoperability between computer programs, and is in the public interest, were submitted.[112] Ultimately, the Software Patent Directive was abandoned when the European Parliament voted against it on 6 July 2005.

If the path of the software patent directive follows that of biotechnological inventions, the directive proposal regarding the patentability of computer-implemented inventions is likely to be resurrected within a few years. In the meanwhile, the situation concerning the patentability of software in Europe remains inconsistent[113].

For the purposes of further discussion on whether patent rights should be narrowed down in cases of interoperability, either in the context of software patents or more generally, it is relevant to note that Article 30 of the Trade-related Aspects of Intellectual Property Rights (TRIPS) agreement sets boundaries for such amendments. According to Article 30, members may specify limited exceptions to the exclusive rights conferred by a patent, provided that such exceptions do not unreasonably conflict with its normal exploitation and do not unreasonably prejudice the legitimate interests of the patent holder, taking account of the legitimate interests of third parties. It is thus clear that such legislative efforts must be necessary for addressing the problems associated with patents and interoperability.

## C. COMPETITION LAWS AND INTEROPERABILITY

With regard to competition laws that could be applied to outlaw companies' anti-competitive actions if interoperability is at stake, the EC Treaty, Article 81, prohibits agreements and concerted practices that prevent, distort or restrict competition within the common market, and Article 82 prohibits the abuse of the dominant position. Similar sections are also included in the member states' national competition laws. In fact, interoperability concerns have played a major role in the Microsoft litigation. Here, one of the issues before the European Commission was whether Microsoft had abused its dominant position by refusing to provide Sun Microsystems

---

[111] Council of ministers, *Common Position (EC) No 20/2005 of 7 March 2005 adopted by the Council, acting in accordance with the procedure referred to in Article 251 of the Treaty establishing the European Community, with a view to adopting a Directive of the European Parliament and of the Council on the patentability of computer-implemented inventions* (2005).

[112] Mylly, at 57-61 (2006).

[113] *See e.g.,* EPO Guidelines, at Part C, Chapter IV, Section 2.3 (2005) and decisions of the BOA referred therein. UK case law includes *e.g.,* Aerotel Ltd v. Telco Holdings Ltd, Telco Global Distribution Ltd and Telco Global Ltd, EWCA Civ 1371 (Court of Appeals, 17 October 2006); and In the matter of Application No. 9204959.2 by Fujitsu Limited, EWCA Civ 1174 (Court of Appeals, 6 March 1997). German case law (BGH decisions) includes *e.g.,* Logikverifikation, X ZB 11/98 (Bundesgerichtshof, 13 December 1999); Sprachanalyseeinrichtung, X ZB 15/98 (Bundesgerichtshof, 11 May 2000) and Suche fehlerhafter Zeichenketten/Tippfehler (Bundesgerichtshof, 17 October 2001). On Swedish case law *see e.g.,* Törnroth (1999).

with interoperability information concerning the specifications for the protocols used by Windows work-group servers. Gaining that information would have allowed Sun to implement the specifications in its products and thus to provide file, print and group and user administration services to Windows work-group networks.[114]

The European Commission found that Microsoft had a dominant position in the market for operating systems for client PCs, and that in fact its Windows operating system was not only a dominant product on the relevant market, but was also the de facto standard operating system for client PCs: interoperability with Windows domain architecture was therefore necessary for a work-group server operating-system vendor to stay on the market. Furthermore, there were no actual or potential substitutes for disclosures of interoperability information by Microsoft, and even though the information was protected by intellectual property rights, and in terms of copyright law Sun Microsystems was not prohibited from decompiling the program in order to gain the interoperability information it needed, the Commission found that, since the circumstances in the case were exceptional and the need to protect Microsoft's incentives to innovate could not constitute an objective justification for the refusal, Microsoft had an obligation to actively supply interface information. The Commission concluded that Microsoft's refusal to supply interoperability information violated Article 82 of the EC Treaty and it ordered Microsoft to provide the necessary information. Microsoft was also imposed a fine of more than 497 million euros.[115]

On 7 June 2004 Microsoft brought an action before the Court of First Instance (CFI) and sought for the annulment of the decision. It argued among other things that the conditions required by the European Courts before a dominant undertaking is obliged to license its intellectual property rights were not met in this case as the technology which it was ordered to license was not indispensable to achieve interoperability with Microsoft PC operating systems, the alleged refusal to supply the technology did not prevent the emergence of new products on a secondary market and it did not have the effect of excluding all competition on a secondary market. Furthermore, Microsoft claimed that the Commission had wrongly denied Microsoft its right to rely on its intellectual property rights as an objective justification for its alleged refusal to supply the technology and instead the Commission had advanced a new and legally defective balancing test invoking public interest in disclosure.[116] Later on, Microsoft applied also for the suspension of the operation of the remedies issued by the Commission (Case T 201/04). While Microsoft did not succeed with the latter claim[117] and the Commission issued Microsoft further fines due to its non-compliance with the Commission's decision[118], the former litigation is currently pending.

---

[114] European Commission v. Microsoft Corp., Case COMP/C-3/37.792 (European Commission, 24 March 2004).

[115] European Commission v. Microsoft Corp., Case COMP/C-3/37.792 (European Commission, 24 March 2004).

[116] Action brought on 7 June 2004 by Microsoft Corporation against the Commission of the European Communities (Case T-201/04) (Official Journal of the European Union, C 179, 10 July 2004, 18-19).

[117] Order of the President of the Court of First Instance, Case T-201/04 R Microsoft Corporation (Court of First Instance, 22 December 2004).

[118] *See e.g.,* European Commission v. Microsoft Corp., Fixing the definite amount of periodic penalty payment imposed on Microsoft Corporation by decision C(2005)4420 final and amending that Decision as regards the amount of the periodic penalty payment, COMP/C-3/37.792 (European Commission, 12 July 2006); European Commission v. Microsoft Corp., Imposing a periodic penalty payment pursuant to Article 24(1) of Regulation No 1/2003 on Microsoft Corporation, COMP/C-3/37.792 (European Commission, 10 November 2005).

The Microsoft case was tried in the U.S. as well, and as in Europe the case was decided on relatively narrow factual circumstances, thereby leaving many questions unanswered with respect to the importance of achieving interoperability when applying antitrust laws in conjunction with intellectual property rights[119]. Indeed, there are many perplexities involved in the application of competition and antitrust laws in the "new economy", and it remains to be seen how they will be resolved in practice[120].

## D. PATENTS AND COMPETITION POLICY

As mentioned earlier, it is still unclear how the relationship between IPRs and competition regulation will evolve, but in essence it could be described as follows: IPRs, such as patents, provide their holders with a legal monopoly in the name of promoting innovation, and this may occasionally, but not always, lead to market power and even monopoly as defined in antitrust/competition laws. As a result, the utilization of patents may sometimes be found to contradict competition regulation, the aim of which is to protect competition, the driving force of efficient markets, for the benefit of consumers. Furthermore, patent holders may sometimes condition licenses in a manner that is not considered appropriate under competition regulation.[121]

Even though these two regimes have traditionally been viewed as conflicting, this is no longer the case. They are presumed to be complementary efforts to promote an efficient market place and long-run, dynamic competition through innovation.[122] Furthermore, it has been recognized that the effect of technological progress may quickly reduce even significant static inefficiencies over time, and this holds true particularly in high-tech industries. There may nevertheless be substantial barriers to entry created by network effects and intellectual property rights even here.[123]

Finding the proper balance between patent and competition policies is challenging, and this fine line has been heavily debated over the years in both Europe and the U.S. The problems with standardization and patents have further spiced up the discussion. The World Intellectual Property Organization (WIPO), for instance, appears to have acknowledged this as various related documents are to be found on its website. In general, it could be said that EU competition policy has placed more limits on the exploitation of patents than U.S. competition policy[124].

---

[119] Scotchmer, at 289-290 (2004).

[120] *See e.g.,* Robert Pitofsky*, Antitrust and Intellectual Property: Unresolved Issues at the Heart of the New Economy* (Berkeley Technology Law Journal, Vol 16, Number 2, Spring 2001); Richard A. Posner, *Antitrust in the New Economy* (University of Chicago Law & Economics, Olin Working Paper No. 106, 2000).

[121] *See e.g.,* EC, *Commission Evaluation Report on the Transfer of Technology Block Exemption Regulation No 240/96. Technology Transfer Agreements under Article 81,* at 10-11 (En COMP/REG. 240/96, "Evaluation Report" 2001), <http://ec.europa.eu/comm/competition/antitrust/technology_transfer/en.pdf> (last visited 14/1/07); Morse, at 17-18 (2003); DOJ/FTC, *Antitrust Guidelines for the Licensing of Intellectual Property* (1995), <http://www.ftc.gov/bc/0558.pdf> (last visited 27/7/06).

[122] Merges, Menell, Lemley, at 992-993 (2003); Morse, at 17-18 (2003).

[123] Morse, at 20 (2003); Pitofsky (2001).

[124] EC, Evaluation Report, at 17 (2001).

In the U.S., the Federal Trade Commission (FTC) has been active in assessing the relationship between patent law and antitrust regulation. It held extensive hearings on the "balance of competition and patent law and policy in the knowledge based economy" in 2002, and one of the areas discussed was standard setting focusing on the disclosure of IP and licensing with respect to standardization activities. Eventually, in 2003, the FTC issued a report on how to promote innovation through balancing competition with patent law and policy. The main conclusion presented in the report was that, as a result of a large number of so-called "questionable patents", the U.S. patent system was not functioning properly, and the FTC suggested various improvements to the law with the aim of reducing the granting and effects of such patents.[125]

The most relevant propositions with respect to the submarine-patent dilemma originating from the difficulty in identifying relevant rights beforehand appear to be the urge to implement legislation that would require publication of all patent applications 18 months after filing, and to enact legislation to require for the liability for willful infringement to require actual, written notice of infringement from the patentee, or deliberate copying of the patentee's invention knowing it to be patented[126]. In addition, various scholars and the National Academy of Sciences (NAS) have presented propositions on how to improve the patent system[127]. Time will tell, how criticism of the U.S. patent system will ultimately be taken into account in legislation and in the courts. The Patent Revision Act of 2005 (H.R. 2795) is currently pending at Congress, and the United States Patent and Trademark Office has also recently put forward a proposal that would limit the number of continuation applications that can be filed. Under the proposal, applicants wishing to file more than one continuations must show by petition that the amendments, evidence or argument could not have been previously submitted. The reasoning behind such a proposal is that the USPTO would then have more resources to conduct proper patent examination: apparently, the continuations amount to approximately one-third of applications under examination.[128]

As is clear from the above, the legal system with respect to patent and antitrust/competition laws is in a state of flux, but if the suggested amendments to the U.S. patent system are made, they will potentially limit the submarine-patent risk as they enhance the possibility of being aware of relevant rights beforehand. I will now turn to a more litigation-oriented discussion. Before going through the available options one by one, I will point out certain features that are relevant in the context of patent-infringement assertions and standards in the ICT sector: matters that have to do with the selection of companies that are most likely to pay licensing fees to the patent holder without threatening its business in other ways, the ways in which different communities may react to patent-infringement assertions, and the content of standards organizations' patent policies and guidelines for their implementation.

---

[125] FTC (2003).

[126] FTC, at Chapter V, 14-15, 28-31(2003).

[127] *See e.g.,* Jaffe & Lerner (2004); NAS, *A Patent System for the 21st Century* (April 2004), <http://www.nap.edu/books/0309089107/html/> (last visited 18/9/06).

[128] Paul Devinsky & Stephen A. Becker, *USPTO to Bar: We Are Drowning in Continuation* (IPFrontline.com, 4 April 2006), <http://www.ipfrontline.com/depts/article.asp?id=10240&deptid=4> (last visited 5/7/06).

# IV. PRELIMINARY CONSIDERATIONS

## A. CONTACTING POTENTIAL INFRINGERS IN THE NETWORKED INDUSTRIES

If a company that has participated in standard setting, or a third party, finds out that it has a patent or patents that are likely to read on a standard and are essential for using it, and decides to enforce its rights, the patent holder probably contacts selected groups of potential infringers one by one by sending them polite letters informing them of its rights. If the patent holder is not seeking to protect some competitive advantage by preventing its competitors from making interoperable products, for instance, but is after licensing revenues - as could be said to be often the case in the ICT sector in which the ability to exclude all others is not as critical as in some other sectors such as pharmaceuticals[129], it usually elaborates on the possibility of granting a license but may simultaneously threaten litigation and injunctions as a tactic to maximize the royalties that could be extracted. In fact, according to Lo (2002), a typical infringement scenario is that the patent holder holds a large patent portfolio in the field but does not sell any products that would compete with those identified as potentially infringing, and the company accused of infringement is a smaller and younger firm that is relatively successful in terms of the volume of products sold but has only few or no patents relevant to the patent holder's business. Furthermore, compliance with the standard identified by the patent holder is usually necessary for interoperability, and therefore it is not easy for the potential infringer to switch to another specification.[130]

After the patent holder has been able to convince a sufficient number of companies to take up a license, which increases the strength of its patent, it may move to more "challenging" companies. For instance, Forgent Networks Inc began the assertion of its patents related to the JPEG image standard against certain Japanese companies, and after having succeeded in licensing its patents with Sony and Sanyo it moved to other U.S., European and Asian organizations. If the approached company refused to license, Forgent Networks Inc sued it for patent infringement: in fact, it filed patent-infringement suits against over 30 companies in 2004.[131]

The reason why it is tempting for a patent holder in pursuit of licensing revenues to target undertakings with which it does not cooperate and which use the patented technology in areas in which the patentee does not compete is that these companies do not typically have any rights they could assert over the patentee and there would be no harm to its regular business. Indeed, since companies in the ICT sector are often heavily dependent on one another, and may be competitors in one area and partners in cooperation in another, infringement cases could in the worst case turn out to be very messy. For instance, Qualcomm has faced several litigations with Ericsson, Broadcom and Nokia due to its actions with respect to the CDMA and WCDMA standards.

---

[129] Cohen, Nelson & Walsh, at 23-24 (2000).

[130] Lo (2002).

[131] Hicks (2004); Forgent Networks (2006).

## B. EVALUATION OF PATENT SCOPE AND VALIDITY

Once a company has become aware of a potentially relevant patent indirectly or has been contacted directly by the patent holder, it generally needs to have the patent evaluated before it can safely proceed to use the technology without agreeing to pay royalties to the patent holder. If the company fails to obtain an opinion clearing its technology in the face of the patent, and the infringing party has already been notified, continued use is likely to be considered willful infringement, and this may under the prevailing legislation (35 U.S.C. § 284) result in treble damages in the U.S. The options of the potential infringer are basically to refrain from using the invention, to design around the patent, to negotiate a license or cross-license, or to attempt to invalidate it in court or through opposition (Europe) or re-examination (U.S.) proceedings[132]. It may also seek to demonstrate that the patent is unenforceable, or that the patent holder has the obligation to license it on certain terms. If the patent holder has promoted the selection of that particular standard and seems to have failed to disclose its rights, there may also be a good chance that the competition authorities will investigate the matter if informed about it.

Then again, if it seems that the patent is not being infringed, this finding is communicated to the patent holder, who may accept it or continue the correspondence and ultimately sue for infringement. The alleged infringer may also choose to initiate a declaratory action in order to get a clarification from the court that the patent is not being infringed[133]. In essence, from the perspective of the companies that are already using the standard, the situation is similar in many respects to a regular patent-infringement analysis. However, the fact that there may be multiple parties involved in the alleged infringement, and that there may be significant economic and societal interests at stake, may bring certain extra elements into the dispute.

## C. THE POWER OF "COMMUNITY"

If it becomes known after the publication of a standard that there may be relevant rights that should be licensed before it can be used, the standards organizations typically contact the patent holder, who is requested to provide the same assurances as other companies whose proprietary technology is involved in a standard. If the patent holder refuses to make the required licensing statement, the standard needs to be revised or withdrawn.[134] However, standards organizations are not typically involved in arrangements related to patents (such as license agreements) or in settling disputes with respect to their validity and scope[135]. It is usually the companies implementing the technology that need to address these issues among themselves. However,

---

[132] *See e.g.,* H. Jackson Knight, *Patent Strategy for Researchers and Research Managers* at 137-143 (John Wiley & Sons, Inc 2001); Miele, at 24-30 (2000).

[133] In Finland such an action is possible under Section 63 of the Patents Act, while in the U.S. the action for declaratory judgement may be initiated on the basis of the Declaratory Judgement Act, 22 U.S.C. § 2201. *See also* Alan L. Durham, *Patent Law Essentials, A Concise Guide*, at 154-155 (Quorum Books 1999).

[134] *See e.g.,* ANSI, *Guidelines for Implementation of the ANSI Patent Policy* (2003), <http://publicaa.ansi.org/sites/apdl/Documents/Standards%20Activities/American%20National%20Standards/Procedures,%20Guides,%20and%20Forms/PATPOL.DOC> (last visited 14/1/06); ITU-T, *Guidelines for Implementation of ITU-T Patent Policy* (2005), <http://www.itu.int/ITU-T/dbase/patent/files/glp20051102.pdf> (last visited 14/1/07); VESA, *Intellectual Property Rights (IPR) Policy* (2005), <http://www.vesa.org/Policies/VP200B.pdf> (last visited 14/1/07).

[135] WIPO (year n/a).

when there are multiple parties using the standard and the public interest in settling the matter is high it is easier to respond to an infringement allocation because it is possible to benefit from the work done by the other interested parties. Moreover, and particularly in the area of software and the Internet, the "community" may be helpful in providing assistance in finding relevant prior art material against the patent. In fact, a widespread prior art-search campaign has been conducted with respect to the Intermind patent and the EOLAS Technologies Inc patents that read on the HTML specification[136].

The Intermind Corporation's patent case is a good illustration of an exceptional situation in which patent analysis was conducted by a standards body, and in which no infringement was found based on a pre-infringement analysis. Here the problem arose when Intermind, which had participated in W3C working groups regarding the Platform for Privacy Preferences (P3P), was granted a U.S. patent, and indicated that this patent could be infringed by the implementation of W3C metadata technologies, including the P3P. As a consequence, W3C faced the problem that developers were becoming hesitant in implementing P3P technology due to the possibility of having to deal with patent complications. W3C then decided to examine the strength and applicability of the patent. It also sought the help of the public during the process, and posted a prior art search call on its web site asking for information on any systems that had predated the Intermind patent and could therefore be used to render the patent invalid. Furthermore, it then conducted an analysis of whether the implementation of their P3P actually infringed Intermind Corporation's patent. The analysis confirmed that it was possible to implement the standard without infringement. After establishing that P3P had not infringed Intermind's patent, W3C commented that they hoped not to make such analyses a regular practice.[137]

In addition to conducting prior art searches and patent-infringement analyses, certain public organizations may be willing to initiate patent re-examination or opposition procedures. In fact, there are examples of the former as in the U.S. any person may initiate such a procedure at any time by citing prior art consisting of relevant patents or printed publications that the person believes to have a bearing on the patentability. To be more specific, there are two types of re-examination that may be requested: ex parte and inter partes. In the former, under the Patent Act (35 USC) Sections 302 to 307, a third-party requester is not directly involved during the re-examination process before the United States Patent and Trademark Office (USPTO), while in the latter, under Sections 311 to 318, a third party whose identity becomes known to the patent holder is able to participate in the process and also appeal the decision.[138] Indeed, in the EOLAS case it was the W3C[139], and in the Forgent episode discussed earlier in the section "Contacting Potential Infringers in the Networked Industries" it was the Public Patent Foundation (PUBPAT), that initiated the process. While in the EOLAS case the patent office ultimately held the patent in force[140], the Forgent re-examination is still ongoing. The USPTO issued its non-final action on the matter on 26 May 2006, finding only 27 of the 46 patent claims valid.[141] Later that year, on 2 November 2006, Forgent announced that it had stopped the assertion of its patent

---

136 Festa (2003).

137 Rein (1999); W3C (1999).

138 Barry P. Golob & Amy El Schoenhard, *Patent Re-examination Procedure as a Litigation Strategy*, <http://www.buildingipvalue.com/05_NA/075_078.htm> (last visited 1/1/07).

139 W3C (2003).

140 Malone (2005).

141 Forgent Networks (2006); Niccolai (2006).

on the JPEG standard, which was certainly a victory for PUBPAT[142]. The PUBPAT is a non-profit legal services organization that was founded to represent the public interest as a response to the damage that an unbalanced patent system may cause, particularly due to wrongly issued patents and an unsound patent policy favoring the applicants[143]. Indeed, there are multiple organizations and individuals who oppose software patenting, among other things, and deem the patent system harmful to innovation. This criticism may already prove beneficial from the perspective of the potential infringer, as the attempts to proprietarize and open standards are likely to be crucified in the media and thus harm the reputation of the patent holder - who might for this reason consider the initiation of patent litigation more seriously.

## D. PATENT POLICIES AND MISCONDUCT DURING STANDARD SETTING

In cases in which the submarine patent holder asserting its rights has participated in setting the standard, and particularly if the company's representative has promoted the selection of the technology covered by the patent, there may be a reason to question the patentee's activities and to argue that it has:

1) violated its contractual obligations;
2) misled others in the industry into believing that the company has no rights, and that this ought to be considered an equitable estoppel or an implied license rendering its rights unenforceable;
3) misused its patent;
4) abused the standardization process in order to gain market power and has thus violated antitrust/competition laws;
5) operated unfairly or deceptively in business, and/or
6) defrauded.

However, in order to demonstrate that the patent holder has not acted in good faith, it generally must be shown that it had some kind of duty or obligation to disclose its essential patents or patent applications in due time, and this is where the language of the written patent policies of standards organizations, guidelines for their implementation, the interpretation of these policies among standard setters, and the adopted practices such as the number and form of "patent calls" taking place during the procedure, come under scrutiny. Certain features of the policies are presented below, and a more detailed account of the disclosure terms of The American National Standards Institute (ANSI)[144], The International Telecommunication Union (ITU/ITU-T)[145], The

---

[142] *See e.g.,* PUBPAT (a) (year n/a).

[143] PUBPAT (b), *About PUBPAT* <http://www.pubpat.org/About.htm> (last visited 6/9/06).

[144] ANSI coordinates the development and use of voluntary consensus standards in the United States and acts as a representative of the U.S. in standardization forums around the world. It oversees the creation, promulgation and use various norms and guidelines in different fields. ANSI is also actively engaged in accrediting programs that assess conformance to standards. (ANSI, *About ANSI Overview* (year n/a), <http://www.ansi.org/about_ansi/overview/overview.aspx?menuid=1> (last visited 14/1/07)).

[145] The ITU Telecommunication Standardization Sector (ITU-T) is one of the three Sectors of the International Telecommunication Union (ITU). Its mission is to ensure an efficient and on-time production of high quality standards (Recommendations) covering all fields of telecommunications with an exception of radio aspects. (ITU-T, *General Information on ITU-T* (year n/a), <http://www.itu.int/ITU-T/info/itu-t/info.html> (last visited 14/1/07)).

European Telecommunications Standards Institute (ETSI)[146], The Video Electronics Standards Association (VESA)[147], JEDEC Solid State Technology Association (JEDEC)[148], The Internet Engineering Task Force (IETF)[149], Organization for the Advancement of Structured Information Standards (OASIS)[150] and the World Wide Web Consortium (W3C)[151] patent policies and guidelines is given in Appendices 1.1. – 1.11. This section is intended to provide the reader with background information of the kind of variations different policies may include, while their impact on the defenses/offences available to potential patent infringers is examined in the appropriate, law-specific sections.

### (i) The ANSI Patent Policy and Guidelines for Its Implementation

Patent policies vary with respect to the nature of the disclosure obligation. Sometimes there is no obligatory duty to disclose at all, and the policy is intended to be more of a guideline or a "code of practice" that encourages the members and other participants if they are allowed to take part in standard setting to come clean with their relevant rights voluntarily. For instance, the ANSI Patent Policy was written down for ANSI-Accredited Standards Developers (ASD) and it does not impose any obligation on the rights holders to identify their rights, but is based on voluntary disclosure.[152] It is merely stated in the ANSI Patent Policy, Section 3.1., which is part of ANSI's "Essential Requirements: Due process requirements for American National Standards" that "there is no objection in principle to drafting a proposed American National Standard in terms that include the use of a patented item, if it is considered that technical reasons justify this approach. If the Institute receives a notice that a proposed American National Standard may

---

146 ETSI is an independent, non-profit organization, whose mission is to produce telecommunications standards for today and for the future. ETSI is officially responsible for standardization of Information and Communication Technologies (ICT) within Europe. These technologies include telecommunications, broadcasting and related areas such as intelligent transportation and medical electronics. (ETSI, *Who is ETSI?* (year n/a), <http://www.etsi.org/about_etsi/5_minutes/home.htm> (last visited 14/1/07)).

147 VESA is an international non-profit corporation, which supports and sets industry-wide interface standards for the PC, workstation, and consumer electronics industries. (VESA, VESA Organization (year, n/a), <http://www.vesa.org/Organization/index.htm> (last visited 14/1/07)).

148 JEDEC (Once known as the Joint Electron Device Engineering Council) is the semiconductor engineering standardization body of the Electronic Industries Alliance (EIA), a trade association that represents all areas of the electronics industry. (JEDEC, *About JEDEC* (year n/a), <http://www.jedec.org/Home/about_jedec.cfm> (last visited 14/1/07)).

149 IETF is a large open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet. Its mission is to produce high quality, relevant technical and engineering documents that influence the way people design, use, and manage the Internet in such a way as to make the Internet work better. These documents include protocol standards, best current practices, and informational documents of various kinds. (IETF, *Overview of the IETF* (year n/a), <http://www.ietf.org/overview.html> (last visited 14/1/07); IETF, *A Mission Statement for the IETF* (2004), <http://www.ietf.org/rfc/rfc3935.txt> (last visited 14/1/07)).

150 OASIS is a non-profit, international consortium that drives the development, convergence, and adoption of e-business standards. The consortium produces Web services standards, standards for security, e-business, and standardization efforts in the public sector and for application-specific markets. (OASIS, *About OASIS* (year n/a), <http://www.oasis-open.org/who/> (last visited 14/1/07)).

151 W3C is an international consortium that develops Web standards and guidelines. W3C also engages in education and outreach, develops software, and serves as an open forum for discussion about the Web. (W3C, *About W3C* (year n/a), <http://www.w3.org/Consortium/> (last visited 14/1/07)).

152 *See e.g.,* Amy A. Marasco (ANSI), *IPR and Standards* (Presentation at AIPLA, 30 October 2003).

require the use of a patented invention, the procedures in this clause shall be followed." These procedures entail the receipt of a statement from the patent holder that it does not possess any relevant patents, or that it is willing to waive them or license them on RAND terms negotiated in more detail between the parties concerned.[153]

In addition to instituting the above policies, organizations may have issued guidelines on their implementation. ANSI has given out such guidelines, which are much more detailed than its patent policy. By definition, they are intended to be suggestions. Adherence is not considered essential for standards developers to be found in compliance with the patent policy, while adherence or non-adherence to ANSI Patent Policy plays a role when ANSI's Board of Standards Review determines whether or not it will approve an American National Standard. It is mentioned in the guidelines among other things that the early disclosure of patents is likely to enhance the efficiency of the standardization process. This is because it permits notification of the patent to the standards developer and ANSI in a timely manner, provides participants with the greatest opportunity to evaluate the effects of standardizing the patented technology, and allows patent holders and prospective licensees to negotiate the terms and conditions of licenses outside the standards-development process. For this reason, according to the guidelines, such procedures may be embedded in the standardization process, during which the participants are asked to disclose their patents, and sometimes also any pending U.S. patent applications related to a standard under development. This does not mean, however, that a standards developer should undertake a patent search of its own or any other portfolio.[154]

### (ii) ITU and ETSI Patent Policies and Associated Guidelines

ITU and ETSI do not require patent holders to affirmatively disclose or search for potentially relevant patents either[155]. The disclosure obligation in these policies is also rather vague, leaving much room for interpretation and making their enforcement on a contractual basis challenging - as discussed in the following section. It is merely stated in the ITU-T Patent Policy, which has been set out as a "code of practice", that an ITU-T member organization putting forward a standardization proposal should, from the outset, draw the attention of the Director of Telecommunication Standardization Bureau (TSB) to any known patent or to any known pending patent application, either its own or of other organizations, although the TSB is unable to verify the validity of any such information.[156] ETSI Patent Policy is much more detailed. Section 4, Disclosure of IPRs of the ETSI Patent Policy (2006), which is part of the ETSI Rules of Procedure (Annex 6) and thus binds its members, reads as follows:

> "4.1. Subject to Clause 4.2. below, each MEMBER shall use its reasonable endeavors, in particular during the development of a STANDARD or TECHNICAL SPECIFICATION where it participates, to inform ETSI of ESSENTIAL IPRs in a timely fashion. In particular, a

---

[153] ANSI, *ANSI Essential Requirements: Due process requirements for American National Standards / ANSI Patent Policy* (2006), <http://public.ansi.org/ansionline/Documents/Standards%20Activities/American%20National%20Standards/Procedures,%20Guides,%20and%20Forms/ER0106.doc> (last visited 14/1/07).

[154] ANSI (2003).

[155] Taffet, at 24 (2002).

[156] ITU-T, *Common Patent Policy for ITU-T/ITU-R/ISO/IEC* (year n/a), <http://www.itu.int/ITU-T/dbase/patent/patent-policy.html> (last visited 14/1/07).

MEMBER submitting a technical proposal for a STANDARD or TECHNICAL SPECIFICATION shall, on a bona fide basis, draw the attention of ETSI to any of that MEMBER'S IPR which might be ESSENTIAL if that proposal is adopted.

4.2. The obligations pursuant to Clause 4.1 above do however not imply any obligation on MEMBERS to conduct IPR searches."[157]

Both ITU and ETSI have issued guidelines to help standard developers to understand and implement their patent policies, and they clarify many obligations of the members[158]. Furthermore, they discuss the rationale of the policies and spell out certain desired but non-obligatory practices. It is stated in the ETSI Guide on Intellectual Property Rights, for instance, that members are not obliged to inform ETSI of any updates to their essential IPRs, but they are nevertheless encouraged to update and complete their information statements. Furthermore, even though patent portfolio searches are not required, members are "invited to investigate in their own company whether their company does own IPRs which are, or are likely to become Essential in respect of the work of the Technical Body".[159]

### (iii) The VESA Patent Policy

Some patent policies, such as the VESA IPR Policy, explicitly require specific assurances from their members, their representatives, and other participants with respect to the existence of patents. According to this policy, such assurances are required at the time a submission is made. The submitter shall make such an assurance by completing, signing and delivering a Submission of Technology form in which a list of relevant patents is included, and the meeting participants are required to disclose any necessary patent claims of which they are at the time aware in response to a "call for patents". This obligation covers patents held by the participant, the member it represents, and any third party. There is no penalty for disclosure that proves to be inaccurate in the absence of a willful and knowing intention to deceive, however. Similarly, there is no penalty for failing to disclose if there has been no willful or knowing failure to comply.[160]

### (iv) Other Issues

As is clear from the above, standards organizations have adopted different types of patent policies, some of which have been formulated to impose explicit duties on their members and possibly also to other participants, while others have been left open to interpretation. Furthermore, patent policies are not commensurable in what they require to be disclosed and when, either. For instance, in the case of JEDEC, VESA, OASIS, IETF and W3C, the obligation to disclose is to the personal knowledge of the individual making a contribution or participating in the standards-setting committee[161]. According to Section 6.1 of the W3C Patent Policy,

---

[157] ETSI (2006a).

[158] ETSI, *ETSI Guide on Intellectual Property Rights* (2006b), <http://www.etsi.org/legal/documents/ETSI_Guide_on_IPRs.pdf> (last visited 14/1/07); ITU-T (2005).

[159] ETSI (2006b).

[160] VESA (2005).

[161] JEDEC, *The JEDEC Patent Policy* (2003), <http://www.jedec.org/home/patent_related/JEDEC_Patent_Policy_Stmt.pdf> (last visited 14/1/07); VESA

disclosure is required when both of the following are true: 1) "an individual in a Member organization receives a disclosure request as described in section 6.3; and 2) that individual has actual knowledge of a patent which the individual believes contains Essential Claim(s) with respect to the specification for which disclosure is requested."[162] Then again, while some patent policies only require the disclosure of granted patents, some also cover published pending patent applications, and some require disclosure of the existence of unpublished patent applications that have been filed on the basis of the work conducted in the standards committee.[163]

In conclusion, it could be said that the patent policies, the guidelines for their implementation, and the existing practices followed in the course of the process are the key for determining whether a company has operated in accordance with fair business practice. It is very possible, however, that some of the relevant rights remain undisclosed even though there may have been no intention to mislead, and this is also recognized in many patent policies. It is specifically mentioned in the OASIS patent policy (2005b), for instance, that it is understood and agreed that Technical Committee Members do not claim that they know of all potentially pertinent claims of patents and patent applications held or claimed by the Technical Committee Party or any third parties. Furthermore, intentional abuse seems to be particularly difficult to prove, and it is thus rare even though there have been some well-publicized examples of situations in which the patent holder has been accused of intentional standards capture. Also Lemley has argued that it is not at all uncommon for the inventor himself to sit on a technical committee and to guarantee that no patents have been filed[164]. Generally speaking, however, companies appear to do their best to follow the rules of standards-setting organizations, and any deviation is considered unethical[165]. In the following I will examine the abilities of those accused of patent infringement by a standards setter to enforce patent policies on a contractual basis, after which I will move onto the world of patent law.

---

(2005); OASIS, *OASIS Intellectual Property Rights (IPR) Policy* (2005a), <http://www.oasis-open.org/who/intellectualproperty.php> (last visited 14/1/07); IETF, *Intellectual Property Rights in IETF Technology* (2005), <http://www.ietf.org/rfc/rfc3979.txt> (last visited 14/1/07); W3C, *Patent Policy* (2004), <http://www.w3.org/Consortium/Patent-Policy-20040205/> (last visited 14/1/07).

[162] W3C (2004).

[163] *See e.g.,* ANSI (2006); W3C (2004).

[164] DOJ/FTC (2002).

[165] Taffet, at 6 (2002); Soininen, at 59 (2007).

## V. PATENT POLICIES AS CONTRACTS

Standards organizations' patent policies, guidelines for their implementation, the practices followed and how the policies are conceived by the members and participants are all relevant in terms of interpreting whether a company has violated antitrust/competition laws, operated unfairly or deceptively, or committed fraud, among other things. Furthermore, patent policies interpreted and supplemented in the light of relevant material could be deemed to pose contractual obligations on the participants and members of the standards organizations[166]. Indeed, at a first sight this would probably seem the most obvious starting point in determining how to defend a company accused of patent infringement when it can be established that the patentee has failed to disclose its rights. In reality, such allocations have been rare in the context of non-disclosure[167], perhaps for the reasons specified further below. There are namely three hurdles to overcome in invoking the patent policy: first, there must be a contract with provisions that are detailed enough to be enforceable; secondly, the standard user must have the standing to sue; and thirdly, the user must be able to prove the extent of the losses he has suffered as a result of the contract breach.

### A. THE CONCLUSION OF A CONTRACT AND ITS CONTENTS

As mentioned earlier, the first obstacle in the way of convincing the court that a contract breach has taken place and that the other party must be compensated is to show that the patentee is in fact bound by the standards organization's policy. Moreover, the contract provisions must be such that they can be enforced in practice.

When it comes to the question of whether the patentee is bound by the standards organization's policy, there is a need to assess whether the parties have entered into a contractual relationship. With this respect, even though contract laws differ in each jurisdiction, and there are differences particularly between common-law and civil-law countries, the legal principles underlying and complementing the statutes are rather similar. Basically, the meeting of minds between the parties, in other words a clear understanding, the offering and acceptance of contributions by everyone, or other conduct by the parties that is sufficient to show agreement, is needed in order for a contract to be formed and the promises made to be regarded as binding and thus enforceable by the courts. No specific form for the conclusion of a contract is needed in normal

---

[166] On relevant interpretation material, supplementation of contracts and relevant case law, *see e.g.,* Mika Hemmo, *Sopimusoikeus I*, at 583-597, 657-664 (Talentum 2003a); Ari Saarnilehto, *Sopimusoikeuden perusteet*, at 146-148 (Talentum 2005); Jan Ramberg & Christina Hultmark, *Allmän avtalsrätt*, at 106-108 (Norsteds Juridik AB, 5th edition, 2000); Michael Furmston, *Law of Contract*, at 133-162 (Butterworths LexisNexis, 14th edition, 2001). *See also* Commission on European Contract Law, *The Principles of European Contract Law/ Lex Mercatoria*, Chapter 5 (2002), <http://www.jus.uio.no/lm/eu.contract.principles.parts.1.to.3.2002/doc#228> (last visited 11/1/2007) and UNIDROIT, *Principles of International Commercial Contracts / Lex Mercatoria*, Chapter 4 (1994), <http://www.jus.uio.no/lm/unidroit.international.commercial.contracts.principles.2004/> (last visited 11/1/2007), both of which may be applied if the parties so agree.

[167] The (contractual) promise made by the patent holder to license its essential rights on RAND terms has been a more frequent subject to litigation. *See e.g.,* ESS Technology Inc v. PC-Tel Inc, Not Reported in F.Supp.2d, 1999 WL 33520483, Docket No. C 99-20292 (N.D. Cal., 9 November 1999); Nokia Corp. and Nokia, Inc v. Qualcomm, Inc, NO. CIV A 06-509-JJF, Slip Copy, WL 2521328 (D.Del., 29 August 2006).

circumstances, and therefore contracts made in writing, orally or implicitly are all equally valid unless otherwise stipulated by law or contract.[168]

As indicated earlier, there needs to be an intention to enter into a contractual relationship for a contract to be concluded. In the context of cooperative standard setting, this intention typically entails the willingness to join the standards organization and to become a member thereof or to otherwise participate in standard setting if that only is possible. The organization's guidelines, codes of practice and policies then provide recommendations to the members and other participants of how to operate, instructions concerning what is considered good practice, and so forth. These guidelines and policies can be taken into account when determining whether someone has violated the terms and conditions of the membership agreement, for instance. Breach of a guideline or policy or such does not necessarily in itself constitute a membership-contract violation, however. Sometimes adherence is, nevertheless, explicitly or implicitly required, and there may be clear and enforceable contractual obligations on the members of the organization or other standard setting participants. Whether a guideline, code of practice or policy is considered an enforceable contract by itself or whether it merely specifies some other contractual obligations depends on their formulation and on what the parties have intended.

Assessment of the prevailing practices with respect to standard setting and patent policies from the contractual perspective suggests that in the most optimal cases all the members and other participants have signed an agreement in which they explicitly agree upon IPR issues. These provisions may be part of the membership agreement, or they may have been agreed upon separately in writing, which appears to be the case mainly when an industry group or consortia are developing a standard. For instance, the W3C Member Agreement contains provisions regarding Intellectual Property Rights (2005)[169].

As far as the patent policies of standards organizations and their nature as enforceable contracts are concerned, in the clearest cases all the parties have entered into written membership or other type of participation agreements and they have explicitly promised to follow the organization's IPR or Patent Policies or bylaws which these policies are a part of. Policies and bylaws may be attached to the membership or participation agreement, or reference may have been made to them and this way they become part of the agreement. For instance the OASIS Membership Application and Agreement, the ETSI Official Application Form for Full Membership and the VESA Membership and Committee Application contain such provisions[170].

---

[168] *See e.g.,* Hemmo, at 100-122, 129-136 (2003a); Saarnilehto, at 39-56 (2005); Ramberg & Hultmark, at 36-37 (2000); Furmston, Chapters 3 and 4 (2001); John Smith, *The Law of Contract*, at 5-11 (Sweet & Maxwell, 4th edition, 2002); T. Anthony Downes, *Textbook on Contracts*, at 60-64 (Blackstone Press Limited 1987); Laurence Koffman & Elizabeth Macdonald, *The Law of Contract*, Chapter 2 (Tolley, 4th edition, 2001); William F. Fox, Jr, *International Commercial Agreements, A Primer on Drafting, Negotiating and Resolving Disputes*, at 49-56 (Kluwer Law International, 3rd edition, 1998); UNIDROID, Article 1.2 (1994); Commission on European Contract Law, Section 1, Articles 2:101, 2:102 and Section 2 (2002). In Finland the offer and acceptance principle has been set out in Chapter 1 of the Contracts Act.

[169] W3C, *Member Agreement* (2005), <http://www.w3.org/2005/03/Member-Agreement> (last visited 15/1/07).

[170] OASIS, *Membership Application and Agreement* (2005b), <http://www.oasis-open.org/join/membership-agreement.pdf> (last visited 15/1/07); ETSI, *Official Application Form for Full Membership* (year n/a), <http://www.etsi.org/about_etsi/membership/documents/FULL_MEMBERSHIP.DOC> (last visited 15/1/07); VESA, *Membership and Committee Application* (2006), <http://www.vesa.org/Join/memapp3.pdf> (last visited 15/1/07).

In other cases, it could be argued that merely by joining an organization or taking part in standard setting the member or other participant accepts that it is governed by its bylaws[171], and the company or an individual may be expelled if he does not operate accordingly[172], although this is already a weaker argument. In any case, these bylaws need to be available in order to be found binding. Thus, a party asserting that the terms of a patent policy should be considered enforceable obligations even though no reference to them has been made in the membership agreement, for instance, needs to prove that the other party has had knowledge of them and has agreed to follow them at least implicitly. In my view, the situation bears some resemblance to occasions on which an organization has posted its privacy policy or other types of terms and conditions on its website and argues that those visiting the website or registering as users of a particular service without explicitly agreeing to follow the policy have become bound by it[173].

The main differences between these so-called browse-wrap agreements described above and patent policies is that in the standard-setting context technical committees often conduct particular "patent calls", and therefore the members and other participants usually become aware of the policies - at least indirectly. Furthermore, the members and participants are often companies, not individuals, and they have a more profound connection to the standard-setting organization than a person downloading software or visiting the website of an airline company. Moreover, it appears that companies generally acknowledge the binding nature of patent policies, and the basic requirement that a company needs to disclose its essential rights in due time and to make a statement about its licensing could already be considered a well-founded principle, and therefore part of the customs of the trade. For this reason, it would probably be relatively easy to attest a claim that a party has been aware of the patent policy and is bound by it. Questions concerning the interpretation of the terms and conditions of the agreement as well as the applicable law become relevant thereafter[174].

If there is no written policy whatsoever, or if the terms are indefinite as is often the case, the party claiming that a contract has been breached needs to prove that the company has orally or

---

[171] Lemley, at 34 (2002).

[172] Cunningham, at 367 (2005).

[173] Relevant U.S. case law involving browse-wrap agreements includes *e.g.,* Ticketmaster v. Tickets.com, Not Reported in F.Supp.2d, 2000 WL 525390 (C.D.Cal.), 2000 Copr.L.Dec. P 28,059, 54 U.S.P.Q.2d 1344 (C.D. Cal. 27 March 2000) in which case the court concluded that "it cannot be said that merely putting the terms and conditions in this fashion necessarily creates a contract with any one using the web site"; In re Northwest Airlines, Not Reported in F.Supp.2d, 2004 WL 1278459 (D.Minn., 6 June 2004), case in which the court concluded on the basis of previous case law that the usual rule in contract cases is that "general statements of policy are not contractual", and that the privacy statement on Northwest's website did not constitute a unilateral contract; *Register.com, Inc v. Verio, Inc*, 356 F.3d 393, 69 U.S.P.Q.2d 1545 (C.A.2 (N.Y.), 23 January 23, 2004) case in which the court declared that a "website development service provider, which routinely requested domain name registrant data from registrar in order to obtain marketing leads, was bound by restrictions registrar imposed on use of such data, even though it was never asked whether it expressly agreed to be bound; once provider became aware of restrictions, making of further requests constituted implied acceptance", and Cristopher Specht, John Gibson, Michael Fagan, Sean Kelly, Mark Gruber, and Sherry Weindorf v. Netscape Communications Corporation and America Inline, Inc, 306 F.3d 17, 48 UCC Rep.Serv.2d 761 (2nd Cir., 1 October 2002). In this case the court ruled that "under California law, Internet users did not agree to be bound by software's license terms, which included arbitration clause, by acting upon invitation to download software free from producer's webpage, even though notice of existence of license terms was on next scrollable screen; reasonably prudent Internet user would not have known or learned of existence of license terms before responding to invitation to download free software."

[174] It has been mentioned in the ETSI IPR Policy, for instance, that "the POLICY shall be governed by the laws of France". (ETSI (2006a)).

implicitly agreed to follow certain procedures, or that certain obligations apply even though they are not explicitly written down and cannot be implied from the wording of the contract clause. The courts may namely supplement contracts and imply contract terms from the usual and reasonable conditions of the contract[175].

Notwithstanding what was said previously, for a contract to be formed, the terms must be clear enough so that the parties can understand what each is required to do[176]. For example, if the written policy only includes a *recommendation* that the members disclose their relevant rights, the provision is not really enforceable because, basically, there can be no violation unless the parties have interpreted the provision as constituting an obligatory duty. Similarly, as mentioned earlier in the section on patent policies in general, the implementing guidelines may sometimes clarify the language of the patent policy and set the starting point for interpretation by explicitly stating that something, such as informing the standards body about the updates on its IPRs, would be desirable, but not necessary for compliance with the policy[177].

Some of the above considerations were present in the Rambus Inc v. Infineon Technologies AG (2003) litigation, in which Infineon Technologies had the burden of proof in terms of demonstrating that Rambus had the duty to disclose the patents and patent applications in question, and that it had breached that duty[178]. The court construed the content of the disclosure obligation from the following sources: three manuals containing the patent disclosure policy and providing instructions to the chairpersons of the committees on what kind of procedures they should follow on the question of patents, the minutes of the committee meetings, and testimonies of how the JEDEC members understood the language of the policies. The court came to the conclusion that even though neither the language of the JEDEC membership agreement nor the excerpts shown to the members expressly imposed an obligation to disclose information, and although there was no indication that the members ever legally agreed to do so, they had factually treated the policy as creating such an obligation. On this basis, the Court also found the JEDEC patent policy to entail a duty to disclose based on the scope of the claimed inventions that would cover any standard and cause those using it to infringe.[179]

---

[175] *See e.g.,* ESS Technology Inc v. PC-Tel Inc, Not Reported in F.Supp.2d, 1999 WL 33520483, Docket No. C 99-20292 (N.D. Cal., 9 November 1999) in which case the court dismissed defendant's argument concerning the vagueness of its agreement with the ITU to license its patents on a non-discriminatory basis and on reasonable terms and conditions. The court reasoned that if it only is able to rely on defendant's other contracts to determine what is fair, reasonable and non-discriminatory, under California law it must try to enforce the contract.

According to UNIDROID, Article 4.8 Supplying an omitted term "(1) Where the parties to a contract have not agreed with respect to a term which is important for a determination of their rights and duties, a term which is appropriate in the circumstances shall be supplied. 2) In determining what is an appropriate term regard shall be had, among other factors, to a) the intention of the parties; (b) the nature and purpose of the contract; (c) good faith and fair dealing; (d) reasonableness." *See also* Hemmo, at 657-664 (2003b).

[176] *See e.g.,* Hynix Semiconductor Inc., Hynix Semiconductor America, Inc, Hynix Semiconductor U.K. Ltd, and Hynix Semiconductor Deuchland GmbH v. Rambus, Inc, 441 F.Supp.2d 1066 (N.D. Cal 17 July 2006).

[177] ETSI (2006b).

[178] The obligation to disclose may in a fraud case, such as this, be based on a contract or fiduciary duty. Rambus Inc v. Infineon Technologies AG, 318 F.3d 1081, 65 U.S.P.Q.2d 1705 (Fed.Cir., 2003).

[179] Rambus Inc v. Infineon Technologies AG, 318 F.3d 1081, 65 U.S.P.Q.2d 1705 (Fed.Cir., 2003).

In addition to the reasoning based on fraud, a contract-related argument was presented at the initial phase of the Rambus v. Infineon Technologies litigation (*see e.g.,* Rambus Inc v. Infineon Technologies AG, Infineon Technologies North America Corp., and Infineon Technologies Holding North America, Inc., 155 F.Supp.2d 668

Similarly in the Hynix Semiconductor, Inc v. Rambus, Inc (2006) litigation that was based on claims for breach of contract and fraud, the court stated that in determining the existence of a JEDEC duty, the JEDEC members' treatment of the JEDEC patent disclosure policy should be considered. Nevertheless, in this case the alleged agreement between JEDEC and Rambus and JEDEC Members and Rambus was not considered to be detailed enough to make clear to Rambus what disclosures it was required to make, if any. Furthermore, lack of details in the policy was found to preclude a finding of any consent or mutual assent when Rambus became a member of JEDEC. In particular, the JEDEC duty to disclose was not found to extend to the beliefs, hopes and intentions to file or amend patent applications nor was the duty found to continue after the member left JEDEC, with an exception of specific disclosures that arose before the member left.[180]

### B. STANDING TO SUE

Even though the duty to disclose patents that are essential for using a standard could be construed as a contractual obligation specific enough to be enforced rather than merely an encouragement to do so, it can only bind the contracting parties. Usually it is the standards organization and its members or other participants that have concluded the agreement, and thus it is the organization that has the standing to sue on that basis. However, if it is stated in the membership agreement or the patent policy that the parties are also liable to one another in case they breach the bylaws of the standards-setting organization, the other members could invoke the contract. This type of construction was present in the old British court case Clarke v. Dunraven A.C. 59; S. & T. 28 (1897), for instance, in which the court affirmed that a competitor entering a race and having made an agreement with the Club that he would pay an injured competitor for any damage he caused in breach of the rules in the course of the race could be sued on this basis by the injured competitor. According to Smith (2002), one possible explanation for such a construction under the contract-law offer-and-acceptance principle is that each person entering the race is thought to have made an offer to any subsequent entrants, and at the same time to have accepted the offers already made by any previous entrants.[181]

If there has been no explicit provision regarding the status of other members or participants, it could be argued that the members of a standards organization and those non-members possibly taking part in standard setting are liable to one another on a contractual basis because they have implicitly entered into such an agreement. This argument is not very strong, but it could be reasoned, for instance, on the basis that the parties constantly cooperate with each other in order

(E.D.Va., 9 August 2001); Rambus Inc v. Infineon Technologies AG, Infineon Technologies North America Corp., and Infineon Technologies Holding North America, Inc., 164 F.Supp.2d 743 (E.D.Va., 9 August 2001)) According to Lavelle & Gunthner (2002) it was claimed that Rambus incurred a contractual obligation to grant licenses on reasonable terms simply because it had attended the standardization meetings. Since Rambus never many any formal (or even informal) statements regarding its willingness to license, the court found that in the absence of any promise by Rambus, there could be no contract. (Lavelle & Gunthner, at 44-45 (2002)).

[180] Hynix Semiconductor Inc., Hynix Semiconductor America, Inc, Hynix Semiconductor U.K. Ltd, and Hynix Semiconductor Deuchland GmbH v. Rambus, Inc, 441 F.Supp.2d 1066 (N.D. Cal 17 July 2006).

[181] Smith, at 6 (2002).

to establish a standard, and in so doing they follow the standards organization's bylaws, and thus they are also bound to them with respect to the other members and participants[182].

If it cannot be established that the patentee has entered into a contractual relationship with the other members or participants, and not just the standards organization, it might be possible to claim for the enforcement of a contractual promise as a third-party beneficiary. Even though the privity of the contract principle, meaning that only a promisee is able to enforce a promise, is well-established in contract law, this rule can be waived in exceptional circumstances, thereby allowing a third party to enforce a contract it is not a party to[183]. Such exceptional circumstances could be present when a contract has been made for the benefit of a third party[184]. In fact, it has been explicitly stated, for instance in Section 4.5.1. of the VESA IPR policy, that "This IPR Policy expressly imposes a duty of good faith among Members and Non-Member Participants with respect to their participation in the standard setting process and, in particular, as regards the disclosure of IPR and conformance with the spirit as well as the letter of this IPR Policy. Each Member and Non-member Participant shall be a third party beneficiary of this duty of good faith. In the event of any breach of this duty of good faith by a member or Non-member Participant with respect to the adoption of a given Specification and the bringing of an infringement action against any Implementer of the same Specification, such Implementer shall be entitled to assert such breach as an affirmative defense for the avoidance of any financial or other obligation to such Member or Non-member Participant with respect to its implementation of such Specification."[185]

Even in the absence of any explicit or implicit agreement between the participants or members of a standards organization themselves, the court might consider particularly the members accused of patent infringement to have a legal standing based on the patentee's contractual obligations to the organization, because they are the intended third-party beneficiaries of that contractual relationship. Indeed, in the ESS Technology Inc v. PC-Tel, Inc (1999) case, litigated in the U.S., this argument sufficed and a third-party beneficiary was found to stake a claim alleging that the RAND licensing commitment was in fact made by the IP holder during the standard setting[186].[187] Among legal scholars Lemley (2002) has stated that since a standards organization is merely an association that is composed of its members, it would be anomalous to permit only the organization to enforce the patent policy. With regard to other third parties, he questioned their

---

[182] On implicit agreements, *see e.g.,* Hemmo, at 133-136 (2003a).

[183] *See e.g.,* Smith, at 93- 116 (2002); Mika Hemmo, *Sopimusoikeus II,* at 407-410, 412-415 (Talentum 2003b); H.G. Beale (General ed.) *Chitty on Contracts, Volume 1, General Principles,* at 1073 (The Common Law Library, Sweet & Maxwell 2004); Downes, at 373-377 (1987).

[184] *See e.g.,* Hemmo, at 412-415 (2003b); Ramberg & Hultmark, at 231 (2000); Lemley, at 41 (2002).

[185] VESA (2005).

[186] ESS Technology Inc v. PC-Tel Inc, Not Reported in F.Supp.2d, 1999 WL 33520483, Docket No. C 99-20292 (N.D. Cal., 9 November 1999); Joseph P. Lavelle & Melissa J. Gunthner, *Standard Setting Activity Offensive Claims*, at 45 (In *A Year in the Life of a High Tech Standard Setting Organization, Section of Antitrust Law*, 30-45, 2002); Flagel & Lawrence, at 61 (2002)

[187] Nokia Corp., and Nokia, Inc v. Qualcomm, Inc litigation (2006) could be mentioned as another dispute that is based on the alleged breach of the RAND-licensing obligation. In this case, the contractual agreement relates to the standard-setting procedures of ETSI and the obligation to license essential patents. Basically, the case involves interpretation of the terms of the licensing agreement between Nokia and Qualcomm which arises from Qualcomm's use of the ETSI procedures to declare certain patents "essential". (Nokia Corp. and Nokia, Inc v. Qualcomm, Inc, NO. CIV A 06-509-JJF, Slip Copy, WL 2521328 (D.Del., 29 August 2006)).

ability to have a standing in the matter because, unless it has been stipulated otherwise in the contract, contracts are not generally interpreted to render the public at large a beneficiary[188].

## C. REMEDIES

If we assume that a standards organization's patent policy is intended to form an integral part of its membership agreement, for instance, and to contractually oblige its members and possibly also other standard-setting participants, and that the content of the disclosure rules is such that it applies to the particular situation and is violated, the next question concerns the remedies that may result from such a contract breach.

First of all, the remedies may have been set out in the membership agreement. It is clearly stated in the ETSI Patent Policy (2006), which is part of the ETSI Rules of Procedure (Annex 6) and thus binds its members, for instance: "Any violation of the policy by a member shall be deemed to be a breach, by that member, of its obligations to ETSI. The ETSI General Assembly shall have the authority to decide the action to be taken, if any, against the member in breach, in accordance with ETSI Statutes." Basically, the remedy for the breach of a membership agreement would, in most cases, be expulsion[189].

Secondly, if a member of the standards organization or another participant has a standing to sue, he may seek to recover the damages he has suffered due to the violation. It may be difficult to establish such damages, however, and the awarded amount will depend on the court's ability to reconstruct what would have happened if the standards organization and the members had been aware of the rights. There needs to be causation between the violation and the suffered losses, unless the parties have agreed upon liquidated damages.[190]

Thirdly, the court may impose on a breaching party an obligation for specific performance. In fact, the issuance of a specific performance obligation is the primary remedy in breach of contract cases in Finland, other northern countries and Germany, while in common-law countries such as the U.S. and the UK these obligations may only be imposed if damages are not considered adequate.[191] Injunctive relief compelling disclosure would not be a very effective remedy, however. Failure to disclose the existence of a patent right is a problem only after the patent holder has asserted his rights and people become aware of it. Before the patent comes to light, they can hardly know to sue[192]. On the other hand, the possibility could be relevant if a member or other participant refused to hand out the disclosure statement. Furthermore, it might be effective in terms of enforcing the patent holder's promise to grant licenses on certain terms, a promise that could be considered to have become effective when the patentee's technology has been included in a standard[193].

---

188 Lemley, at 41 (2002).

189 Cunningham, at 367 (2005).

190 *See e.g.,* Lemley, at 44 (2002); Hemmo (2003b); Furmston, at 657-658 (2001); Fox, at 65-67 (1998).

191 Smith, at 234 (2002); Hemmo, at 193 (2003b); Lemley, at 43 (2002).

192 Lemley, at 44 (2002).

193 Lavelle & Gunthner, at 45 (2002).

## D. PROMISSORY ESTOPPEL

In addition to contractual obligations, under the U.S. law a non-contractual promise may sometimes be made enforceable in order to avoid injustice. In fact, the doctrine of promissory estoppel was (unsuccessfully) invoked in the U.S. litigation Hynix Semiconductor, Inc v. Rambus, Inc (2006). In this case Hynix alleged that "as a result of its membership in JEDEC, Rambus agreed, both explicitly and implicitly that it would abide by the rules governing JEDEC members .... [including] to disclose to other JEDEC members any patents or patent applications that may bear upon standards being considered by JEDEC committees."[194]

The Court reasoned that since there was no clear and unambiguous promise by Rambus that it would abide by the JEDEC rules, Hynix did not have a viable promissory estoppel claim based upon Rambus's membership in JEDEC. Under the California law the elements of a promissory estoppel claim are: 1) a promise clear and unambiguous in its terms; 2) reliance by the party to whom the promise is made; 3) the reliance must be both reasonable and foreseeable; and 4) the party asserting the estoppel must be injured by his reliance.[195]

[194] Hynix Semiconductor Inc., Hynix Semiconductor America, Inc, Hynix Semiconductor U.K. Ltd, and Hynix Semiconductor Deuchland GmbH v. Rambus, Inc, 441 F.Supp.2d 1066 (N.D. Cal 17 July 2006).

[195] Hynix Semiconductor Inc., Hynix Semiconductor America, Inc, Hynix Semiconductor U.K. Ltd, and Hynix Semiconductor Deuchland GmbH v. Rambus, Inc, 441 F.Supp.2d 1066 (N.D. Cal 17 July 2006).

## VI. PATENT LAWS

If the patent holder decides to proceed with a patent-infringement action the process typically follows a predictable pattern in the course of which the case can be, and often is, settled. As a step following, and sometimes also preceding, the sending of warning letters the patentee may seek an interim or preliminary injunction, after which the infringement action is typically initiated. The alleged infringer usually contests the need for the granting of an interim/preliminary injunction, then disputes the actual infringement claim, and in many cases files a counter-claim arguing that the patent should be held invalid[196]. He may also argue that the patent holder should be estopped from enforcing his rights for some reason. Furthermore, patent re-examination (U.S.) or opposition procedure (Europe) may be an available route to contesting the validity of a patent. Indeed, it is possible to file an opposition within nine months of the publication of the granting of a patent in Europe, and according to the European Patent Convention (EPC) Article 100 it may be filed on the grounds that the subject matter of the European patent is not patentable, that it does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, or that the subject-matter of the patent extends beyond the content of the application as filed. The benefit of filing an opposition particularly at the European Patent Office (EPO) is not only related to lower costs compared to patent-annulment action but also to the consideration that if the patent is held invalid or it is limited in some way, the effects spread throughout the designated EPC member states, while cases trialed in national courts only affect the country in question.

As to the defense options that could be used in the context of submarine patents and standards, laches, equitable estoppel, implied license, and patent misuse doctrines in particular could be invoked in the U.S. It should be noted, however, that except for the possibility of arguing that the patent holder has granted the potential infringer an implied license[197], and the laches defense applicable in Germany[198] and Switzerland[199], these options are not available in many European countries[200].

The most prominent "defense", apart from invalidity and non-infringement, recognized in the Finnish Patents Act is the prior-user right, which basically allows any person who, at the time the patent application was filed, was commercially exploiting the invention in Finland, or who had by that time made substantial preparations for its commercial exploitation, to continue to do so notwithstanding the granting of a patent, provided that the general nature of such previous exploitation is maintained and that the exploitation does not constitute evident abuse in relation

---

[196] *See e.g.,* Rainer Oesch & Heli Pihlajamaa, *Patenttioikeus, Keksintöjen suoja,* at 193 (Talentum 2003).

[197] It should be noted that also this possibility is contentious in some European countries. To my knowledge there is no case law addressing implied licenses in Finland, for instance.

[198] Hans Marshall, *The Enforcement of Patent Rights in Germany*, at 134 (In Christopher Heath & Laurence Petit (eds), *Patent Enforcement Worldwide, A Survey of 15 Countries*, IIC Studies, Vol 23, 2005, 109-138).

[199] Fritz Blumer, *The Enforcement of Patent Rights in Switzerland*, at 225-226 (In Christopher Heath & Laurence Petit (eds), *Patent Enforcement Worldwide*, *A Survey of 15 Countries*, IIC Studies, Vol 23, 2005, 205-229).

[200] Similar results may be reached by limiting patent holders' possibilities of claiming (reasonable) compensation and damages for infringement that has taken place prior to institution of proceedings. In Finland, the patent holder is only able to recover remuneration for the last five years preceding the institution of proceedings (Section 58 of the Finnish Patents Act).

to the applicant or his predecessor in title (Finnish Patents Act, Section 4)[201]. Thus, in cases in which the submarine patent has been filed before the standard has been published, and the discussions held in technical committees cannot be regarded as relevant prior art that could be used in an attempt to invalidate the patent, it may be possible to invoke the exception provided that there has been prior commercial use of the inventions or preparations thereof have been made. The reasons why the discussions preceding the election of a standard cannot be considered relevant prior art under the European first-to-file regime could be that they do not disclose the invention in a detailed enough manner, or that the participants have entered into non-disclosure agreements and the material has not therefore become known to the public.[202].

The available defenses of patent-infringement claims, especially in the U.S., are examined in more detail later on. Prior to that, certain arguments the standard user could put forward in his statement of defense in response to an interim/preliminary injunction request and the issuance of a permanent injunction, particularly if the patent assertion comes form a patent-trolling company, are presented. This is because these companies could be said to pose a considerable threat to open standards. The topic is also significant because interim injunctions could be deemed as the sharpest sword the patent holders have at their disposal in order to defend their rights[203]. In other respects, patent litigation involving standardized technology is fairly similar to other patent litigation[204] although it is possible to bring out standard-related arguments when the magnitude of the damage award is being discussed, for instance. One of these arguments carrying some weight in European countries could be that the infringement has been merely inadvertent or slighly negligent because, due to the patent holder's misleading actions during the standard setting, the infringer could not have reasonably known about the infringement[205]. This argument is not well-grounded in the U.S. under the prevailing legal regime[206] even though there is nothing in the statutory law that would preclude the possibility of putting weight on such considerations[207].

---

[201] On prior-user rights in other European countries *see e.g.,* Christopher Heath & Laurence Petit (eds), *Patent Enforcement Worldwide, A Survey of 15 Countries* (IIC Studies, Vol 23, 2005).

[202] On relevant prior art *see e.g.,* EPO Guidelines, at Part C, Chapter IV, Section 5 (2005).

[203] Christopher Heath, *Comparative Overview and the TRIPS Enforcement Provisions*, at 26 (in Christopher Heath & Laurence Petit (eds), *Patent Enforcement Worldwide, A Survey of 15 Countries*, IIC Studies, Vol 23, 2005, 5-65).

[204] On patent litigation in different countries *see e.g.,* Heath & Laurence (2005).

[205] According to the Finnish Patents Act, Section 58.2 "A person found guilty of patent infringement that is neither intentional nor negligent shall pay compensation for the exploitation of the invention if and to the extent held reasonable". Furthermore, in case of slight negligence the compensation may be adjusted. *See also* Enforcement directive (2004/48/EC), Article 13 and Heath & Petit (2005). It is worth noting that there is a strong presumption that everyone should be aware of all granted patents and published patent applications. *See e.g.,* Haarmann, at 182 (2006).

[206] According to 35 U.S.C. § 287 no damages accrue before the infringer has marked its patented products or put the infringer otherwise on notice of such rights. Nevertheless, a patentee who does not market any products embodying the invention may recover damages for infringement that has taken place before the defendant has been notified. This follows that the patent holder may recover damages accruing from the beginning of the infringement, regardless of whether the defendant is on notice or has knowledge of the patent prior to such date. *See e.g.,* Roger D. Blair & Thomas F. Cotter, *Strict Liability and Its Alternatives in Patent Law* (Berkeley Technology Law Journal, Vol. 17, Issue 2, Spring 2002), <http://btlj.boalt.org/data/articles/17-2_spring-2002_blair.pdf> (last visited 3/1/07); American Medical Systems, Inc. v. Medical Engineering Corp. 6 F.3d 1523, 28 U.S.P.Q.2d 1321 (Fed. Cir., 1993); Crystal Semiconductor Corp. v. TriTech Microelectronics Intern., Inc., 246 F.3d 1336, 57 U.S.P.Q.2d 1953 (Fed. Cir., 2001).

[207] According to 35 U.S.C. § 284 "Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court".

## A. ARGUMENTATION IN RESPONSE TO A REQUEST FOR A PRELIMINARY/INTERIM INJUNCTION AND A PERMANENT INJUNCTION

### (i) Preliminary/Interim Injunction

If the patent holder from whom a license could be needed in order to employ a certain standard seeks to enforce its rights in court, the process might begin with a request for a preliminary/interim injunction, which can typically be initiated before the main subject matter, such as a patent-infringement claim, has been filed[208]. In many countries, as in Finland, the

---

[208] On preliminary/interim injunctions in different countries *see e.g.,* Heath & Laurence (2005).

With respect to the EU member states, the minimum standards for the grant of preliminary/interim injunctions have been set out in Article 9 of the Directive 2004/48/EC of the European Parliament and of the Council of 29 April 2004 on the enforcement of intellectual property rights. According to Article 9, Paragraph 1 (a) Member States must ensure that the judicial authorities may, at the request of the applicant: issue against the alleged infringer an interlocutory injunction intended to prevent any imminent infringement of intellectual property right. Then again, according to Paragraph 3 the judicial authorities must, in respect of the precautionary measures, have the authority to require the applicant to provide any reasonably available evidence in order to satisfy themselves with a sufficient degree of certainty that the applicant is the rightholder and that the applicant's right is being infringed, or that such infringement is imminent. Furthermore, in accordance with Paragraph 4 member states must ensure that interlocutory injunctions may, in appropriate cases, be taken without the defendant having been heard, in particular where any delay would cause irreparable harm to the rightholder. In that event, the parties must be so informed without delay after the execution of the measures at the latest. A review, including a right to be heard, must take place upon request of the defendant with a view to deciding, within a reasonable time after notification of the measures, whether those measures shall be modified, revoked or confirmed. The provisional measures must be revoked or otherwise cease to have effect, if the applicant does not institute, within a reasonable period, proceedings leading to a decision on the merits of the cased before the competent judicial authority, and the defendant so requires (paragraph 5). It has been further stated in paragraphs 6 and 7 that competent judicial authorities may make the provisional measures subject to the lodging by the applicant of adequate security or an equivalent assurance intended to ensure compensation for any prejudice suffered by the defendant, and that where provisional measures are revoked or where they lapse due to any act or omission by the applicant, or where it is subsequently found that there has been no infringement or threat of infringement, the judicial authorities must have the authority to order the applicant to provide the defendant at his request appropriate compensation for injury caused by those measures.

Main principles for the issuance of preliminary/interim injunctions have also been set out in the TRIPS agreement, Article 50, according to which

"1. The judicial authorities shall have the authority to order prompt and effective provisional measures:

(a) to prevent an infringement of any intellectual property right from occurring, and in particular to prevent the entry into the channels of commerce in their jurisdiction of goods, including imported goods immediately after customs clearance;

(b) to preserve relevant evidence in regard to the alleged infringement.

2. The judicial authorities shall have the authority to adopt provisional measures *inaudita altera parte* where appropriate, in particular where any delay is likely to cause irreparable harm to the right holder, or where there is a demonstrable risk of evidence being destroyed.

3. The judicial authorities shall have the authority to require the applicant to provide any reasonably available evidence in order to satisfy themselves with a sufficient degree of certainty that the applicant is the right holder and that the applicant's right is being infringed or that such infringement is imminent, and to order the applicant to provide a security or equivalent assurance sufficient to protect the defendant and to prevent abuse.

4. Where provisional measures have been adopted *inaudita altera parte*, the parties affected shall be given notice, without delay after the execution of the measures at the latest. A review, including a right to be heard, shall take place upon request of the defendant with a view to deciding, within a reasonable period after the notification of the measures, whether these measures shall be modified, revoked or confirmed.

injunction is granted in summary proceedings without substantive assessment of whether the patent has been infringed or whether it is factually valid, provided that the requirement of urgency is fulfilled[209]; *i.e.* there exists a danger that the other party will hinder or undermine the realization of the right by deed, action or negligence or in some other manner, or will essentially decrease its value or significance[210]. Only a certain probability of the existence of a valid right is needed, and in many cases the issuance of a patent already speaks for such a finding. Furthermore, the granting of the preliminary/interim injunction is often tied to the balance of convenience, meaning that the other party must not suffer undue inconvenience in comparison with the benefit to be secured. In sum, there are three prerequisites for an interim/preliminary injunction order: 1) requirement of substantive claim, 2) requirement of danger and 3) requirement of reasonable inconvenience.[211]

In contrast to many other European countries and the U.S. in particular, the Finnish courts, especially the Court of Appeals, have been rather hesitant to issue interim injunction orders and

---

5. The applicant may be required to supply other information necessary for the identification of the goods concerned by the authority that will execute the provisional measures.

6. Without prejudice to paragraph 4, provisional measures taken on the basis of paragraphs 1 and 2 shall, upon request by the defendant, be revoked or otherwise cease to have effect, if proceedings leading to a decision on the merits of the case are not initiated within a reasonable period, to be determined by the judicial authority ordering the measures where a Member's law so permits or, in the absence of such a determination, not to exceed 20 working days or 31 calendar days, whichever is the longer.

7. Where the provisional measures are revoked or where they lapse due to any act or omission by the applicant, or where it is subsequently found that there has been no infringement or threat of infringement of an intellectual property right, the judicial authorities shall have the authority to order the applicant, upon request of the defendant, to provide the defendant appropriate compensation for any injury caused by these measures.

8. To the extent that any provisional measure can be ordered as a result of administrative procedures, such procedures shall conform to principles equivalent in substance to those set forth in this Section."

[209] The interim injunction may be first granted as preliminary without reserving the other party an opportunity to be heard if the purpose of the precautionary measure would otherwise be compromised. (The Finnish Code of Judicial Procedure, Chapter 7, Section 5).

[210] The Finnish Code of Judicial Procedure, Chapter 7, Section 3 reads as follows:

"If the petitioner can establish a probability that he/she has a right not referred to in section 1 or 2, enforceable against the opposing party by a decision referred to in chapter 3, section 1(1) of the Enforcement Act, and that there is a danger that the opposing party by deed, action or negligence or in some other manner hinders or undermines the realisation of the right of the petitioner or decreases essentially its value or significance, the court may:

(1) prohibit the deed or action of the opposing party, under threat of a fine;

(2) order the opposing party to d o something, under threat of a fine;

(3) empower the petitioner to do something or to have something done;

(4) order that property of the opposing party be placed under the administration and care of a trustee; or

(5) order other measures necessary for securing the right of the petitioner to be undertaken.

When deciding on the issue of a prohibition or an order referred to in paragraph (1), the court shall see to that the opposing party does not suffer undue inconvenience in comparison with the benefit to be secured."

*See also* Marcus Norrgård, *Intermistiska förbud i immaterialrätten* (Kauppakaari 2002).

[211] Finnish Code of Judicial Procedure, Chapter 7, Section 3. *See also* Heath & Petit (2005).

In Finland, it is also possible to be issued an interim order on the basis of the Patents Act, Section 68 after the infringement action has been initiated.

the requirements have been set high[212]. Nevertheless, the number of interim injunction applications has increased notably during the last five years[213] and the recent Helsinki Court of Appeals decision in the Warner-Lambert Company LLC and Pfizer Oy v. Ranbaxy Laboratories Limited case (S 04/3156) decided on 16 February 2006 could be deemed to indicate a minor shift toward a more pro-patentee approach with regard to the interest comparison[214]. It is also worth

---

[212] *See e.g.,* Marcus Norrgård, *Väliaikaiset kiellot patenttioikeudessa* (Defensor Legis, No 6, 2004, 1063-1079).

The Supreme Court has published only one precedent which has had to do with the issuance of interim injunctions in patent cases. In this case the Supreme Court confirmed that Finnish Code of Judicial Procedure, Chapter 7, Section 3 applies to patent cases and clarified that in those situations in which the applicant would achieve the same position through a precautionary measure than he would when the whole case was decided, i.e. in case of an upfront usufruct, there is a need to set higher qualifications for the issuance of the precautionary measure than in other situations. In the end, the Supreme Court found the precautionary measure unqualified. This was because the Finnish Patent and Registration Office had annulled Langh Ship's patent after the suit was filed and therefore the applicant was deemed to lack a valid right. It is worth pointing out that the district court of Helsinki granted the preliminary injunction while the Court of Appeals declared it unfounded. (KKO:2003:118, Oy Langh Ship Ab v. Flinter Groningen B.V and Wijnne Wijnne & Barends Cargadoors- en Agentuurkantoren B.V., Docket No S2003/101 (Supreme Court, 12 December 2003)).

Further cases decided in the recent years include among others CCPI Inc and Foseco International Limited v. Bet-Ker Oy, Docket No. S03/1226 (Court of Appeals, 1 April 2004), Pfizer Inc. and Pfizer Oy v. Oy Hexal Ab, Docket No. S 05/2601 (Court of Appeals, 16 February 2006) and AS Hässle and AstraZeneca Oy v. Ratiopharm Oy, Docket No. S03/723 (Court of Appeals, 7 April 2004) rulings issued by the Court of Appeals. In the two latter cases both the district court of Helsinki and the Court of Appeals found the issuance of interim injunction without merit. Then again in Tesa AG v. Oy Lindell Ab, Docket No. S 05/678 case the district court of Helsinki issued an interim injunction, and in Beecham Group PLC and GlaxoSmithKline Oy v. Oy Gea Ab (S02/24447) litigation the Helsinki district court granted the interim injunction as preliminary without hearing the other party, but rejected the claim later on.

[213] Norrgård (2002) who examined in his dissertation how typical it is to apply for interim injunctions in Finland by analysing decisions delivered by the district court of Helsinki in years 1995 – 2000, found that only seven (7) of all the actions founded on Chapter 7, Section 3 of the Finnish Code of Juridical Procedure related to intellectual property rights. Furthermore, only in nine (9) patent, copyright and trademark cases trialled before the Helsinki district court had the claimant applied for the issuance of an interim injunction, and only in one (1) case had the court allowed the claim. (Norrgård, at 10 – 11 (2002)). In comparison in years 2001-2006 the Court of Appeals had issued at least five such rulings in patent matters.

[214] In this case the interim injunction order was awarded against Ranbaxy who had planned the launch of products that contained substance atorvastatin in Finland, and had informed Pfizer whose patent covered the manufacturing method of atorvastatin of its intentions. As to the requirement of substantive claim, the Helsinki Court of Appeals found *e.g.,* the fact that Pfizer had been granted a Finnish patent to an improved method of manufacturing atorvastatin which was an active substance of product Lipitor, and that this patent was in force to speak for the enforceability of Pfizer's rights. Also, it was deemed likely on the basis of a brief comparison of the patented method and the allegedly infringing manufacturing method for atorvastatin which had been described in the Drug Master File (DMF) submitted to the U.S. authorities, that the methods were similar. Furthermore, the fact that in order to be granted a marketing authorisation for parallel drugs the product must be biologically comparable with the original product was held to speak on behalf of Pfizer. Then again, *e.g.,* the following were considered to weaken Pfizer's status: 1) Pfizer's patent was so-called analogy-method patent granted in accordance with the Finnish Patents Act that was valid before year 1995, meaning that it was not possible at that time to be awarded patent protection for new pharmaceutical products even though the patentability of the manufacturing process was based on the novelty of the substance. Hence, it was possible to produce the same pharmaceutical product in different ways without infringing the patent, and even Pfizer had patented more than one method for producing atorvastatin. This indicated that the patented method was not the only way to produce atorvastatin; 2) many applications for the marketing authorization of medicines the active substance of which was atorvastatin were pending in the National Agency for Medicines, and 3) different intermediate products were formed when Ranbaxy's method was practiced and that method contained fewer reaction steps than the one described in the patent.

As to the balance of hardship assessment the Court of Appeals noted that the issuance of an interim injunction order would cause Ranbaxy loss of revenue, but that since the National Agency of Medicines had not granted Ranbaxy the

mentioning that in addition to the TRIPS agreement the Enforcement directive (2004/48/EC) sets its member states an obligation to make sure that patent holders have effective means to enforce their rights at hand. Notwithstanding what was said above, arguments discussed below and supported by the U.S. Supreme Court in its eBay decision that concerned the granting of a permanent injunction in the U.S. could be used to tip the balance in favor of the potential infringer also in Finland and other European countries.

The arguments presented in the eBay case could also be used in the U.S. in response to a request for a preliminary injunction. The decision to grant or deny the motion for a preliminary injunction in the U.S. is generally based on the following factors[215]:

1) The likelihood that the patent holder will ultimately succeed on the merits of the case, meaning that it needs to be likely that the patent will be held valid, enforceable, and infringed[216].

2) The likely suffering of irreparable harm if the preliminary relief is not granted. In accordance with the prevailing case law promoted by the Federal Circuit, such harm could often be presumed when a clear case of patent validity and infringement has been made, unless other factors speak against such a presumption. These factors might include a delay by the patent holder in seeking injunctive relief and the effectiveness of monetary damages to compensate for market loss, along with the ability to pay such damages[217];

3) The balance of hardship if the motion is granted or denied. Thus, the magnitude of the threatened injury to the patent holder against the injury to the accused infringer if the preliminary injunction is granted in error, must tip in favor of the patent holder. Consequently, a court is unlikely to grant an injunction if the potentially infringing product accounts for a substantial portion of the accused infringer's business unless it is very clear that the patent holder will prevail on the merits[218].

---

marketing authorisation for atorvastatin or atorvastatin calcium, and Ranbaxy's atorvastatin product was not sold in Finland, the direct inconveniences that would result to Ranbaxy due to the issuance of an interim injunction order were lesser than in a situation in which such products were already marketed and sold in Finland. Then again, if the precautionary measure would not be granted, Pfizer would, at a high probability, suffer remarkable inconveniencies due to loss of revenue and decrease in the number of Lipitor products sold. Furthermore, the market entrance of a parallel product was deemed to lessen the value of Pfizer's patent right remarkably. Moreover, the court stated that since Pfizer had a strict liability for the damages and costs caused to Ranbaxy if the precautionary measure turned out to be unnecessary, no undue inconvenience would result to Ranbaxy in comparison to the benefit to be secured. (Warner-Lambert Company LLC and Pfizer Oy v. Ranbaxy Laboratories Limited, Docket No S 04/3156 (Helsinki Court of Appeals, 16 February 2006)).

[215] *See e.g., Reebok* Int'l, Ltd v. J Baker, Inc., 32 F.3d 1552, 31 U.S.P.Q.2d 1781 (Fed. Cir., 1994); New England Braiding Co. v. A.W. Chesterton Co., 970 F.2d 878, 23 U.S.P.Q.2d 1622 (Fed. Cir., 1992); Durham, at 158 (1999) and Merges & Duffy, at 1040-1059 (2002) and references mentioned therein.

[216] *See e.g.,* Amazon.com Inc v. Barnesandnoble.com Inc, 239 F.3d 1343, 57 U.S.P.Q.2d 1747 (Fed. Cir., 2001) in which case the Federal Circuit concluded that there was reason to suspect that the patent was not valid and therefore prerequisites for entry of a preliminary injunction were lacking.

[217] *See e.g.,* Smith International Inc. v. Hughes Tool Co, 718 F.2d 1573, 219 U.S.P.Q. 686 (Fed. Cir., 1983); Rosemount Inc v. United States Int'l Trade Commi'n, 910 F.2d 819, 12 ITRD 1561, 15 U.S.P.Q.2d 1569, 8 Fed. Cir. (T) 149 (Fed. Cir., 1990); High Tech Medical Instrumentation, Inc. v. New Image Indus., Inc., 49 F.3d 1551, 33 U.S.P.Q.2d 2005 (Fed. Cir., 1995); Durham, at 158 (1999).

[218] *See e.g.,* Durham, at 159 (1999).

4) The favorable impact of the injunction on the public interest, meaning that if there exists some critical public interest that would be injured by the granting of preliminary relief, it should not be issued. Such public interest could be present for instance in the case of patent-protected drugs or medical devices. In other situations the enforcement of valid patents ultimately benefits the public as it encourages innovation.[219]

### (ii) Injunction and the EBay Decision

Injunctions are the standard remedy for patent infringements in Finland and many other European countries, in addition to which damages may be awarded[220]. In Finland the remuneration consists of a reasonable compensation and other incurred damages[221]. U.S. courts

---

[219] *See e.g.*, Reebok Int'l Ltd v. J. Baker Inc, 32 F.3d 1552, 31 U.S.P.Q.2d 1781 (Fed.Cir., 1994); Merges & Duffy, at 1058 (2002); Durham, at 159 (1999).

[220] *See e.g.,* Marschall, at 135-138 (2005); Blumer, at 227-229 (2005); Heath, at 44-59 (2005); Oesch & Pihlajamaa, at 186 (2003), Hallituksen esitys Eduskunnalle laeiksi teollis- ja tekijänoikeuksia koskevan lainsäädännön muuttamisesta (HE 26/2006 vp.).

In accordance with the Supreme Court's ruling KKO 2003:127 in situations in which there is no danger of the continuation or repetition of the infringing act, the court may refuse to issue an injunction, while in other types of situations injunction serves as an important legal remedy (KKO: 2003:127, Oy LMP Patents Ltd Ab v. Porin kaupunki, Docket No. S2001/489 (Supreme Court, 18 December 2003)).

See also TRIPS, Articles 44, 45 and 48 and the Enforcement directive (2004/48/EC), Article 11 Injunctions and Article 13 Damages which read as follows:

Article 11, Injunctions "Member States shall ensure that, where a judicial decision is taken finding an infringement of intellectual property right, the judicial authorities may issue against the infringer an injunction aimed at prohibiting the continuation of the infringement. Where provided for by national law, non-compliance with an injunction shall, where appropriate, be subject to a recurring penalty payment, with a view to ensuring compliance. Member States shall also ensure that rightholders are in a position to apply for an injunction against intermediaries whose services are used by a third party to infringe an intellectual property right, without prejudice to Article 8(3) of Directive 2001/29/EC".

Article 13, Damages "1. Member States shall ensure that the competent judicial authorities, on application of the injured party, order the infringer who knowingly, or with reasonable grounds to know, engaged in an infringing activity, to pay the rightholder damages appropriate to the actual prejudice suffered by him/her as a result of the infringement.

When the judicial authorities set the damages:

(a) they shall take into account all appropriate aspects, such as the negative economic consequences, including lost profits, which the injured party has suffered, any unfair profits made by the infringer and, in appropriate cases, elements other than economic factors, such as the moral prejudice caused to the rightholder by the infringement;

or

(b) as an alternative to (a), they may, in appropriate cases, set the damages as a lump sum on the basis of elements such as at least the amount of royalties or fees which would have been due if the infringer had requested authorisation to use the intellectual property right in question.

2. Where the infringer did not knowingly, or with reasonable grounds to know, engage in infringing activity, Member States may lay down that the judicial authorities may order the recovery of profits or the payment of damages, which may be pre-established."

[221] According to the Finnish Patents Act, Section 58, paragraph 1 "Any person who intentionally or negligently infringes a patent shall be liable to pay reasonable compensation for the exploitation of the invention and damages for other injury caused by the infringement. In case of slight negligence, the compensation may be adjusted accordingly."

have also treated permanent injunctions as a standard remedy in the absence of exceptional circumstances for quite some time. At the same time as increasing the possibilities of being granted a preliminary injunction by lessening the patentee's burden of proof over time, this could be deemed an indication of the pro-patent era spurred on by the establishment of the Court of Appeals for the Federal Circuit in 1982. Indeed, according to Morrisson, the post-Federal Circuit success rate for preliminary-injunction motions has been 52%, while the rate from the preceding twenty-nine years was 36%[222].

However, the Supreme Court has recently reviewed this open-minded practice of issuing injunctions with respect to so-called patent-trolling companies, and even though its decision in the EBay Inc. et al. v. Mercexhange, L.L.C. (2006) case concerned the granting of permanent injunctions, it is likely also to have an effect on the granting of preliminary injunctions since the grounds are partly similar. According to the Supreme Court, the traditional four-factor test applied by courts of equity when considering whether to award permanent injunctive relief to a prevailing plaintiff applies to disputes arising under the Patent Act. Furthermore, it is not appropriate to issue permanent injunctions automatically in the absence of exceptional circumstances as promoted by the Federal Circuit[223], which in this case had overruled the district court's decision not to issue a permanent injunction to a patent-trolling company. This four-factor test requires the plaintiff to demonstrate that:

1) he has suffered irreparable injury;
2) remedies available at law are inadequate to compensate for that injury;
3) considering the balance of hardships between the plaintiff and the defendant, a remedy in equity is warranted; and
4) the public interest would not be disserved by a permanent injunction.[224]

The district court had applied the above-mentioned four-factor test in its decision, and had arrived at the conclusion that the "plaintiff's willingness to license its patents" and "its lack of commercial activity in practicing the patents" could not be held sufficient to establish that the patent holder would not suffer irreparable harm if an injunction was not issued. The Supreme Court did not accept such a categorical exclusion of certain parties from being granted a permanent injunction, but it did not make any statements to indicate that these factors should not carry weight in the assessment. It only noted that, in addition to using so-called patent trolls, university researchers and self-made inventors might reasonably prefer to license their patents rather than to undertake efforts to secure the financing necessary in order to be able to introduce their inventions to the market, which does not mean that they should be banned from preventing

---

For more information on the level and the grounds of reasonable compensation and damages in Finland, *see e.g.,* Tapio Rantala, *Kohtuullisen käyttökorvauksen määrittäminen patentinloukkaustilanteessa* (Defensor Legis, Number 2, 2005, 284-302).

222 William A. Morrisson, *The Impact of the Creation of the Court of Appeals for the Federal Circuit on the Availability of Preliminary Injunctive Relief Against Patent Infringement* (Indiana Law Review, Vol 23, 1990); Merges & Duffy, at 1056-1057 (2002). *See also* M.A. Cunningham, *Preliminary Injunctive Relief in Patent Litigation* (IDEA: The Journal Of Law and Technology, No 2, 1995, ) <http://www.idea.piercelaw.edu/articles/35/35_2/7.Cunningham.pdf> (last visited 18/1/07).

223 *See e.g.*, MercExhange, L.L.C. EBay Inc., 401 F.3d 1323, 74 U.S.P.Q.2d 1225 (Fed. Cir., 2005); Rite-Hite Corp. v. Kelley, Inc., 56 F.3d 1538, 64 USLW 2032, 35 U.S.P.Q.2d 1065 (Fed. Cir., 1995); Roche Prods., Inc. v. Bolar Pharm. Co., 733 F.2d 858, 221 U.S.P.Q. 937 (Fed.Cir., 1984).

224 EBay Inc. et al v. MercExhange, L.L.C., 126 S.Ct. 1837 (Supreme Court, 2006).

others from using their inventions.[225] In any case, the decision can be deemed as a slight victory to the users of patented technology[226].

### (iii) Argumentation

On the basis of the above discussion about the requirements for issuing a preliminary injunction in Finland (and some other European countries) and a preliminary and permanent injunction in the U.S., the arguments users of standards could present in their response include the typical ones that the invention lacks novelty and inventive step, that there is no infringement, and that the patent is not enforceable for some reason discussed below in more detail. Furthermore, it could be claimed that the patentee does not suffer any irreparable harm when the patent holder itself does not employ the invention and has been ready to grant a license. This argument might be particularly strong if the patent holder could be deemed a patent-trolling company.

Moreover, if the patent holder has delayed the filing of the patent-infringement suit to allow its patented technology to become implemented more broadly, this might be considered an indication that no irreparable harm has resulted to the rights holder. In terms of the interest balance, the positive effects of (interoperability) standards might speak for the finding that the injury to the patent infringer from the issuance of an injunction would be more severe than the damages imposed on the patentee for not issuing it. This argument, combined with alleged potential abuse of the standard-setting procedure, could also be used when considering whether the granting of a preliminary or permanent injunction is in the public interest, as required in the U.S.

## B. UNENFORCEABILITY OF A PATENT

U.S. patent law entails multiple defenses that may bar the patentee from relief in an infringement action: the doctrine of inequitable conduct, laches, estoppel, shop rights and patent misuse, all of which are intended to protect the patent system from abuse. If these doctrines are successfully invoked, they essentially provide the defendant with a license to practice the patented technology, and thus affect the enforceability of the patent, not its validity[227]. Some of the defenses mentioned above may prove essential in the battle against submarine patents. Also the affirmative defense of implied license could be attempted.

### (i) The Laches Doctrine

The laches defense could be used when it is possible to establish that the patent holder has unreasonably and inexcusably delayed bringing an infringement suit starting from the time it should have known about the infringement. Furthermore, in order to succeed with the claim the infringer needs to have suffered economic or evidentiary prejudice, *i.e.* loss of investment and

---

[225] EBay Inc et al. v. MercExhange L.L.C., 126 S.Ct. 1837 (Supreme Court, 2006).

[226] *See e.g.,* Jessica Holzer, *Supreme Court Buries Patent Trolls* (Forbes.com 16 May 2006), <http://www.forbes.com/home/businessinthebeltway/2006/05/15/ebay-scotus-patent-ruling-cx_jh_0516scotus.html> (last visited 18/1/07).

[227] Durham, at 115 (1999); Merges & Duffy, 1215-1216 (2002); Schechter & Thomas, at 500 (2003).

business expansion or the destruction of records, the death of a witness or the unreliability of people's memories. There are several possible factors that might excuse a dilatory patent holder, however. These include other litigation, negotiations with the accused infringer, poverty and illness, wartime conditions, the extent of the infringement and dispute over ownership of the patent. In the end, the enforcement of laches defense is left to the judge's discretion and sense of fairness.[228]

The burden of proof in showing that the patentee has delayed filing suit is on the defendant's side, until the delay has lasted for more than six years measured from the time the patent holder first knew, or should have known, of the alleged infringement. In these cases laches is presumed, and can be waived only if the patentee introduces contrary evidence. Basically, the effect of a successful laches defense is that it bars the patent holder from recovering damages that have incurred before the lawsuit was filed.[229] Thus, the patent holder is still able to recover damages for subsequent infringement as well as an injunction against future infringement[230].

It follows from what was said earlier that laches defense could be attempted if the patent holder whose patent claims a standard has been waiting for it to become broadly adopted before it comes clean with his rights. Moreover, the laches doctrine could be applied if the patent has been granted after an unexplained delay at the patent office, meaning that in cases in which the patentee has attempted to intentionally direct its patenting activities to broadly used technologies, prosecution laches defense may prove useful. Indeed, the U.S. Court of Appeal for the Federal Circuit confirmed in the Symbol Tehnologies et al. v. Lemelson (Fed. Cir. 2002) case that the equitable doctrine of prosecution laches is applicable when a patent has been issued following an unreasonable and unexplained delay by the applicant during the patent prosecution. Here, it does not matter whether the patentee's practice of keeping the application pending for many years has been accomplished strictly in accordance with the rules or not.[231] The Federal Circuit further declared that even though there may be legitimate reasons for re-filing patent applications, doing so repetitiously solely for the business purpose of delaying issuance could be considered an abuse of the patent system. The legitimate reasons for continuing patent applications mentioned by the Court included a) filing a divisional application in response to a requirement for restriction, b) re-filing an application containing rejected claims in order to present evidence of unexpected advantages of an invention that may not have existed at the time of the original rejection, and c) re-filing an application to add subject matter in order to support broader claims as the development of an invention progresses, although entitlement to an earlier filing date for any claimed subject matter may of course be necessary to avoid a statutory bar created by certain intervening events. According to the Federal Circuit, it is also possible to file a continuation in

---

[228] A.C. Aukerman Co. v. R.L. Chaides Construction Co, 960 F.2d 1020, 22 USPQ2d 1321 (Fed. Cir., 1992); Durham, at 169-170 (1999); Schechter & Thomas, at 500 (2003). Relevant case law includes also Chair Co. v. Infanti Chair Mfg. Corp., 60 F.3d 770, 34 U.S.P.Q.2d 1822 (Fed. Cir., 1995) and Meyers v. Asics Corp., 974 F.2d 1304, 24 U.S.P.Q.2d 1036 (Fed. Cir., 1992) among others.

[229] A.C. Aukerman Co. v. R.L. Chaides Construction Co, 960 F.2d 1020, 22 USPQ2d 1321 (Fed. Cir., 1992); Durham, at 170 (1999); Schechter & Thomas, at 501-502 (2003).

[230] Durham, at 170 (1999).

[231] Symbol Technologies Inc. v. Lemelson Medical, Education & Research Foundation, 277 F.3d 1361, 61 U.S.P.Q.2D (BNA) 1515 (Fed. Cir., 2002); Lynda L. Calderone & Tara L. Custer, *Prosecution Laches As A Defense in Patent Cases* (Flaster Greenberg 2005), <http://www.flastergreenberg.com/pdf/PatentArtic_prf3.pdf> (last visited 30/1/07).

the absence of the above reasons if it is not unduly successive or repetitive.[232] It thus follows that the use of submarine-patenting tactics, by either a standard setter or a third party, could occasionally result in patent unenforceability[233].

**(ii) Equitable Estoppel**

Equitable estoppel defense could be used in cases in which the patent holder has, through misleading conduct, led the alleged infringer to believe that it does not intend to enforce the patent against the other party. Such misleading conduct could include an affirmative statement, action, inaction, or even silence if there has been an obligation to speak, and therefore the action may be considered sufficiently misleading to amount to bad faith. Furthermore, there is a need to demonstrate that the infringer has relied on the patentee's misleading conduct, and that it has suffered material prejudice as a result of it. This material prejudice could comprise either economic or evidentiary losses.[234] Unlike the laches defense, equitable estoppel requires no element of delay, and if found applicable it bars any relief to the patent holder. The equitable estoppel defense is most easily applied in cases in which the patent holder explicitly told the potential infringer that it would not interfere with its activities and the potential infringer relied on such communication.[235] Situations in which the patent holder has done nothing and the alleged infringer has interpreted that inaction as tacit permission are more difficult. For instance in Mayers v. Asics Corp (Fed. Cir. 1992) case the fact that the patent holder had threatened immediate enforcement and then failed to follow through was interpreted as a change of heart and the equitable estoppel defense was applied[236].

The equitable estoppel doctrine could be, and has been in practice, successfully invoked in circumstances in which the patent holder has made misleading statements to the standards body in connection with the formulation of a standard, or has failed to disclose the existence of relevant rights even though there has been an obligation to do so[237]. For instance, in the Stambler v. Diebold, Inc (1989) litigation the Federal Circuit upheld an equitable estoppel defense when the patent holder who had been a member of an ANSI standards committee had not disclosed the existence of a patent he knew to read on the proposed standard, and attempted to enforce it ten years after its granting. The court determined that the patent holder "could not remain silent while an entire industry implemented the proposed standard and then when the standards were adopted assert that his patent covered what manufacturers believed to be an open and available

---

232 Symbol Technologies, Inc et al. v. Lemelson Medical, Education & Research Foundation, LP et al., 422 F.3d 1378, 76 U.S.P.Q.2d 1354 (Fed. Cir., 2005).

233 Samsung Electronics Co. filed a suit against Rambus, Inc on 7 June 2005 in the district court of Virginia and invoked the prosecution laches defense against Rambus, Inc alleging that Rambus had unfairly and inequitably filed multiple continuation applications over a long period of time during prosecution of its SDRAM and DDR SDRAM patents (Samsung Electronics Co. Ltd. v. Rambus, Inc., Original Complaint, Civil Action No. 3:05W406, 7 June 2005).

234 A.C. Aukerman Co v. R.L. Chaides Construction Co, 960 F.2d 1020, 22 USPQ2d 1321 (Fed. Cir., 1992); Durham, at 170-171 (1999); Schechter & Thomas, at 500, 502-503 (2003); Lemley, at 46-47 (2002); Morse, at 22-23 (2003).

235 Durham, at 170-171 (1999); Schechter & Thomas, at 500 (2003); Lemley, at 46-49 (2002); Morse, at 22-23 (2003).

236 Mayers v. Asics Corp, 974 F.2d 1304, 24 U.S.P.Q.2d 1036 (Fed. Cir., 1993); Durham, at 171 (1999).

237 Mark A. Flagel & Michael J. Lawrence, *Strategic Considerations when Asserting Defenses against a Claim for Infringement of a Patent that Reads on an Industry Standard,* at 50 (In *A Year in the Life of a High Tech Standard Setting Organization. Section of Antitrust Law*, 2002, 46-63).

standard. Furthermore, plaintiff's silence could reasonably be interpreted as an indication that plaintiff had abandoned its patent claims."[238]

No proof of an intent to mislead is required in estoppel cases, and therefore, according to Lemley (2002), it should also be available in situations in which the patentee's failure to disclose has been inadvertent or merely negligent. Since it is a condition that the infringer has relied on the patent holder's conduct, it may not be as easy to claim that the patentee's course of conduct has reasonably given rise to interference, however, if the patent policy only encourages disclosure but does not mandate it[239]. Similarly, in situations in which the patentee has not purposefully concealed the existence of his rights, it may be difficult to show reliance: patent policies do not generally make any promises that all IPRs have been declared, and many of them acknowledge that patents may remain unknown by accident. Thus, on these occasions there should, in principle, be no expectations that all potentially or actually relevant patents have been disclosed unless there are other extenuating circumstances, such as prolonged inaction from the patentee's side, that speak for the finding of such expectations, just as in the Stambler case presented above. Affirmatively misleading statements about the openness of standards the patentee has himself proposed should also give rise to an estoppel defense[240].

Another difficulty in relying on an equitable estoppel defense is that it may not be available to parties that have not been involved in the standard-setting procedure: in order to show reliance, the infringer must have had a relationship or communication with the patent holder. Sometimes, however, the patent holder's statement with respect to its patents could be considered enough to create such reliance if the alleged infringer is aware of the promise.[241] Similar situations arise with respect to implied licenses too, as discussed below. In fact, the implied license doctrine is rather closely related to the equitable estoppel defense: the finding of an equitable estoppel might be an indication, although not a prerequisite, for finding an implied license[242].

### (iv) Implied License

The implied license doctrine, which is an affirmative defense based upon the patentee's waiver of his rights, may be inferred when the patent holder's words or conduct have reasonably suggested a grant of consent or permission to utilize his patent. In fact, this defense could sometimes be successfully invoked on occasions when the patent holder has allegedly made misleading statements to the standard-setting body, or has not disclosed the relevant rights at all.

One of the actualized disagreements that involved implied license considerations was that between Wang Laboratories Inc and Mitsubishi Electronics America Inc (1997). In this case the Federal Circuit held that Wang was estopped from suing Mitsubishi for patent infringement because its conduct had granted Mitsubishi an implied license to manufacture and sell the

---

[238] Stambler v. Diebold, Inc, 11 U.S.P.Q.2d (BNA) 1709 (E.D.N.Y., 1988), aff'd, 878 F.2d 1445 (Fed. Cir., 1989). *See also* Potter Instrument Co. v. Storage Technology Corp, 1980 U.S. Dist. LEXIS 1438, 207 U.S.P.Q. (BNA) 763 (E.D. Va., 1980) Aff'd, 641 F.2d 190 (4th Cir., 1981), cert. denied, 454 U.S. 832 (1981); Flagel & Lawrence, at 50 (2002).

[239] *See e.g.,* ANSI (2006).

[240] Lemley, at 49 (2002).

[241] Lemley, at 49-52 (2002); Mueller (2002).

[242] Mueller (2002); Wang Laboratories Inc v. Mitsubishi Electronics America Inc and Mitsubishi Electric Corporation 103 F.3d 1571, 41 U.S.P.Q.2d 1263 (Fed. Cir., 1997).

patented products. Implied license means that no formal granting of a license is necessary in order to give it effect. Any language used by the patent owner, or any conduct on his part that shows to another that he approves the use of the patented invention, may under the implied license principle constitute a license and a defense in an action for a tort.[243]

What happened in this case was that Wang filed two patent applications for its single in-line memory module design (SIMM) at the beginning of September 1983, and after the grant of its patents in 1987 and 1988 sued Mitsubishi for patent infringement. However, prior to filing the first application, Wang had introduced its SIMM technology to the computer industry press, and later that year it brought the SIMM design to the Joint Electron Device Engineering Council (JEDEC), the industry's standard-setting organization. It lobbied for the selection of its design for a standard, declaring that it would not produce SIMMs but intended to encourage others to produce the modules, and that it would then buy SIMMs for use in its products. It was not seeking to patent the technology and, according to Wang's representatives, it had no licensing agreements with the companies that it had already approached to make SIMMs. SIMM makers could sell their products freely to third parties. The panelist Daniel Devlin summarized Wang's goal as follows: "Hopefully if they sell it, and if they have enough interest, and the market gets big enough, we get the advantage of the cost reduction because of the volumes involved." Eventually, in June 1986, JEDEC did accept the SIMM as a standard.[244]

Despite its promises to the contrary, however, Wang did apply for patent protection during the standardization period, but did not inform the JEDEC about its ongoing patenting activities, even though it was required under JEDEC's internal policies that participants must disclose their pending patent applications. After the standard was elected, as Wang had hoped, several manufacturers began to mass-produce and market SIMMs. A large market developed for the modules, and Wang became a high-volume purchaser.[245]

Mitsubishi was one of the manufacturers that Wang had approached to produce SIMMs. Wang supplied drawings and other details in their meetings, and repeatedly demanded that Mitsubishi start manufacturing them. In one meeting, Wang even suggested that Mitsubishi should modify its own SIMM design to comply with Wang's technology. Mitsubishi did start to mass-produce SIMMs later on, and Wang began to buy them in 1987. Wang never informed Mitsubishi of its patent applications or patents until it sent it a cease-and-desist letter on 22 December 1989, claiming that Mitsubishi had infringed its patents. In its defense, Mitsubishi filed counterclaims seeking a declaratory judgment of invalidity, non-infringement, and unenforceability, as well as alleging certain state and federal antitrust violations. It also asserted several affirmative defenses, including the one discussed here - that Wang's conduct created an implied license. The district court found for the existence of an implied license, while on other issues the jury determined that Mitsubishi had failed to prove that the patents were invalid and found that the other patent had, in fact, been infringed. It further concluded in its advisory capacity that Mitsubishi had not been

[243] Wang Laboratories Inc v. Mitsubishi Electronics America Inc and Mitsubishi Electric Corporation, 103 F.3d 1571, 41 U.S.P.Q.2d 1263 (Fed. Cir., 1997).

[244] Wang Laboratories Inc v. Mitsubishi Electronics America Inc and Mitsubishi Electric Corporation, 103 F.3d 1571, 41 U.S.P.Q.2d 1263 (Fed. Cir., 1997).

[245] Wang Laboratories Inc v. Mitsubishi Electronics America Inc and Mitsubishi Electric Corporation, 103 F.3d 1571, 41 U.S.P.Q.2d 1263 (Fed. Cir., 1997).

able to prove its defenses of inequitable conduct, equitable estoppel, laches, patent misuse, or unclean hands.[246]

The case was appealed to the Federal Circuit, which interpreted the situation to Mitsubishi's benefit and reasoned that, "Although judicially implied licenses are rare under any doctrine, Mitsubishi proved that the "entire course of conduct" between the parties over a six-year period led Mitsubishi to infer consent to manufacture and sell the patented products." The court also stated, "Wang received exactly the remuneration it desired: Wang's design is an industry standard, and the benefits of a large market and lower prices for SIMMs redound to this day."[247]

**(v) Patent Misuse**

If the patent holder attempts to leverage the advantage of a patent into something beyond its intended boundaries with anticompetitive effects, the patent holder may be held to have committed "patent misuse"[248]. As a consequence, the patent may be held unenforceable until the patent holder ceases from misusing its rights. The patent may be enforced again after the effects of the misuse have dissipated.[249]

There is no exhaustive list of the type of behavior that might constitute misuse, and the doctrine is mainly based on rather old case law the relevancy of which is questionable at points[250]. This is because the applicability of the once vital defense has been limited by legislative means, and also the recent practice of the Federal Circuit has been considered to suggest its waning influence. It appears that the Federal Circuit will find misuse only when the Supreme Court has specifically declared a commercial arrangement as such, or when the conduct is demonstrably anticompetitive.[251] It is nevertheless possible to identify situations which have often raised patent-misuse considerations. Durham (1999) has mentioned the following licensing arrangements some of which are also specified in section 271 of the Patent Act (35 U.S.C.):

---

[246] Wang Laboratories Inc v. Mitsubishi Electronics America Inc and Mitsubishi Electric Corporation, 103 F.3d 1571, 41 U.S.P.Q.2d 1263 (Fed. Cir., 1997).

[247] Wang Laboratories Inc v. Mitsubishi Electronics America Inc and Mitsubishi Electric Corporation, 103 F.3d 1571, 41 U.S.P.Q.2d 1263 (Fed. Cir., 1997).

[248] *See e.g.,* Morton Salt Co. v. G.S. Suppiger, 314 U.S. 488 62 S.Ct. 402, 86 L.Ed. 363, 52 U.S.P.Q. 30 (Supreme Court, 1942); Windsurfing Int'l, Inc. v. AMF, Inc, 782 F.2d 995, 54 USLW 2420, 228 U.S.P.Q. 562 (Fed. Cir., 1986); Zenith Radio Corp. v. Hazeltine Research, Inc., 395 U.S. 100, 89 S.Ct. 1562, 23 L.Ed.2d 129, 161 U.S.P.Q. 577 (Supreme Court, 1969); B. Braun Med. Inc. v. Abbot Labs, 124 F.3d 1419, 43 U.S.P.Q.2d 1896 (Fed. Cir., 1997). See also Schechter & Thomas, at 506 (2003); Flagel & Lawrence, at 51-52 (2002); Durham, at 119 (1999); Merges & Duffy, at 1350 (2002); Donald S. Chisum, Craig A. Nard, Herbert F. Schwartz, Pauline Newman & F. Scott Kieff, *Principles of Patent Law, Cases and Materials*, at 1103 (Foundation Press, 3rd edition, 2004).

[249] *See e.g.*, C.R. Bard, Inc v. M3 Systems, Inc, 157 F.3d 1340 (Fed.Cir., 1998); Schechter & Thomas, at 506 (2003); Durham, at 119 (1999); Flagel & Lawrence, at 52 (2002); Merges & Duffy, at 1353 (2002); Chisum et al., at 1084 (2004).

[250] Schechter & Thomas, at 505 (2003); Merges & Duffy, at 1349-1350 (2002); Chisum et al, at 1084-1085 (2004).

[251] Schechter & Thomas, at 507-508 (2003); Chisum, at 1084-1085 (2004). See also Mallincrodt Inc. v. Medipart Inc, 976 F.2d 700, 61 USLW 2204, 24 U.S.P.Q.2d 1173 (Fed.Cir., 1992).

1) A patent license that compels the licensee to purchase separate, unpatented goods from the patent holder who enjoys market power. ("tying")[252].
2) A patent license that forbids the licensee from dealing with the patent holder's competitors[253].
3) A patent license granted only on the condition that other patents are also licensed (package licensing), even though the other patents may be undesired or even invalid, and the patentee refuses to license individual patents on reasonable terms[254].
4) A patent license that attempts to fix downstream prices[255].[256]

Situations in which the patent-misuse doctrine has been applied resemble those in which antitrust laws have been and could be applied even though they are based on different policies. Misuse, which is a broader concept, focuses mainly on the patent holder's behavior, while antitrust measures the impact of that behavior in the market, and even though considerations of "market power", anticompetitive effects and business justifications are also present in patent-misuse cases, misuse may be found in the absence of antitrust violation.[257] In any case, if the patent holder grants only a limited number of licenses, or refrains from licensing altogether, it is not viewed as patent misuse[258]. In fact, it is stated explicitly in the Patent Misuse Reform Act of 1988, Section 271 (d)(4) that the doctrine is not applicable if the patent holder refuses to license. There are, however, a few cases in which the court found the refusal to license so detrimental to the public welfare that it refused to enjoin infringement.[259]

When it comes to the application of the patent misuse law to standard setting and the enforcement of undisclosed patents, Mueller (2002) has promoted it. According to her, the

---

[252] Relevant case law includes *e.g.,* Morton Salt Co. v. G.S. Suppiger, 314 U.S. 488 62 S.Ct. 402, 86 L.Ed. 363, 52 U.S.P.Q. 30 (Supreme Court, 1942) and Senza-Gel Corp. v. Seiffhart, 803 F.2d 661, 231 U.S.P.Q. 363, 1986-2 Trade Cases P 67,307 (Fed. Cir., 1986). *See also* Durham, at 119 (1999); Flagel & Lawrence, at 52 (2002).

[253] Also prohibiting the manufacture of competing products may constitute misuse. *See e.g.*. National Lockwasher Co. v. George K. Garrett Co., 137 F.2d 255, 58 USPQ 460 (3d Cir., 1943); Keystone Retaining Wall Sys. Inc. v. Westrock Inc., 792 F.Supp. 1552, 1991-2 Trade Cases P 69,677, 22 U.S.P.Q.2d 1001 (D. Ore., 1991); Schechter & Thomas, 506 (2003); Flagel & Lawrence, at 53 (2002).

[254] Relevant case law includes *e.g.,* American Securit Co. v. Shatterproof Glass Corp., 268 F.2d 769, 122 USPQ 167 (3d Cir., 1959); Western Elc. Co. v. Stewart-Warner Corp., 631 F.2d 333, 208 U.S.P.Q. 183, 1980-81 Trade Cases P 63,724 (4th Cir., 1980); MacCullough Tool Co. v. Well Surveys, Inc., 343 F.2d 381, 145 U.S.P.Q. 6 (10th Cir., 1965); Apex Elec. Mfg. Co. v. Altorfer Bros. Co., 238 F.2d 867, 111 U.S.P.Q. 320 (7th Cir., 1956).

Also basing royalty payments on total sales regardless of the extent to which the patented invention is used could constitute patent misuse. *See e.g.,* Zenith Radio Corp. v. Hazeltine Research, Inc., 401 U.S. 321, 91 S.Ct. 795, 28 L.Ed.2d 77, 14 Fed.R.Serv.2d 1169, 1971 Trade Cases P 73,484 (Supreme Court, 1971); Engel Indus., Inc v. Lockformer Co., 96 F.3d 1398, 65 USLW 2273, 40 U.S.P.Q.2d 1161 (Fed. Cir., 1996); Schechter & Thomas, at 506 (2003); Flagel & Lawrence, at 52 (2002).

[255] Relevant case law includes *e.g.,* Bauer & Cie v. O'Donnell, 229 U.S. 1, 33 S.Ct. 616, 57 L.Ed. 1041, 50 L.R.A.N.S. 1185, Am.Ann.Cas. 1915A,150 (Supreme Court, 1913); Mallincrodt Inc. v. Medipart Inc, 976 F.2d 700, 61 USLW 2204, 24 USPQ2d 1173 (Fed.Cir., 1992). See also Schechter & Thomas, at 506 (2003); Flagel & Lawrence, at 53 (2002).

[256] Durham, at 119-120 (1999).

[257] Mueller (2002); Flagel & Lawrence, at 51-52 (2002); Durham, at 120 (1999); Scechter & Thomas, at 500 (2003).

[258] Durham, at 121 (1999).

[259] Durham, at 121 (1999); Merges & Duffy (2002); *See e.g.,* Rite-Hite Corp. v. Kelley Co., 56 F.3d 1538, 64 USLW 2032, 35 U.S.P.Q.2d 1065 (Fed. Cir., 1995).

Patent Misuse Reform Act, Section 271 (d)(4) was not intended as a categorical rule. Indeed, in her opinion, the legislative history of the Act shows that there was no intention to disallow the use of the doctrine in refusal to license cases when the public welfare is at stake. Thus, it should not prevent the courts from finding misuse in cases in which the patent holder has intentionally and willfully failed to disclose its rights and thus abused the standardization procedure.[260] However, due to the express statute indicating otherwise, the courts are, in reality, likely to be skeptical of misuse claims based on the unilateral refusal to license[261].

## C. COMPULSORY LICENSING

If the submarine patent holder refuses to license, it may sometimes be possible to ask the court to force it to do so under the national patent laws. The views adopted with respect to compulsory licensing vary to some extent in different countries, but the basic principles and limits concerning the issuance of a compulsory license followed by the World Trade Organization (WTO) member states are set out in Article 31 of the Trade-related Aspects of Intellectual Property Rights (TRIPS) agreement. These include the stipulation that the proposed user has made an effort to obtain authorization from the rights holder on reasonable commercial terms and conditions, and that such efforts have not been successful within a reasonable period of time[262]. Furthermore, it is stated that the compulsory license granted by the court must be limited in scope and in duration to the purpose for which it was authorized. The license must also be non-exclusive and non-assignable. Moreover, the patent holder must be paid adequate remuneration, taking into account the economic value of the authorization.

In addition to the above, Article 31 of the TRIPS agreement states that in situations in which the use of a patent is authorized in order to permit the exploitation of one patent ("the second patent") that cannot be exploited without infringing another ("the first patent"), the following additional conditions apply: (i) the invention claimed in the second patent must involve an important technical advance of considerable economic significance in relation to the invention claimed in the first patent; (ii) the owner of the first patent must be entitled to a cross-license on reasonable terms to use the invention claimed in the second patent; and (iii) the use authorized with respect to the first patent must be non-assignable except with the assignment of the second patent.

TRIPS does not specifically list the reasons that might be used to justify compulsory licensing. Thus, each member is free to determine the grounds upon which such licences can be granted[263].[264]

---

[260] Mueller (2002).

[261] Lemley, at 78-79 (2002).

[262] This requirement may be waived by a Member in the case of a national emergency or other circumstances of extreme urgency or in cases of public non-commercial use.

[263] Each member has also the right to determine what constitutes a national emergency or other circumstances of extreme urgency, it being understood that public health crises, including those relating to HIV/AIDS, tuberculosis, malaria and other epidemics, can represent a national emergency or other circumstances of extreme urgency. WTO, *TRIPS and Health, Frequently Asked Questions, Compulsory licensing of pharmaceuticals and TRIPS* (2005) <http://www.wto.org/English/tratop_e/trips_e/public_health_faq_e.htm> (last visited 2271/07).

[264] WTO, *Declaration on the TRIPS Agreement and Public Health* (DOHA WTO Ministerial, WT/MIN(01)/DEC/2, 14 November 2002) <http://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_trips_e.htm> (last visited

There is no statutory law in the U.S. covering the national application of the TRIPS agreement, and there is no general possibility to mandate licensing under the U.S. Patent Act. Nevertheless, according to Mueller (2002) it has been a well-recognized principle that courts may in extreme cases revoke any conflicting intellectual property rights if the protection of public health, safety and welfare so requires.[265] Meanwhile, the Finnish Patents Act contains specific provisions concerning compulsory licensing that comply with the basic principles set out in the TRIPS agreement. The idea behind the adoption of a compulsory licensing possibility has been to diminish some of the disadvantages created by the patent system and to make sure that certain public interests can be taken into account[266].

The Finnish Patents Act mentions five grounds for the granting of a compulsory license, the scope and terms of which are decided by the court. These grounds include:

1) Disuse of an invention for three years from the granting of the patent and four years from the filing of the application unless legitimate grounds for failing to employ the invention are shown (Section 45).
2) Exploitation of a (second) patent that is dependent on a (first) patent held by another person provided that the grant of a compulsory license is reasonable given the significance of the invention, or that there are other grounds for the granting of a license (Section 46).
3) Substantial commercial interest concerning plant variety (Section 46a).
4) Considerable public interest (Section 47).
5) Commercial exploitation, or substantial preparations thereof, of an invention subject to a patent application at the time the application documents were made available (Section 48).

Of the above, numbers four and five appear particularly useful for combating the submarine-patent dilemma, while having a dependency patent might work for some companies. However, public interest mainly concerns government security and access to drugs and food[267], and this needs to be considerable in order to suffice.[268] It was also stated in the preparatory work that in order for a compulsory license to be issued on this basis there should be no possibility to achieve the same end-result by applying regulations intended to protect commerce from unhealthy practices[269]. Therefore, even though interoperability standards are important and carry a lot of economic significance, it is unlikely, although not impossible, that access, particularly to voluntary standards, would be thought to present considerable public interest as intended in the Finnish Patents Act. It is interesting to note, however, that in the context of the EU software patent directive proposal, suggestions were made in order to allow the issuance of compulsory licenses to computer-implemented inventions in situations in which their use would be indispensable for

---

22/1/07); WTO, *TRIPS and Health, Frequently Asked Questions, Compulsory licensing of pharmaceuticals and TRIPS* (2005) <http://www.wto.org/English/tratop_e/trips_e/public_health_faq_e.htm> (last visited 2271/07).

265 Mueller (2002).

266 Hallituksen esitys Eduskunnalle patenttilainsäädännön uudistamisesta (HE 101/1966 vp.), at 6, 21-23; Oesch & Pihlajamaa, at 86 (2003).

267 At the time this provision was included into the Finnish Patents Act it was not possible to obtain patent protection to nutritive substances and medicinal products, and it was explicitly stated in the preparatory work that Section 47 of the Patents Act has been intended to alleviate problems that may result if such patents will be allowed in the future. (HE 101/1966 vp.), at 6, 22.

268 Haarmann, at 174 (2006); HE 101/1966 vp., at 22.

269 HE 101/1966 vp., at 22.

achieving interoperability between computer programs, and it would be in the public interest[270].

There is also the possibility, in certain situations, of being granted a compulsory license if the user of a standard has begun to operate the invention prior to the publication of the patent application. A prerequisite for such a grant is that the exploiter did not have any knowledge of the application and could not reasonably have obtained such knowledge, and that there are special reasons for the granting. Furthermore, a compulsory license could be granted, under corresponding conditions, to any person who had made substantial preparations for commercial exploitation of the invention. Thus, if the patentee has not made it known during the standard-setting procedure or thereafter that it has relevant secretly pending patent applications, a compulsory license could, in principle, be issued. In particular, if the patentee has violated the

---

[270] The committee on legal affairs suggested the adoption of Article 6 a which would have read as follows:

"1. Member States shall ensure that licences are available to use a patented computer-implemented invention on reasonable and non-discriminatory terms and conditions when such use is

(a) indispensable for achieving interoperability between computer programs, and
(b) in the public interest.

2. The public interest shall be assumed in cases prohibited by Articles 81 and 82 of the Treaty.

3. Reasonable and non-discriminatory terms and conditions shall in particular have regard to

(a) the cost of obtaining all necessary licenses from other relevant right holders for the licensed product, system, network or service,

(b) the generally prevailing business conditions applicable to that class of licensed product, system, network or service, and

(c) the R&D investments by the patent holder. (Committee on Legal Affairs, II Recommendation for Second reading, on the Council common position for adopting a directive of the European Parliament and of the Council on the patentability of computer-implemented inventions (11979/1/2004 – C6-0058/2005 – 2002/0047(COD)) FINAL 6-0207/2005, 21 June 2005), <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+REPORT+A6-2005-0207+0+DOC+WORD+V0//EN&language=EN> (last visited 22/1/07)).

Then again MEP's Pia-Noora Kauppi and John Purvis suggested the following wording for Article 6 a:

1. Member States shall ensure that licences are readily available as of right so as to permit use of a patented computer-implemented invention on reasonable and non-discriminatory terms and conditions when such use is

(a) indispensable for achieving interoperability between computer programs, and
(b) in the public interest.

2. Without prejudice to any other remedies that may be applicable under competition law, the patent shall be unenforceable to the extent such enforcement were to constitute or contribute to an infringement of Article 81 and/or 82 of the Treaty.

3. Reasonable and non-discriminatory terms and conditions, including remuneration, shall in particular have regard to:

(a) the public interest in permitting open access to the patented invention,

(b) the market position of the patent owner if also a supplier of a computer program using the patented invention,

(c) the conduct of the patent owner in relation to granting, or refusing to grant, a license under the patent for such use,

(d) the cost of obtaining necessary licenses from other relevant right holders for the licensed product, system, network or service, and

(e) the generally prevailing business conditions, including distribution method, and license fees charged for the class of product, system, network or service requiring interoperability. (</NoDocMylly, at 59-60 (2006)).

patent policy by keeping its patent applications a secret, this should constitute special reasons for the granting of a license. It should be realized, however, that the compulsory licensing process, which positive action for declaratory judgement may precede or follow an infringement claim, is cumbersome and slow, and the starting point is that a license needs to be issued separately in every country in which the patent is used. So far, the provisions have not proven efficient in reality, and they have been applied only seldom.[271]

[271] Oesch & Pihlajamaa, at 88, 192-193 (2003); Mylly, at 56 (2006); Farmos Yhtymä Oy v. Imperial Chemicals Industries Ltd, Docket No. S 78/4349 (Helsinki Court of Appeals, 27 march 1979).

## VII. ANTITRUST AND COMPETITION LAWS

Antitrust (U.S.) and competitions laws (Europe) are designed to protect the integrity of market competition against attempts to raise prices and reduce output, either by a single firm that dominates the market and excludes competition or by a group of firms acting collectively to coordinate their price and output decisions.[272] These laws relate to standard setting in various ways: standard setting has been under scrutiny due to its nature as an activity through which competitors cooperate, and the activities of standard-setting organizations and their policies with respect to IPRs have been addressed from this perspective.

Currently, legal precedents recognize the legitimate and pro-competitive benefits of creating industry standards, and therefore standard-setting activity is generally reviewed under the so-called "rule of reason" principle, which examines the anti-competitive nature of a practice to determine legality or illegality, both in the U.S. and in Europe.[273] In order for the standard setting to pass this assessment and to be determined as an activity in which pro-competitive benefits outweigh anticompetitive risks, a due process to make sure that the setting is not distorted should be in place. The decisions of the standards body must be based on the merits of objective expert judgments and procedures that prevent the process from being influenced by members or other participants with economic interests in stifling product competition.[274]

Moreover, the licensing terms companies impose with respect to their essential IPRs may violate Section 1 of the Sherman Act or Section 81 of the EC Treaty, which regulate agreements between companies. Basically, the idea is that even though the Patents Act specifically authorizes assignments and patent licenses, an assignment or a license may violate the antitrust or competition laws when it constitutes unlawful monopolization or abuse of dominant position, is part of an agreement to restrain trade, or may substantially lessen competition.[275] It thus follows that certain licensing arrangements, and patent pooling and cross-licensing activities, may come under scrutiny on this basis[276].

Most importantly, from the perspective of this paper, antitrust and competition laws could sometimes be imposed in refusal-to-license cases, or in situations in which the standard setter has acquired market power by misleading the standard-setting organization into adopting a standard

---

[272] *See e.g.,* Lemley, at 63 (2002); Merges, Menell & Lemley, at 989 (2003); Guy Tritton, Richard Davis, Michael Edenborough, James Graham, Simon Malynicz & Asley Roughton, *Intellectual Property in Europe*, at 565-567 (Sweet & Maxwell 2002); European Commission*, DG Competition Discussion Paper on the Application of Article 82 of the Treaty to Exclusionary Abuses*, at 4 ("Discussion Paper", 2005); EC Evaluation Report, at 11 (2002).

[273] *See e.g.,* Morse, at 19 (2003); Allied Tube & Conduit Corp v. Indian Head Inc, 486 U.S. 492, 108 S.Ct. 1931, 100 L.Ed.2d 497, 56 USLW 4539, 1988-1 Trade Cases P 68,062 (Supreme Court, 1988); Watts & Baigent, at 838-839 (2002).

[274] Allied Tube & Conduit Corp v. Indian Head Inc, 486 U.S. 492, 108 S.Ct. 1931, 100 L.Ed.2d 497, 56 USLW 4539, 1988-1 Trade Cases P 68,062 (Supreme Court, 1988); Morse, at 20-21 (2003); Watts & Baigent, at 838-839 (2002). *See also* Dolmans (2002); EC*, Guidelines on the Applicability of Article 81 of the EC Treaty on Horizontal Cooperation Agreements* (Official Journal C 003, 6 January 2001).

Tritton et al. (2002) pointed out that the European Commission nor the European Court of Justice have not historically adopted the sophisticated "rule of reason" analysis that existed in the U.S., but that this approach has been recently amended. (Tritton et al., at 583 (2002)).

[275] Morse, at 18 (2003). *See also* EC Evaluation Report, at 12-13 (2001).

[276] Cunningham, at 371-374 (2005); Watts & Baigent, at 838-839 (2002).

believed to be free, but which is in fact controlled by the patentee[277]. The benefit of antitrust claims is that in the U.S. they offer the plaintiff the lure of treble damages and attorney's fees, as well as the possibility of enforcement by federal or state antitrust authorities, which may impose both civil and criminal penalties in addition to private defensive or offensive actions.[278] Similarly, the competition authorities in Europe such as the European Commission, and national competition authorities may initiate investigations on their own or upon application, and if the patent holder is deemed to have violated the competition laws, the concerned companies may be imposed fines, ordered to terminate the violation, or the parties may be given positive responsibilities such as the granting of a license, for instance[279]. In the following I will first discuss situations that have to do with nondisclosure, and then move on to cases of refusal to license.

## A. FAILURE TO DISCLOSE

In the U.S., the Sherman Act, Section 2 makes it illegal to monopolize, or attempt to monopolize, or combine or conspire with any other person or persons to monopolize, any part of the trade or commerce among the several States, or with foreign nations. It has been further established by the Supreme Court, that in order to succeed with a claim of monopolization the defendant must control a relevant market share, *i.e.* must have the power to control prices or exclude competition in a defined market[280], and that this substantial market power, *i.e.* monopoly, has been acquired or is being maintained through anticompetitive conduct[281]. Thus, a firm that controls the relevant market share must actually or prospectively harm the competitive process, and thereby the consumers: damage to one or more competitors is not enough. The harm to the competitive process may involve obstruction to the achievement of lower prices, better products, or more efficient production methods, among other things, and this anticompetitive harm must outweigh the conduct's procompetitive benefits, if any.[282] Furthermore, the alleged monopolist having substantial market power must have acted illegally in the sense that it must have wilfully[283]

---

[277] Lemley, at 63 (2002).

[278] Lemley, at 63 (2002).

[279] *See e.g.,* Tritton et al, at 892-895 (2002).

[280] *See e.g.,* United States v. E.I. du Point de Nemours & Co., 351 U.S. 377, 76 S.Ct. 994, 100 L.Ed. 1264 (Supreme Court, 1956).

Defining the relevant market and the analysis of the power in that market is an indispensable part of any monopolization or its attempt case, and both of these extremely complex questions. (Merges, Menell & Lemley, at 990, 997-1000 (2003); David A. Balto & Andrew M. Wolman, *Intellectual property and Antitrust: General Principles*, at 401 (IDEA The Journal of Law and technology, Vol. 43, Number 3, 2003). For more information *see e.g.,* Philip E. Areeda & Herbert Hovenkamp, *Fundamentals of Antitrust Law*, at 5-5 - 5-100 (Aspen Publishers, 3rd edition, 2005) and references mentioned therein.

[281] United States v. Grinnell Corp, 384 U.S. 563, 86 S.Ct. 1698, 16 L.Ed.2d 778 (Supreme Court, 1966); In the Matter of Rambus Incorpoted, Opinion of the Commission, Docket No. 9302 (FTC, 2 August 2006).

[282] In the Matter of Rambus Incorpoted, Opinion of the Commission, Docket No. 9302 (FTC, 2 August 2006); Mueller (2002), Lemley, at 70-71 (2002); Balto & Wolman, at 428-429 (2003); Areeda & Hovenkamp, at 6-19 - 6-21 (2005).

[283] On the basis of the case law, it is not clear what kind of willfulness or anticompetitive intent is required. While on the basis of various cases the definition of wilfulness of anticompetitive/exclusionary actions is objective and does not depend on the actual purpose, intent or wilfulness of the defendant, there are also cases in which the subjective motivation of the monopolist has become under scrutiny. (*See e.g.,* Areeda & Hovenkamp, at 6-12 - 6-16 (2005), and references mentioned therein. *See also* Image Technical Services v. Eastman Kodak Co., 125 F.3d 1195, 1997-2 Trade

acquired its monopoly position through anticompetitive means[284] rather than through growth or development that takes place as a consequence of a superior product, business acumen, or historic accident[285]. Attempted monopolization also has three elements: there must be a specific intent to monopolize, anticompetitive means have to be utilized, and there has to be a high probability of successful monopolization. Furthermore there must be a causal "antitrust" injury.[286]

In the standard-setting context, intentional monopolization or attempts through "failing" to disclose one's patents or pending patents could violate Section 2 of the Sherman Act in extreme cases. This requires, however, that the company is likely to gain or has gained durable monopoly power, which may be established either by direct or indirect evidence of such power. The former includes the power to raise prices above competitive levels and to exclude competition, and the latter, inter alia, a high market share in a properly defined relevant market with high barriers to entry.[287] It follows that the use of the standard must be indispensable for operating on defined technology markets, and that it should not be easy for the industry to switch to using alternative technologies without incurring significant additional costs[288].

Furthermore, the ways in which the company acquired its monopoly position must have been "anticompetitive" or "exclusionary", and there must be clear causation between the market power and the company's actions. Thus, the misrepresentation during the standard setting needs to be material. It must have resulted, or have been likely to result, in the company achieving relevant market power; i.e., had the standards organization known about the patent or patent application, another technology would have been chosen and the company would not have gained its dominant position on a defined market. Given these requirements, it appears that if the standards organization has no patent policy that requires disclosure, concealment of one's rights does not typically raise antitrust concerns because, unless other kinds of practice have been followed during the process, participating companies should not have reasonable expectations regarding such a disclosure. Similarly, if the failure to disclose is accidental, there is typically no misrepresentation. Even if the misrepresentation or omission has been negligent it may be

---

Cases P 71,908, 44 U.S.P.Q.2d 1065, 97 Cal. Daily Op. Serv. 7197 (9th Cir., 26 August 1997) in which case the subjective motivation of the defendant was considered relevant and In re Independent Service Organizations, 203 F.3d 1322, 2000-1 Trade Cases P 72,795, 2000 Copr.L.Dec. P 28,026, 53 U.S.P.Q.2d 1852 (Fed. Cir., 2000) matter in which the Federal Circuit explicitly stated that the subjective motivation plays no role in antitrust analysis applicable in cases having to do with refusal to license a patent).

[284] The relevant, anticompetitive conduct is often referred as "exclusionary" which implies that the conduct impairs the opportunities of rivals and is not "competition on the merits" or is more restrictive than reasonably necessary for such competition. (Areeda & Hovenkamp, at 6-6, 6-12 (2005)).

[285] United States v. Grinnell Corp, 384 U.S. 563, 86 S.Ct. 1698, 16 L.Ed.2d 778 (Supreme Court, 1966); Eastman Kodak Co. v. Image Technical Services, 504 U.S. 451, 112 S.Ct. 2072, 119 L.Ed.2d 265, 60 USLW 4465, 1992-1 Trade Cases P 69,839 (Supreme Court, 1992); Morse, at 18-19 (2003); Areeda & Hovenkamp, at 6-5, 6-22 (2005) and references mentioned therein.

[286] Transamerica Computer Co v. IBM Corp, 698 F.2d 1377, 1982-83 Trade Cases P 65,218 (9th Cir., 15 February 1983); Aspen Skiing Co. v. Aspen Highlands Skiing Co., 472 U.S. 585, 105 S.Ct. 2847, 86 L.Ed.2d 467, 53 USLW 4818, 1985-2 Trade Cases P 66,653 (Supreme Court 1985); Areeda & Hovenkamp, at 6-13 - 6-14, 8-12 - 8-13 (2005); Lemley, at 64 (2002); Balto & Wolman, at 401 (2003).

[287] In the Matter of Rambus Incorpoted, Opinion of the Commission, Docket No. 9302 (FTC, 2 August 2006); United States v. Dentsply v. Dentsply Int'l Inc, 399 F.3d 181, 2005-1 Trade Cases P 74,706 (3rd Cir., 24 February 2005); United States v. Microsoft Corp, 253 F.3d 34, 346 U.S.App.D.C. 330, 2001-1 Trade Cases P 73,321 (D.C. Cir., 28 June 2001).

[288] In the Matter of Rambus Incorpoted, Opinion of the Commission, Docket No. 9302 (FTC, 2 August 2006).

difficult to construe a case because antitrust violation requires willful monopolization or its attempt, and even though its presence is usually determined objectively, in the context of deceptive conduct also the subjective motivation and intent of the defendant has been considered to help in determining whether the challenged conduct can be fairly characterized as exclusionary or anticompetitive[289]. Such willful misrepresentation could take the form of not intentionally asserting ownership of the standard until after it has been adopted, or in the form of an affirmative statement in which it is declared that the party has no intellectual property rights in the proposed standard[290].

In addition to the above, misrepresentation needs to result in the gaining of market power the patentee would not have enjoyed if it had not manipulated the standard-setting process, and also antitrust injury must result. Therefore, given the standard-setting organization's willingness also to consider the inclusion of proprietary technology, it is possible that the standard would have been set even if the patent holder had come clean with its rights. However, if the standard-setting organization has a clear policy or practice of not accepting such technologies, it is more likely that another technology would have been elected, and that the patent holder's actions have resulted in the increase in licensing fees, for instance.[291]

---

[289] In the Matter of Rambus Incorpoted, Opinion of the Commission, Docket No. 9302 (FTC, 2 August 2006). *See also* Aspen Skiing Co. v. Aspen Highlands Skiing Co., 472 U.S. 585, 105 S.Ct. 2847, 86 L.Ed.2d 467, 53 USLW 4818, 1985-2 Trade Cases P 66,653 (Supreme Court 1985).

[290] In the Matter of Rambus Incorpoted, Opinion of the Commission, Docket No. 9302 (FTC, 2 August 2006); Lemley, at 65 (2002).

[291] In the Hynix Semiconductors v. Rambus, Inc litigation which is still going on the district court of California reasoned, with respect to the antitrust claims, as follows:

"Rambus also seeks summary adjudication that as a threshold issue of antitrust law, the JEDEC disclosure duty Hynix has alleged was too vague for any breach to give rise to antitrust liability. Rambus notes that the activities of standard setting organizations can sometimes tread a fine line between the policies of the United States patent laws and antitrust laws. Therefore, Rambus argues that the rights and duties of participants in standard setting organizations must be clearly defined with respect to their intellectual property rights.

In opposition, Hynix argues that Rambus's conduct associated with its breach of the JEDEC disclosure requirement is part of a course of conduct to unlawfully secure a monopoly of the DRAM interface technology market. Hynix points to alleged predatory and anticompetitive conduct by Rambus. Specifically, Hynix asserts Rambus attended JEDEC meetings so that it could secretly amend it patent applications to claim SDRAM and DDR SDRAM technology being standardized by JEDEC. Vega Decl., Exs. 30, 31, 33-35. Hynix asserts that the evidence shows that Rambus chose not to disclose these amendments because it did not "yet" want the industry to know that its patents or patent applications covered JEDEC standards. *See e.g.,* Exs. 24, 32.

[18] The court agrees that industry wide standards set by organizations such as JEDEC can serve to foster competition, but at the same time also pose a risk of anticompetitive conduct. *See Allied Tube & Conduit Corp. v. Indian Head, Inc.,* 486 U.S. 492, 500-01, 108 S.Ct. 1931, 100 L.Ed.2d 497 (1988). In addition, the patent laws secure upon patentees lawful monopolies to encourage innovation. *Intergraph Corp. v. Intel Corp.,* 195 F.3d 1346, 1362 (Fed.Cir.1999). "It is well-settled that the secrecy of pending and abandoned United States patent applications should ***1081** be preserved whenever possible." *Cordis Corp. v. SciMed Life Sys., Inc.,* 982 F.Supp. 1358, 1360 (D.Minn.1997). On the other hand, it is apparent that abuse of the standards setting process could lead to serious anticompetitive and antitrust concerns. *See e.g., Infineon,* 318 F.3d at 1096 (noting that interpreting JEDEC membership as creating a fiduciary duty among members would raise serious antitrust concerns).

In light of the patent law policies implicated, breach of the JEDEC disclosure policies, without more, cannot give rise to antitrust liability. To do so, particularly in light of the vagueness of the JEDEC disclosure policy at issue, would directly conflict with the protection afforded patentees and patent applicants to encourage innovation. The court finds that breach of JEDEC's disclosure policy, by itself, is not sufficient to constitute antitrust liability. The court notes, however, that Hynix is not barred from asserting that Rambus's overall course of conduct, which may

In Europe, Article 82 of the EC Treaty corresponds largely to the Sherman Act in that it prohibits abuse of the dominant position, and its application requires that a firm has 1) a significant degree of market power in a properly defined relevant product market, which may be established with reference to various factors such as market share and general market importance, and 2) it has abused its dominant position in a way that is likely to affect competition significantly[292]. On the other hand, unlike in the U.S., the acquisition of a dominant position or attempted monopolization is not prohibited, and Article 82 is not therefore well suited to misrepresentation in relation to the disclosure obligation if the firm was not already dominant before the establishment of the standard and there was no collusion, in which case Article 81 might be applicable. However, dominant position is more easily found in Europe than in the U.S., and therefore in practice much conduct that would not be treated as monopolization, or even attempted monopolization, in the U.S. is subject to control under EC Treaty Article 82.[293] In terms of what could be considered abuse, the concept is objective, and therefore the conduct of a dominant company may be regarded as abusive even in the absence of any fault. Assessment of whether a dominant firm has operated abusively takes into account among other things, how far the conduct is normal industry practice, and how far it is plainly restrictive of competition or unfair. Its effects on competitors and customers are also assessed.[294] Furthermore, even if Article 82 did not apply at the time of the concealment, it may apply to subsequent patent enforcement as is discussed later on[295].

## B. REFUSAL TO LICENSE

Even if there has been no abuse of the process, the anti-competitive use of a patent may result in its compulsory licensing in exceptional circumstances. The mere existence of a patent does not confer control over the relevant market in terms of antitrust or competition laws, however, and even if the standardization participant or a third-party patent holder is in a monopoly (U.S) or dominant (EU) position, given the complementary nature of patent and antitrust/competition regulation in promoting innovation and consumer welfare, patent holders are, as a rule, able to exploit their rights rather freely.[296] It should also be noted that even if the patent is essential for

---

include the circumstances and intent behind its decision to not disclose its patents and patent applications, violated antitrust laws." (Hynix Semiconductors Inc. v. Rambus Inc, 441 F.Supp.2d 1066 (N.D.Cal., 17 July 2006)).

[292] EC Treaty, Article 82; Watts & Baigent, at 839-840 (2002); Mikko Alkio & Christian Wik, *Kilpailuoikeus*, at 271 (Talentum 2004); Tritton et al., at 806 (2002).

On the definition of relevant market and dominant position *see e.g.,* Tritton et al, at 806-828 (2002) and cases and references mentioned therein; EC Discussion Paper, at 6-17 (2005) and references mentioned therein.

[293] Valentine Korah, *Intellectual Property Rights and the EC Competition Rules*, at 170 (Hart Publishing 2006).

[294] Relevant cases include *e.g.,* Europemballage Corporation and Continental Can v. Commission, Case 6/7 [1973] ECR 215 [1973] CMLR 199; Hoffman La Roche & Co v. Commission, Case 85/79 [1979] ECR 461 [1979] 3 CMLR 211.

*See also* Christopher Bellamy & Graham Child, *European Community Law of Competition*, at 716-721 (Sweet & Maxwell, 5th edition, 2001); Tritton et al., at 830-833 (2002); Alkio & Wik, at 275-277 (2004).

[295] Dolmans, at 6, 19 (2002).

[296] FTC (2003); Alkio & Wik, at 315-319, 371-372 (2004); Korah, at 133-135 (2005); Balto & Wolman, at 428-429 (2003); Tritton et al, at 833-834 (2002); EC Discussion Paper, at 67 (2005).

the utilization of an interoperability standard, this does not as such provide the required market power in the relevant market. Dominance is determined on a case-by-case basis.

**(i) The Sherman Act, Section 2**

It is a generally recognized principle in the U.S. that intellectual property (IP) is no different than real property, such as manufacturing plant or mines, and the IP guidelines drafted by the FTC, for instance, are based on the fundamental principle that the same general antitrust principles apply to conduct involving IP and any other form of tangible or intangible property[297]. However, even though patents do not confer the privilege to violate antitrust laws, the courts have not so far been keen on restricting the patent holder's conduct more than necessary. In the CSU L.L.C. v. Xerox Corp (2000) case, for example, the Federal Circuit came to the conclusion that a patentee could refuse to license or sell its patented inventions, and was immune under the antitrust laws for that refusal unless one of the following conditions applied: 1) the patent was obtained by defrauding the patent office, 2) the suit to enforce the patent was a "sham", or 3) the patent was used as part of an illegal tie-in strategy to extend market power beyond the legitimate confines of the patent grant.[298] In fact, this ruling narrowed the previous Image Technical Services Inc v. Eastman Kodak decision (1997) in which the Ninth Circuit that heard the case on remand from the Supreme Court came to the conclusion that leveraging one's intellectual property rights was presumably legitimate, but if the refusal to license was intended to protect a market position other than the market for the patented or copyrighted product, it might be unlawful. According to the Court a valid business justification may be rebutted by evidence of pretext. Unlike in the Xerox case, which was based on objective determination, the Court also focused here on the IPR holder's subjective motivation.[299]

The Xerox ruling has been criticized for providing too broad an immunity for patent holders[300]. Nonetheless, the current situation is that a dominant patent holder whose patent claims standards technology, for instance, is typically able to enforce his statutory right and to prevent others from implementing it unless, of course, one of the previously mentioned criteria applies.

The patent holder's right to exclude others forms the core of his rights, and may in many cases be a legitimate business justification for a company's anti-competitive conduct even if the patent claimed only a certain functionality of the standards specification, for example. The obligation to grant licenses could be seen as a nullification of such rights[301]. Sometimes, nevertheless, it is in society's best interests to compel a patent holder to grant a license. Indeed, the obligation to license could sometimes be based on the essential-facilities doctrine, which is regarded as a form of monopolization in the U.S. This doctrine has been applied when one firm controlling an essential facility has denied a second firm reasonable access to a product or a service that is absolutely necessary for the latter to be able to compete with the former in a downstream market. Four factors must be present before the doctrine can be applied, however: control of the

---

[297] DOJ/FTC (1995); Morse, at 17-18 (2003).

[298] In re Independent Service Organizations, 203 F.3d 1322, 2000-1 Trade Cases P 72,795, 2000 Copr.L.Dec. P 28,026, 53 U.S.P.Q.2d 1852 (Fed. Cir. 2000).

[299] Image Technical Services v. Eastman Kodak Co., 125 F.3d 1195, 1997-2 Trade Cases P 71,908, 44 U.S.P.Q.2d 1065, 97 Cal. Daily Op. Serv. 7197 (9th Cir., 26 August 1997); Balto & Wolman, at 432 (2003).

[300] Balto & Wolman, at 432 (2003).

[301] Rahnasto, at 141 (2003).

essential facility by a monopolist, the competitor's inability to practically or reasonably duplicate the essential facility, denial of the use of the facility to a competitor, and feasibility in terms of providing the facility to competitors, meaning that there is no need to share an essential facility if such sharing would be impractical, for example. There may be legitimate business or technological justification for such refusal. Although the application of the doctrine is not dependent on the essential facility constituting a separate vertically-related product market, compared to a more general antitrust analysis the requirement of a truly essential facility limits its application fundamentally.[302]

Since the above-mentioned doctrine has also been applied in the context of IPRs, I see no reason why it could not be carefully applied to essential patents that surface after a standard has been established and become so widely adopted that it would be extremely burdensome, if not impossible, to modify the specifications. In fact, the U.S. Antitrust Agencies have also taken the position that it could be applicable to intellectual property "bottlenecks"[303]. On the other hand, however, U.S. courts have generally been reluctant to accept the essential facilities doctrine as a valid basis for compelling an IP holder to license its rights to competitors in a downstream market[304]. Also, for instance, Areeda and Hovenkamp (2005) note that the essential facilities doctrine is generally inconsistent with the purpose of antitrust laws, which is not to force firms to share their monopolies but to prevent monopolies from occurring. On the whole, just like the application of the more general antitrust analysis in refusal to license cases the application of the essential-facilities doctrine will depend on the views adopted regarding the interface between patent and antitrust regulations.

### (ii) EC Treaty, Article 82

Principles in Europe concerning market power resulting from patents in standards and their anticompetitive use in business are similar to those in the U.S. Nevertheless, competition laws are more likely to be applied, and compulsory license to be issued, in Europe[305]. It is the EC Treaty, Article 82, paragraph (b) that is applicable to refusal-to-license cases, which provides as follows:

---

[302] Robert Pitofsky, Donna Patterson & Jonathan Hooks, *The Essential facilities Doctrine under U.S. Antitrust Law,* at 448-448 (Antitrust Law Journal, Vol 70, 2002, 443-462) and references mentioned therein; Gregory V. S. McCurdy, *Intellectual Property and Competition: Does the Essential Facilities Doctrine Shed Any New Light?,* at 472-477 (European Intellectual Property Review, Volume 25, Issue 10, 2003, 472-480) and references mentioned therein; Soininen, at (2005a).

Relevant case law includes *e.g.,* United States v. Terminal Railroad Ass'n, 224 U.S. 383, 32 S.Ct. 507, 56 L.Ed. 810 (Supreme Court, 1912); Associated Press v. United States, 326 U.S. 1, 65 S.Ct. 1416, 89 L.Ed. 2013, 1 Media L. Rep. 2269 (Supreme Court 1945); Lorain Journal Co. v. United States, 342 U.S. 143, 72 S.Ct. 181, 96 L.Ed. 162, 1 Media L. Rep. 2697 (Supreme Court, 1951); Otter Tail Power Co. v. United States, 410 U.S. 366, 97 P.U.R.3d 209, 93 S.Ct. 1022, 35 L.Ed.2d 359, 1973-1 Trade Cases P 74,373 (Supreme Court, 1973); Alaska Airlines, Inc v. United Airlines, Inc, 948 F.2d 536, 60 USLW 2327, 1991-2 Trade Cases P 69,624 (9th Cir., 1991); MCI Communications Corp v. AT&T Co, 708 F.2d 1081, 1983-2 Trade Cases P 65,520, 1982-83 Trade Cases P 65,137, 12 Fed. R. Evid. Serv. 590 (7th Cir., 1983); Intergraph Corp. v. Intel, Corp., 195 F.3d 1346, 1999-2 Trade Cases P 72,697, 52 U.S.P.Q.2d 1641, 40 UCC Rep.Serv.2d 107 (Fed. Cir., 1999).

[303] Pitofsky, Patterson & Hooks, at 452-454, 457 (2002).

[304] McCurdy, at 477 (2003) and references mentioned therein.

[305] According to Korah (2006) dominant positions have been found with market shares just under 40 per cent, when there are other factors, such as entry barriers, which share is much lower than would suffice for finding of monopolization under Section 2 of the Sherman Act. (Korah, at 133 (2006). See also EC Discussion Paper, at 11 (2005) and references mentioned therein).

"Any abuse by one or more undertakings of a dominant position within the common market or in a substantial part of it shall be prohibited as incompatible with the common market insofar as it may affect trade between Member States.

Such abuse may, in particular, consist in:
(a) directly or indirectly imposing unfair purchase or selling prices or other unfair trading conditions;
(b) limiting production, markets or technical development to the prejudice of consumers;
(c) applying dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage;
(d) making the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts."

It is a general principle under the European Community competition regulation that companies of all sizes are entitled to choose freely the supplier of their products and services with, and whether they want to continue their supplying relationship with certain trading partners[306]. Similarly, companies may freely choose their licensees and negotiate licensing terms that are favorable to them. Sometimes the refusal to license, or the threat of refusal, by dominant companies may be held anticompetitive, however. This may be the case if the dominant company denies access to an indispensable input in order to exclude another company from participating in an economic activity in downstream markets. Typically, issues of competition law arise when the prospective buyer or licensee is a rival of the dominant company in the economic activity for which the input is needed.[307]

Even though the essential facilities principle described earlier is well known in EC competition law, as the case law of the European Court of Justice (ECJ), demonstrates it is only in exceptional circumstances that a refusal to license intellectual property rights could be considered an abuse: imposing on an IPR holder an obligation to license, even in return for a reasonable royalty, would lead to the rights holder being deprived of the substance of the exclusive right[308]. Relevant case law includes Volvo AB v. Eric Veng (UK) Ltd (1988)[309], Magill (1995), and IMS Health (2004),

---

[306] EC Discussion Paper, at 60 (2005); Bellamy & Child, at 734-735 (2001).

[307] EC Discussion Paper, at 61 (2005); John T. Lang, *Compulsory Licensing of Intellectual Property in European Community Antitrust Law* (For the DOJ/FTC Hearings, Washington D.C. May 2002), <http://www.ftc.gov/opp/intellect/020522langdoc.pdf> (last visited 30/1/07); Korah, at 135 (2006).

[308] EC Discussion Paper, at 67 (2005).

[309] In the Volvo AB v. Eric Veng case the ECJ noted that "the right of a proprietor of a protected design to prevent third parties from manufacturing and selling or importing, without his consent, products incorporating the design constitutes the very subject-matter of his exclusive right", and that this "follows that an obligation imposed upon the proprietor of a protected design to grant to third parties, even in return for a reasonable royalty, a license for the supply of products incorporating the design would lead to the proprietor thereof being deprived of the substance of his exclusive right, and that a refusal to grant such a license cannot in itself constitute an abuse of a dominant position". Notwithstanding the above, the Court reasoned that "the exercise of such an exclusive right by the proprietor of a registered design in respect of car body panels may be prohibited by Article 86 if it involves, on the part of an undertaking holding a dominant position, certain abusive conduct such as the arbitrary refusal to supply spare parts to independent repairers, the fixing of prices for spare parts at an unfair level or a decision no longer to produce spare parts for a particular model even though many cars of that model are still in circulation, provided that

among others. Of these, the Magill (1995) case concerned copyrighted TV program information that certain TV stations refused to give out to Magill, which had started to publish comprehensive weekly listings for all these stations. Then again, the IMS Health (2004) case concerned the use of a copyrighted brick structure that had been developed by the IMS for the provision of German regional sales data on pharmaceutical products, and which had become a de facto standard in the field. While the IMS Health case was ultimately dropped, the Court concluded in the Magill ruling that Magill was indeed dependant on the TV stations for program information, and if these stations refused to license, the appearance of a new product for which there was consumer demand would have been prevented. Since the refusal was not justifiable, and by excluding all competition from the market through denial of access to the basic information which is the raw material indispensable for the compilation of such a guide, the companies reserved the secondary market of weekly television guides to themselves, the court held that the TV stations' conduct had been abusive.[310]

It could be concluded from the not-so-coherent ECJ case law, which also includes the Tierce Ladbroke (1997)[311] and Oscar Bronner (1998)[312] decisions revolving around the essential-facilities doctrine in addition to the above cases, that at least five conditions have to be present in order for the refusal to license to be considered abusive under the EC treaty Art 82. These requirements are the following:

1) The refusing company has to be dominant on a properly defined market. In determining dominance, the existence of a legal monopoly, such as a patent, is not sufficient in itself and there are usually comparable goods, processes and services on the market. In fact, it is only in exceptional circumstances that patents play a role in determining whether a company is in a dominant position. This might be the case if the product protected by the patent is highly innovative and it is not interchangeable with other products, for example.[313] This could also be the case if the patent "reads on" an industrial standard so that the patent holder controls certain technology markets.

2) The behavior of the undertaking must be such that it could properly be characterized as a refusal to license, which could include outright refusal or other kinds of practice that de

---

such conduct is liable to affect trade between Member States" (Volvo AB v. Erik Veng (U.K.) Ltd, Case 238/87 [1988] ECR 6211 [1989] 4 CMLR 122).

[310] Radio Telefis Eireann (RTE) and Independent Television Publications Ltd (ITP) v Commission, Joined cases C-241 and 242/91P, [1995] ECR 1-743, [1995] 4 CMLR 718; Korah, at 138-140 (2006).

[311] Tiercé Ladbroke v. Commission, Case T-504/93, [1997] ECR II-923, [1997] 5 CMLR 309.

[312] In this case the Court declared that for the existence of an abuse "it would be necessary not only for that the refusal of the service comprised in home delivery to be likely to eliminate all competition in the daily newspaper market on the part of the person requesting the service and for such refusal to be incapable of being objectively justified, but also for the service in itself to be indispensable to carrying on that person's business, for lack of any actual or potential substitute for that home-delivery scheme. That is not the case where, first, other methods of distributing daily newspapers, such as by post and through sale in shops and at kiosks, even though they may be less advantageous for the distribution of certain newspapers, exist and are used by the publishers of those daily newspapers and, secondly, there are no technical, legal or even economic obstacles capable of making it impossible, or even unreasonably difficult, for any other publisher of daily newspapers to establish, alone or in cooperation with other publishers, its own nationwide home-delivery scheme and use it to distribute its own daily newspapers". (Oscar Bronner GmbH & Co. KG v Mediaprint Zeitungs- und Zeitschriftenverlag GmbH & Co. KG, Mediaprint Zeitungsvertriebsgesellschaft mbH & Co. KG and Mediaprint Anzeigengesellschaft GmbH & Co. KG, Case T-7/97, [1998] ECR I-7817, [1999] 4 CMLR 112).

[313] Tritton et al., at 804 (2002).

facto result in such a refusal. Such practices include imposing unfair licensing conditions and charging prices that make it economically unviable for the licensee to continue its activity.[314]

3) The input must be indispensable to the carrying on of normal economic activity in the downstream market. Thus, when real or potential substitutes exist, the input of the dominant company is not indispensable. The same holds true if it were legally and economically possible for other companies to produce the input in question themselves. A facility is an indispensable input only when duplication of the existing facility is impossible or extremely difficult, either because it is physically or legally impossible, or because the second facility is not economically viable in the sense that it would not generate enough revenues to cover its costs. One element that might speak for reaching the conclusion that a facility is indispensable is that customers would incur high switching costs if they had to use an alternative structure. It thus follows that, in the case of essential patents, it must not be possible for competitors to turn to any workable alternative technology, or to "invent around" them.[315] Such a requirement is likely to be met if the technology the patent claims has become a standard, the use of which is absolutely necessary for the company's business.

4) The refusal to license must be likely to have a negative effect on competition and ultimately on consumer welfare, which could be the case if the holder of the indispensable input refuses access to a licensee that would use the input to manufacture a new product or provide a new service in such a not-yet-existing market. Furthermore, in the case of IPRs, it is required that the company requesting the license does not intend to limit itself essentially to duplicating the goods or services already offered on this market by the holder of the IPR, but intends to produce new goods or services not offered by the rights holder and for which there is potential consumer demand.[316] It follows that a refusal to license an IPR-protected technology that is indispensable as the basis for follow on innovation by competitors may be abusive even if the license does not seek to directly incorporate the technology in clearly identifiable new goods and services[317].

5) The refusal cannot be objectively justified, which would be the case if it were intended to secure the company reasonable returns on investments it had made in R&D activities, for instance. Thus, it appears that compulsory licenses cannot easily be issued in cases in which a third-party patent surfaces after the standard has been established, because these parties are likely to have objective justification for their actions. For the standard-setters, and particularly the companies that have actively promoted the selection of a certain standard but have not properly disclosed their rights, it is easier to argue that there is no objective business justification for such a refusal.

Consequently, as far as standardization is concerned, compulsory licensing requires the company to be in a dominant position, that there are no viable alternatives for the established standard,

---

[314] EC Discussion Paper, at 63 (2005).

[315] IMS Health GmbH & Co KG v. NDC Health, Case C-418/01[2004] 4 CMLR1543 (preliminary ruling); EC Discussion Paper, at 65 (2005).

[316] IMS Health GmbH & Co KG v. NDC Health, Case C-418/01,[2004] 4 CMLR1543 (preliminary ruling).

[317] EC Discussion Paper, at 65-66 (2005).

and that the refusal is not justified. Some kind of "moral misconduct" has to take place[318]. Then again, if the submarine patent holder does not refuse to license, but aims at generating income through imposing excessive royalty obligations on those who implement the standard, the U.S. antitrust regulation is typically not applicable. As a general rule, a dominant patent holder in the U.S. is able to extract whatever price he is able to get, while in Europe requiring too high royalties may constitute a violation of the Article 82 as it may be regarded as excessive pricing.[319]

Although, it is difficult to find a basis for antitrust/competition law violation in the context of submarine patents, the importance of interoperability in networked industries should carry weight in assessing what exactly constitutes anti-competitive behavior in the meaning of Sherman Act, Section 2 and the EC Treaty, Article 82. In fact, the Microsoft cases, the United States v. the Microsoft Corporation (2000) and the European Commission v. the Microsoft Corporation (2004), have already touched upon the topic and speak for the importance of ensuring interoperability. Furthermore, the Software Directive, which forms the basis for the decompilation right implemented in national copyright laws, and the directive proposal concerning the patentability of computer-implemented inventions, stress the importance of balancing intellectual property rights and interoperability considerations in the software industry, even with respect to non-dominant firms.

---

[318] Ian S. Forrester, *Competition and Intellectual Property Law and Policy in the Knowledge-Based economy: Comparative Law Topics* (Presentation, DOJ/FTC Hearings, Washington, D.C, 22 May 2002).

[319] Rahnasto, at 154-155 (2003); Michal S. Gal, *Monopoly Pricing as an Antitrust Offense in the U.S. and the EC: Two Systems of Belief about Monopoly?* (Antitrust Bulletin, New York University Law and Economics Research Paper Series, Working Paper No. 04-01, 2004), <http://law.haifa.ac.il/faculty/lec_papers/gal/mgal_excessive_pricing.pdf> (last visited 28/1/07); Bellamy & Child, at 721-724 (2001) and references mentioned therein; Tritton et al., at 831-832, 855-859 (2002) and references mentioned therein.

Relevant case law includes *e.g.*, General Motors v. Commission, Case 26/75, [1975] ECR 1367, [1976] 1 CMLR 95; United Brands v. Commission, Case 27/76, [1978] ECR 207 [1978] 1 CMLR 429; British Leyland v. Commission, Case 226/84, [1986] ECR 3263 [1987] 1 CMLR 184.

*See also* Alkio & Wik (2004) who have noted that there is quite much Finnish case law which has to do with excessive pricing in networked industries. (Alkio & Wik, at 284-290 (2004)).

## VIII. UNFAIR BUSINESS PRACTICES

In the U.S. a submarine patent holder may face a claim based on the pursuit of unfair business practices on two different bases: the state unfair-competition laws and the Federal Trade Commission (FTC) Act, Section 5. The first option is available to private parties, and thus the defendant in patent-infringement litigation may counterclaim or initiate litigation and argue that the patent holder has violated the state unfair competition laws. These laws are based on common law or statutes, and the available remedies vary depending on the state. Generally speaking, their scope is somewhat broader than that of the federal antitrust laws, and an accused infringer may in principle be able to plead an offensive claim that falls short of constituting an antitrust violation.[320] For instance, Section 17200 of the California Business and Professions Code, which prohibits certain acts of unfair competition and allows for the disgorgement of the defendant's unjust enrichment and other equitable relief, applies when the plaintiff shows that the challenged conduct threatens an incipient violation of an antitrust law, or violates the policy or spirit of one of those laws because its effects are comparable to or the same as a violation of the law, or otherwise significantly threatens or harms competition[321]. In practice, however, motions to dismiss claims under Section 17200 directed at patentees conduct before standards bodies, for instance, have tended to be resolved in the same way as federal antitrust claims[322]. It is, therefore, likely that if the patent holder's conduct were to be held anticompetitive under federal antitrust laws such as the Sherman Act, it would also be considered to violate California state law.

---

[320] Lavelle & Gunthner, at 41 (2002); Flagel & Lawrence, at 59 (2002).

[321] Lavelle & Gunthner, at 41 (2002); Flagel & Lawrence, at 59 (2002). In both writings the authors referred to the California Supreme Court decision Cel-Tech Communications, Inc. v. Los Angeles Cellular Tel Co., 20 Cal. 4th 163, 83 Cal.Rptr.2d 548, 973 P.2d 527 (1999) in which the court explained that California's unfair competition statute (California Business & Professions Code § 17200) mirrors the antitrust law and requires "conduct that threatens an incipient violation of an antitrust law, or violates the policy or spirit of one of those laws".

[322] Lavelle & Gunthner, at 41 (2002). Reference was made by the authors to ESS Technology, Inc v. PC-TEL, Inc, Not Reported in F.Supp.2d, 1999 WL 33520483, Docket No. C 99-20292 (N.D.Cal., 4 November 1999), Townshend v. Rockwell International Corp. and Conexant Systems, Inc., Not Reported in F.Supp.2d, 2000 WL 433505, 2000-1 Trade Cases P 72,890, 55 U.S.P.Q.2d 1011 (N.D. Cal 28 March 2000), Hyundai Electronics Indus. Co. v. Rambus, Inc., No. C 00-20905 RMW (N.D. Cal., 19 January 2001), and SanDisk Corp. v. Lexar Media, Inc., Docket No. C 98-01115 (N.D. Cal. 17 October 2000) decisions.

In the ESS Technology case the court dismissed the claimant's claim that was based on Sherman Act, Section 2 and the related state unfair competition claim due to its failure to show actual injury and to allege antitrust injury. It also dismissed the defendant's motion to dismiss the declaratory relief claims of patent misuse and estoppel as well as the contract-based claim for specific performance. This litigation arose as a result of a disagreement over proper licensing terms: PC-Tel had acquired the patents which were necessary for modem producers to comply with the V.34 and V.90 standards established by the ITU when it purchased and merged with General Data Comm, Inc which in turn had agreed to negotiate licenses on a non-discriminatory basis and on reasonable terms and conditions. Since the modem markets had changed by the time it was ready to enter the market, ESS Technology was of the opinion that the royalty payments proposed by General Data Comm and later by PC-Tel were unreasonably expensive and did not allow for new market entrants to compete with existing market participants. When the parties were unable to reach consensus, PC-Tel begun to contact the claimant's customers and informed them that if they continued to purchase products from the claimant without acquiring licenses for the V.34 and V.90 patents, they would face patent infringement actions. (ESS Technology, Inc v. PC-TEL, Inc, Not Reported in F.Supp.2d, 1999 WL 33520483, Docket No. C 99-20292 (N.D.Cal., 4 November 1999)) The parties entered into a settlement agreement on 5 February 2002 (PC-Tel, Inc, *Annual Report 2001*, at 6-7 (2002), <http://files.shareholder.com/downloads/PCTI/82495000x0x22268/E95326A3-990F-42D0-8609-ADF71E6ADA98/2001AR.pdf> (last visited 8/1/06)).

Under the second option, the Federal Trade Commission has the exclusive power to issue a complaint and to terminate actions which violate the Federal Trade Commission Act, Section 5. This Act prohibits unfair and deceptive business practices and unfair methods of competition in or affecting commerce. These methods of unfair competition include conduct that violates the federal antitrust laws.

In order to find something deceptive there must, according to the FTC Policy Statement on Deception (1983), be a written or oral misrepresentation, omission of material information, or another kind of practice that is likely to mislead others acting reasonably under the circumstances, and thereby likely to affect their conduct or decisions.[323] Indeed, the Act has been applied on various occasions that have involved disputes over undisclosed patenting activities of standard setters, and these cases are examined more closely in the following. It is noteworthy that in all of these cases the literal wording and the interpretation of the standards organizations' patent policy played an important role. Basically, there must be an explicit duty to disclose in order to be able to demonstrate that the withholding of information is unfair and deceptive from the perspective of other standard setters unless there are other factors that support such a finding. These other factors include the interpretation of the rules by the members as evidenced by their behaviour and their statements of what they understand the rules to be[324]. Moreover, there must be a clear indication that another technology would have been chosen for a standard had the patent holder disclosed its rights. Otherwise, it is more challenging to prove that the patentee's behaviour has caused or has been likely to cause harm to the competition and consumers, as is required in order to find violation of the act[325]. What is not required for the FTC Act to apply in comparison to the Sherman Act, Section 2, is proof of competitive harm. Also the state of mind of the respondent is irrelevant in determining whether Section 5 has been violated.[326]

In the European context, there is no EU-level regulation that would correspond to the FTC Act, but national Unfair Business Practices Acts may be applicable. It should be noted, however, that the purpose of the Finnish Unfair Business Practices Act, for instance, does not directly correspond to that of competition regulation in the category in which the FTC Act falls[327]. Its application is focused on marketing efforts, and it has been designed to protect entrepreneurs rather than consumers and the public interest[328].

---

[323] FTC, *FTC Policy Statement on Deception* (14 October 1983), <http://www.ftc.gov/bcp/policystmt/ad-decept.htm> (last visited 5/1/07); *See also* In the Matter of Rambus Inc, Opinion of the Commission, Docket No. 9302 (FTC, 2 August 2006).

According to the policy statement of the FTC "Practices that have been found misleading or deceptive in specific cases include false oral or written representations, misleading price claims, sales of hazardous or systematically defective products or services without adequate disclosures, failure to disclose information regarding pyramid sales, use of bait and switch techniques, failure to perform promised services, and failure to meet warranty obligations".

[324] *See e.g.,* In the Matter of Rambus Inc, Opinion of the Commission, Docket No. 9302 (FTC, 2 August 2006).

[325] FTC (1983). *See also* Areeda & Hovenkamp, at 6-24 (2005).

[326] *See e.g.,* In the Matter of Rambus Inc, Opinion of the Commission, Docket No. 9302 (FTC 2 August 2006).

[327] The FTC Act is not, however, part of the "antitrust laws" for the violation of which private parties may sue and recover treble damages. (Areeda & Hovenkamp, at 6-24 (2005)).

[328] Hallituksen esitys Eduskunnalle laeiksi sopimattomasta menettelystä elinkeinotoiminnassa ja markkinatuomioistuimesta annetun lain muuttamisesta (HE 114/1978 vp.), at 9.

The application of the Finnish Unfair Business Practices Act in the context of submarine patents and standardization is very much untested. Nevertheless, it would seem possible to apply it, if it can be demonstrated that a company has not operated in accordance with good business practice as potentially defined by the patent policies and the ways in which they have been construed and interpreted. Moreover, it appears that the threshold for considering that the patentee has violated the Finnish Unfair Business Practices Act by withholding relevant information is lower than in the case of the FTC Act the application of which is in practice shaped by the antitrust analysis. It is to be seen how the courts will set the boundaries with respect to the application of the national Unfair Business Practices Acts.

## A. THE FEDERAL TRADE COMMISSION ACT

U.S. antitrust regulation could be said to incorporate the FTC Act in addition to the Sherman and Clayton Acts. According to Section 5 of the FTC Act, the Federal Trade Commission has the power to prohibit unfair methods of competition, and unfair or deceptive acts or practices in or affecting commerce. Basically, violations of the Sherman Act are also violations of the FTC Act Section 5, but Section 5 may be applied to some other practices as well, and therefore it could be applied even in cases that involve patents and standards but are beyond the scope of the Sherman Act[329]. Indeed, over the past few years the FTC has become increasingly concerned about the potentially anticompetitive effects of companies attempting to mislead other companies into believing that they do not have any patents or patent applications that cover an industry standard[330]. The underlying premise is that if these patents had been properly disclosed, other participants would have had the incentive to develop and propose competing solutions[331], and hence another technology could have been selected for the standard. The companies against which the FTC has initiated investigations include Dell Computer Corporation, Rambus Inc, Sun Microsystems, and Unocal Inc, and the remedy it has sought has been to preclude these companies from enforcing their rights.

### (i) Dell Computer Corporation

In the Dell (1996) case the FTC initiated an investigation with respect to Dell's actions during the Video Electronics Standards Association (VESA) VL-bus technology-standardization process. Although it was stated in the VESA IPR policy that its members must produce certification disclosing potentially conflicting intellectual property rights, Dell claimed that it did not have such rights. After VESA adopted the standard based in part on Dell's certification, Dell sought to enforce its patent against VESA members.

The Commission found that Dell had failed to act in good faith as VESA's affirmative disclosure requirement created an expectation that its members do their best to identify and disclose conflicting intellectual property rights. The FTC also concluded that if Dell had disclosed its patents properly, VESA would have incorporated a different technology into the standard as its

---

329 Areeda & Hovenkamp, at 6-24 (2005).

330 Nicholas Papastavros & Timothy Mungovan, *Rambus Cleared: FTC Standard-Setting Misconduct claims Dismissed* (Nixon Peabody, LLP. Technology and Intellectual Property Alert, March 2004), <http://www.nixonpeabody.com/linked_media/publications/TIPA_03052004.pdf> (last visited 8/1/06).

331 Rahnasto, at 192 (2003).

patent policy was designed to further VESA's strong preference for adopting standards that do not include proprietary technology. Due to its misconduct, Dell unreasonably restrained competition and caused harm to consumers by hindering the adoption of the standard and raising the costs of its use, and obstructed legitimate standard-setting activity. In the end, Dell entered into a consent agreement with the FTC, and promised not to assert its patents against computer manufacturers that complied with the standard.[332]

**(ii) Rambus, Inc**

The Dell consent decree provoked lively discussion, and antitrust scholars in particular questioned the application of the FTC Act in a situation in which the defendant's anticompetitive intent was far from clear[333]. Perhaps, as a result of the criticism, the FTC's reasoning in its complaint against Rambus was more detailed in this respect than that presented in the Dell case even though the respondent's state of mind is, in principle, irrelevant in determining whether there has been deceptive conduct under Section 5 of the FTC Act[334]. In fact, even though the FTC charged Rambus with a pattern of anticompetitive acts and practices through which it had allegedly caused or threatened to cause substantial harm to competitors and to consumers, thus violating the FTC Act, Section 5, the arguments presented were largely the same needed in order to prove the violation of Sherman Act, Section 2. According to the FTC, Rambus had, by deliberate and intentional means, illegally monopolized, attempted to monopolize, and otherwise engaged in unfair methods of competition in certain markets related to certain technological features that were necessary for the design and manufacture of a common form of digital computer memory, DRAM[335].[336]

What Rambus did to cause the FTC to raise the complaint was that it participated in the work of an industry standard-setting organization (JEDEC) without making it known that it held a patent, and had several pending patent applications involving specific technologies that had been proposed and were ultimately selected for a SDRAM[337] standard that was adopted in 1993 and for the second-generation SDRAM standard (DDR-SDRAM[338]) published in 1999: this was despite the fact that the policies, procedures and practices existing within the JEDEC could, in the view of the FTC, be fairly interpreted to impose upon JEDEC members certain basic duties to disclose relevant rights. By concealing this information and through other deceptive conduct, Rambus had purposely given JEDEC the materially false and misleading impression that it did not possess any relevant IPRs. Had Rambus disclosed its rights, this would probably have affected the content of the standard.[339]

---

[332] In the Matter of Dell Computer Corporation, Decision and Order, Docket No. C-3658 (FTC, 20 May 1996); Lavelle & Gunthner, at 39 (2002).

[333] Lavelle & Gunthner, at 39-40 (2002).

[334] FTC (1983); In the Matter of Rambus Incorpoted, Opinion of the Commission, Docket No. 9302 (FTC, 2 August 2006).

[335] DRAM stands for "dynamic random access memory".

[336] In the Matter of Rambus Incorporated, Complaint, Docket No. 9391 (FTC, 18 June 2002).

[337] SDRAM stands for "static random access memory".

[338] DDR stands for "double data rate".

[339] In the Matter of Rambus Incorporated, Complaint, Docket No. 9391 (FTC, 18 June 2002).

Furthermore, Rambus perfected its patent applications, consisting of the original '898 application filed in 1990, 10 divisional applications, and numerous other amended, divisional and continuation applications, all claiming priority from that of the original application, during its participation in the DDR-SDRAM standard-setting procedure and thereafter in order to cover the standard better. By the late 1990s, it had succeeded in obtaining numerous patents, and it began to enforce these rights after the standard had been broadly adopted and the DRAM manufacturers and their customers had already become "locked in" to the JEDEC standards. Therefore, according to the FTC, it was not economically feasible for the industry to attempt to alter or work around the JEDEC standards in order to avoid payment of royalties to Rambus. The FTC concluded that the threatened or actual anticompetitive effects of Rambus' conduct included:

a) "increased royalties (or other payments) associated with the manufacture, sale, or use of synchronous DRAM technology;
b) increases in the price, and/or reductions in the use or output, of synchronous DRAM chips, as well as products incorporating or using synchronous DRAMs or related technology;
c) decreased incentives, on the part of memory manufacturers, to produce memory using synchronous DRAM technology;
d) decreased incentives, on the part of DRAM manufacturers and others, to participate in JEDEC or other industry standard-setting organizations or activities; and
e) both within and outside the DRAM industry, decreased reliance, or willingness to rely, on standards established by industry standard-setting collaborations."[340]

The above charges were litigated in an administrative trial. In its initial decision, released on 24 February 2004, Judge MacGuire ruled for Rambus. She stated that even though Rambus indeed had monopoly power in the relevant markets, the FTC "failed to sustain their burden of establishing liability for the violations alleged". In her opinion, there was no evidence, for example, that Rambus had engaged in a pattern of exclusionary, anticompetitive conduct that subverted an open standards process, or that it had utilized such conduct to capture an unlawful monopoly in technology-related markets.[341]

The case was appealed further to the Commission, and ultimately, in August 2006, the FTC unanimously decided that Rambus' acts of deception constituted a violation not only of the FTC Act, but also of Section 2 of the Sherman Act. The Commission held that Rambus had engaged in exclusionary conduct that had significantly contributed to its acquisition of monopoly power in four markets that included technologies that had been incorporated into the JEDEC standards for computer memory, and over which Rambus claimed patent rights[342]. Furthermore, by hiding the possibility that Rambus would be able to impose royalty obligations of its own choosing, and by silently using the JEDEC to assemble a patent portfolio to cover the SDRAM and DDR-SDRAM standards its conduct significantly contributed to JEDEC's choice of Rambus' technologies for incorporation into the JEDEC DRAM standards, and further to JEDEC's failure to secure assurances regarding future royalty rates. This, in turn, was held to have significantly contributed to Rambus' acquisition of monopoly power. According to the

[340] In the Matter of Rambus Incorporated, Complaint, Docket No. 9391 (FTC, 18 June 2002).

[341] In the Matter of Rambus Incorporated, Initial Decision, Docket No. 9391 (FTC, 23 February 2004).

[342] These markets were latency technology, burst length technology, data acceleration technology and clock synchronization technology.

Commission, it was unlikely that the superiority of Rambus' technology was the reason why it was incorporated into the standards.[343]

**(iii) Sun Microsystems, Inc**

In 2001 the FTC initiated preliminary investigations into Sun Microsystems' conduct during its participation in a JEDEC panel that drafted a dual inline memory module (DIMM) interface standard for a 64-bit memory bus line. More specifically, it investigated whether Sun had had a duty to disclose certain patents and patent applications during the JEDEC standard-setting process, and whether it had failed to do so, thereby violating the FTC Act, Section 5. However, Sun later disavowed the patents that related to the standards at issue, and abandoned its sole pending patent application based on these patents. As a consequence, the FTC formally closed its inquiry in November 2001, concluding, "It is no longer in the public interest to continue this investigation, notwithstanding the fact that the Commission had serious questions about the propriety of the underlying conduct involved".[344]

**(iv) Union Oil Company of California**

In the matter between the FTC and Union Oil Company of California (Unocal) a consent order was agreed upon on 27 July 2005, and Unocal promised to cease and desist from any and all efforts to enforce its relevant patents. In this case, the FTC issued a complaint against Unocal because it had reason to believe that, during the standardization procedure run by the California Air Resources Board (CARB) it had misrepresented the fact that certain technology was non-proprietary and in the public domain, while at the same time it was pursuing patent protection that would enable it to charge substantial royalties if CARB mandated the use of Unocal's technology in the refining of CARB-compliant summertime reformulated gasoline (RFG). The Commission alleged that, as a result of willful misrepresentations and through deceptive conduct, Unocal had illegally monopolized, attempted to monopolize and otherwise engaged in unfair methods of competition in both the technology market for the production and supply of CARB-compliant "summer-time" RFG and in its downstream product market, thus undermining competition and harming consumers. The Commission argued that without Unocal's fraud, CARB would not have adopted RFG regulations that substantially overlapped with Unocal's concealed patent claims, and by the time Unocal came clean with its patents, the refining industry had already spent billions of dollars in capital expenditures to modify their refiners to comply with the regulations. The FTC further estimated that Unocal's enforcement of its patents could have potentially resulted in additional consumer costs of up to six cents for every gallon of gasoline pumped in the State of California, which would have amounted to over $500 million of additional consumer costs per year.[345]

---

[343] In the Matter of Rambus Incorpoted, Opinion of the Commission, Docket No. 9302 (FTC, 2 August 2006).

[344] Sun Microsystems Inc, File No. 011-0006 (FTC, 9 November 2001).

[345] In the matter of Union Oil Company of California, Opinion of the Commission, Docket No. 9305 (FTC, 27 July 2005).

## B. THE FINNISH UNFAIR BUSINESS PRACTICES ACT

As mentioned earlier, EC competition laws do not entail regulation that would correspond to the FTC Act, Section 5, but many European countries have national laws stemming from the Paris Convention of 1883 (as amended)[346] that prohibit the use of unfair business practices. Moreover, the European Commission has recently been active in this matter, issuing directive 2005/29/EC on Unfair Commercial Practices on 11 May 2005. This directive is focused on business-to-consumer relationships however, and therefore does not harmonize the member states' legislation with regard to business-to-business relationships, in which segment regulation has therefore remained geographically diversified[347].

In Finland, enforcement of the Unfair Business Practices Act does not belong to the judicature of the national competition authorities. The Council of Fair Trading may give its non-binding opinion on whether certain business practices are considered unfair, but other than that, legal proceedings must be initiated in the Market Court, which, according to Section 6 of the Act, has the power to prohibit an entrepreneur from continuing or repeating a violation. The court may also issue a conditional fine in order to reinforce its decision. However, if the claimant seeks damages on the basis of violation of the Act or criminal sanctions the lawsuit must be initiated in the district court. As these damages are typically non-contractual and not connected with personal injury and damage to property, they may be claimed on the basis of the Finnish Tort Liability Act, Chapter 5, Section 1 only if the injury or damage has been caused by an act punishable by law, in the exercise of public authority, or in other cases in which there are especially weighty reasons that speak for such a liability.

What are the circumstances under which the submarine patent holder's behavior could be deemed to violate the Unfair Business Practices Act of Finland? The purpose of the Act is to protect the undertaking's right to operate and compete from unfair business practices and improper means of influencing the purchase decisions[348]. The Act contains a general clause,

---

[346] Paris Convention for the Protection of Intellectual Property, Article 10bis is as follows:

"Unfair Competition

(1) The countries of the Union are bound to assure to nationals of such countries effective protection against unfair competition.

(2) Any act of competition contrary to honest practices in industrial or commercial matters constitutes an act of unfair competition.

(3) The following in particular shall be prohibited:

(i) all acts of such a nature as to create confusion by any means whatever with the establishment, the goods, or the industrial or commercial activities, of a competitor;

(ii) false allegations in the course of trade of such a nature as to discredit the establishment, the goods, or the industrial or commercial activities, of a competitor;

(iii) indications or allegations the use of which in the course of trade is liable to mislead the public as to the nature, the manufacturing process, the characteristics, the suitability for their purpose, or the quantity, of the goods."

[347] Directive 2005/29/EC of the European Parliament and of the Council of 11 May 2005 concerning unfair business-to-consumer commercial practices in the internal market and amending Council Directive 84/450/EEC, Directives 97/7/EC, 98/27/EC and 2002/65/EC of the European Parliament and of the Council and Regulation (EC) No 2006/2004 of the European Parliament and of the Council ('Unfair Commercial Practices Directive').

[348] HE 114/1978 vp., at 3.

Section 1, according to which "good business practice may not be violated nor may practices that are otherwise unfair to other entrepreneurs be used in business". Furthermore, it incorporates more detailed rules the violation of which always infringes Section 1 of the Act, which has been designed to be a broad rule adaptable to changing circumstances. Due to the ambiguity, violation of the more detailed sections related to marketing activities (Section 2), discounts, additional benefits, price contests and lotteries (Section 3), as well as to trade secrets (Section 4), is punishable as illicit if conducted on purpose or in gross negligence, but violation of the general and rather ambiguous clause is not.[349] It is not required that the defendant has operated unfairly intentionally in order for the court to find a violation of Section 2, however[350].

According to Section 2, the use of a false or misleading expression concerning one's own business or the business of another is prohibited if the said expression is likely to affect the demand or supply of a product or to harm the business of another. It was specified in the Government's Bill (HE 114/1978 vp.) that a statement may be misleading, for instance, if something that is relevant is left unsaid thus leaving the recipient of that information with a wrong impression of the product characteristics[351]. Then again, the "use" of false or misleading statements refers to the activities through which the information is brought to someone's attention.[352] It is also worth noticing that in Article 6 of the Unfair Commercial Practices directive (2005/29/EC) non-compliance by the trader with commitments contained in codes of conduct by which the trader has undertaken to be bound is regarded as misleading if the commitment is not aspirational but is firm and is capable of being verified, the trader indicates in a commercial practice that he is bound by the code and causes or is likely to cause the average consumer to take a transactional decision that he would not have taken otherwise[353].

It is Sections 1 and 2 of the Act that are most likely to be applied in situations in which the patent holder has not disclosed the existence of its patents or pending patent applications during standard setting, particularly when these activities constitute a breach of a patent policy. It was stated at the preparatory stages that when interpreting what constitutes good business practice it is possible also to take into account the voluntary rules applied in commerce[354]. It is therefore probable that patent policies would fall into that category irrespective of how they are formulated. The policies and the guidelines for implementing them basically illustrate what is considered good business practice with respect to standardization efforts. Sometimes there may not even be a need for a written patent policy. It is recognized in the Government's Bill (HE 114/1978 vp.) that practices that are followed by diligent and honest entrepreneurs and have

---

[349] HE 114/1978 vp., at 3; Aimo O. Aaltonen, *Sopimattomasta menettelystä elinkeinotoiminnassa*, at 35 (Suomalaisen Lakimiesyhdistyksen julkaisuja, B-sarja. N:o 198, 1985).

[350] Aaltonen, at 34 (1985).

[351] It has also been pointed out in the Unfair Commercial Practices Directive (2005/29/EC), Article 7 that "a commercial practice shall be regarded as misleading if, in its factual context, taking account of all its features and circumstances and the limitations of the communication medium, it omits material information that the average consumer needs, according to the context, to take an informed transactional decision and thereby causes of is likely to cause the average consumer to take a transactional decision that he would not have taken otherwise."

[352] HE 114/1978 vp., at 12.

[353] Unfair Commercial Practices Directive (2005/29/EC). "Code of conduct" has been defined in the Directive to mean "an agreement or set of rules not imposed by law, regulation or administrative provision of a Member State which defines the behaviour of traders who undertake to be bound by the code in relation to one or more particular commercial practices or business sectors".

[354] HE 114/1978 vp., at 3

been accepted by competitors and consumers could be deemed good business practice.[355] Thus, if it can be demonstrated that certain principles, such as the early disclosure of essential patents and pending patent applications to the other standardization participants, represent a generally accepted and practical way to operate in the context of standard setting, it may be enough to prove that deviation from such a practice is not acceptable under Section 1 of the Act. Then again, in order for Section 2 to apply the statement or omission of the patent holder must be false or misleading from the perspective of the other standard setting participants. If the principle laid down in the directive is applied also in the context of the Unfair Business Practices Act, such situation would be at hand when the patent holder has truly committed to adhering the patent policy of the standard setting organization, and then violates such a policy thereby causing or being likely to cause the others to vote for and ultimately set and implement a standard they would not have selected otherwise.[356]

Irrespective of the above, the challenge for the claimant with respect to the application of Sections 1 and 2 of the Unfair Business Practices Act is that these rules have mainly been designed and used to prohibit *marketing* efforts that are false or misleading, and which may therefore result in a loss of sales, a slowing down of revenue increase, or a shrinking market share[357]. The disagreements that have been handled in court or in the Council of Fair Trading have involved issues to do with slavish copying, comparative advertising, and cease-and-desist letters that have been sent to third parties[358]. Nevertheless, since it was explicitly stated in the preparatory work that besides marketing correspondence and advertisement, other false or misleading expressions concerning one's own business or that of another also fall within the scope of Section 2[359], there appears to be a well-grounded reason to argue for the application of the Act. Furthermore, if the scope of marketing is interpreted broadly, patent holder's misrepresentation that has taken place during the standard setting procedure could certainly be considered as some kind of a promotion of its technology.

The word "expression" used in Section 2 of the Act basically covers all types of performances, acts and deeds in which the company manifests itself. The false or otherwise misleading statement may very well relate to patents or other intellectual property rights, for instance, as this information is relevant from the perspective of someone who is considering the purchase of the product.[360] Therefore, particularly if a company is able to prove that the patent holder's misrepresentation during standard setting could have affected the demand or supply of a product incorporating the standards technology, or that it could otherwise harm its business, I see no

---

[355] HE 114/1978 vp., at 11; Aaltonen, at 33 (1985).

[356] When making a decision concerning the right instance of filing a suit based on the Unfair Business Practices Act and the arguments on which the claim is founded, it should be noticed that the Market Court has no authority to take up cases in which the application for an injunction is founded on contract breach. The district court is, however, able to take up such matters. *See* KKO 1980-I-3, Docket No. A79/540 (Supreme Court, 31 December 1980).

[357] HE 114/1978 vp., at 10-11.

[358] *See e.g.,* Haarmann, at 338-351 (2006). Cases in which the inappropriateness of informing the other company's clients of potential patent infringement has been assessed include decisions MAO: 42/03, Mineral Technologies, Inc. v. Oy Aga Ab, Docket No. 4/2002 (Market Court, 28 February 2003); MT:2001:015, Lamor Corporation Ab vastaan Oy LMP Patents Ltd Ab, Docket No. 4/2001 (Market Court, 15 October 2001); MT: 2001:002, Sonera Oyj ja Sonera SmartTrust Oy vastaan Oy Technopol Ltd ja Behruz Vazvan, Docket No. 6/2000 (Market Court, 12 February 2001).

[359] HE 114/1978 vp., at 11-12; Aaltonen, at 64 (1985).

[360] HE 114/1978 vp., at 12; Aaltonen, at 64 (1985).

reason why the Market Court or the district courts would not apply the Unfair Business Practices Act in the context of standardization. The argument that potential harm could have been caused might be justified by the fact that another standard could have been chosen had the patent holder disclosed its rights, but now due to its behavior it is no longer possible to use the standard at all; alternatively, there may be a need to increase product prices so that the company is able to pay for the royalties.

The problem with relying on the Unfair Business Practices Act is that the remedy resulting from the finding of a violation may not be a satisfactory one. The Market Court has only the authority to prohibit an entrepreneur from continuing or repeating a violation of the Act, and even though the Supreme Court has explicitly stated in its decision KKO:2004.32 that the ordered injunction must be an efficient one and that it should not be defined too narrowly,[361] it is unlikely that the Market Court would extend its powers and preclude the company from enforcing its patent rights. Perhaps an injunction concerning the patent holder's future misbehavior in the same standard setting forum could be invoked, however, and this injunction could be boosted with a conditional fine. The conditional fines issued by the Market Court have traditionally varied between 20 000 - 100 000 euros[362].

The possibility of being issued damages resulting from the violation of the Act depends on whether it is Section 1 or Section 2 that has been infringed. Furthermore, in case of Section 2, it depends on whether the violation has been conducted intentionally, or in gross negligence, as only such actions have been criminalized. This is because in order for the Finnish Tort Liability Act, Chapter 5, Section 1 to apply, the act must be punishable by law or there must especially weighty reasons at hand.

According to the Supreme Court, these weighty reasons are valid in principle when the Unfair Business Practices Act has been violated on purpose, unless there are special counter-arguments to the contrary.[363] It thus follows that if the court finds that the submarine patent holder's actions do violate the Unfair Business Practices Act, Section 1 and that such violation is intentional, the claimant could be awarded damages for the economic losses it has suffered due to the patentee's behavior. In order to be awarded damages based on the violation of Section 2, gross negligence is enough.

---

[361] KKO: 2004:32, Docket No. S2003/590 (Supreme Court, 29 March 2004).

[362] Haarmann, at 359 (2006).

[363] KKO:2005:105, Rediviva Oy on Fiskars Oyj Abp, Docket No. S2004/489 (Supreme Court, 29 September 2005).

## IX. FRAUD

Sometimes a patent holder who has failed to disclose its rights during the standardization procedure could be charged with fraud. If the case is trialed as a civil case in the U.S. and the claimant is able to prove that the patentee has acted fraudulently the holder has the possibility of recouping his damages, and punitive damages could also be awarded[364]. Even so, it is not easy to succeed with a fraud claim in the U.S. For instance, under Virginia state law, in order to succeed with such an assertion in relation to the failure to disclose, the claimant must present clear and convincing evidence to show that there has been: 1) a false representation (or omission in the face of a duty to disclose), which 2) concerns a material fact, and 3) which has been made intentionally and knowingly and 4) with the intent to mislead. Furthermore, there must be 5) reasonable reliance by the misled party on the misrepresentation, and 6) he must have suffered damages as a result of it. Then again, silence or the withholding of information can only be considered fraud if there has been a duty to disclose that information.[365] The Rambus, Inc v. Infineon Technologies AG et al. case (2003) could be taken as an example of private litigation based on fraud. The background of this case is the same as for the FTC claim based on violation of the FTC Act, Section 5, and the Sherman Act, Section 2.[366]

---

[364] Mueller (2002).

[365] Rambus, Inc. v. Infineon Technologies AG, Infineon Technologies North America, Corp., Infineon Technologies Holding North America, Inc., 318 F.3d 1081, 65 U.S.P.Q.2d 1705 (Fed. Cir., 2003).

[366] Hynix has also accused Rambus of fraud on the basis of California law under which the elements of fraud are: (1) representation, (2) falsity, (3) knowledge of falsity, (4) intent to deceive, and (5) reliance and resulting damage. According to the Court fraudulent deceit occurs where one "willfully deceives another with intent to induce him to alter his position to his injury or risk" and therefore "is liable for any damage which he thereby suffers". A deceit, within the meaning of Cal. Civ.Code § 1709 is, in relevant part, (1) the suggestion, as a fact, of that which is not true, by one who does not believe it to be true and (2) the suppression of a fact, by one who is bound to disclose it, or who gives information of other facts which are likely to mislead for want of communication of that fact.

In this case Hynix claimed that Rambus had a duty to disclose its patent applications and intentions related to obtaining coverage of SDRAM and DDR SDRAM on the basis of a number of factors. Specifically, Hynix asserted that Rambus had a duty to disclose based on (a) the JEDEC patent policy, (b) the "partner" relationship between Rambus and Hynix, (c) Rambus's repeated admissions at the time and during litigation that Rambus had an "obligation" to disclose and should disclose its position the SDRAM and DDR SDRAM infringed, and (d) Rambus's repeated misleading "half-truths" which required full disclosure to avoid deceiving Hynix (*e.g.,* Rambus had told JEDEC and Hynix independently that SyncLink infringed Rambus's patent rights while saying nothing about SDRAM or DDR SDRAM even though Rambus also believed that those products infringed, Rambus had failed to seek royalties under the "Other DRAM" provision of Hynix's license for SDRAM and DDR SDRAM even though it was Rambus's secret claim that those products used Rambus Technology, and Rambus had disclosed the '703 patent while it had failed to disclose the intellectual property that it had believed SDRAM and DDR SDRAM would actually infringe).

According to the Court there are four circumstances in which nondisclosure or concealment may constitute actionable fraud: (1) when the defendant is in a fiduciary relationship with the plaintiff; (2) when the defendant had exclusive knowledge of material facts not known to the plaintiff; (3) when the defendant actively conceals a material fact from the plaintiff; and (4) when the defendant makes partial representations but also suppresses some material fact. Exception (1) was not considered applicable in this case because Rambus was not in a fiduciary relationship with Hynix, but the court could not rule out the possibility that Rambus had a duty to disclose its patents or patent applications based upon Rambus's business and licensing relationship with Hynix. Starting in mid-1994, Rambus and Hynix had namely been in preliminary discussions to enter into a technology license agreement, during which time Hynix's representative had made affirmative statements to Rambus's JEDEC representative of Hynix's beliefs that its manufacture of SDRAMs, potentially including a PLL feature, would not require it to pay royalties to Rambus. Furthermore, the parties had discussed whether SLDRAM might give rise to royalty payments to Rambus. While

The Rambus, Inc v. Infineon Technologies AG (2003) litigation arose when Rambus sued Infineon for infringement of its SDRAM- and DDR-SDRAM-related patents. Infineon counterclaimed that Rambus had violated the Sherman Act (attempted monopolization), and had defrauded Infineon when the company had purposefully failed to disclose its relevant patents and pending patent applications related to the SDRAM and DDR-SDRAM technologies during its membership of JEDEC, and while JEDEC was developing the industry standards. The District Court of Virginia dismissed the antitrust claims on the grounds that Infineon had no proof of the relevant geographic market Rambus was allegedly attempting to monopolize, but partially agreed with respect to the fraud claim: it ruled that Rambus had indeed committed fraud associated with the SDRAM standard. As far as the DDR-SDRAM standard was concerned, the court ruled that since Rambus had resigned from the standards organization prior to its election, no fraud had taken place.[367]

The district court's decision was appealed to the Federal Circuit, which ultimately came to the conclusion that Rambus had not fraudulently failed to disclose its SDRAM-related patents to the standard-setting organization because, after a proper claim construction, it became obvious that the patents did not factually cover the standard. The Federal Circuit interpreted the JEDEC patent policy and how it had been applied, and reasoned that Rambus' duty to disclose its issued and pending patents as a JEDEC member could only be considered to apply to patents/patent applications that contained claims that could reasonably be deemed necessary in order to operate the proposed standard. Furthermore, the court confirmed that there was no subjective element involved in the JEDEC patent policy, and for this reason it did not matter that Rambus had factually wanted to obtain claims that would cover the SDRAM standard, and had believed at the time it was under the disclosure obligation that its pending patents did claim the standard when the ultimate analysis of Rambus' patents revealed that it had no rights that could be deemed reasonably relevant.[368]

---

Rambus responded to Hynix that it was likely that the SLDRAM device would infringe Rambus's patents, they remained silent as to SDRAM and DDR SDRAM.

Hynix also asserted a constructive fraud claim on the basis that "Rambus, as a member of JEDEC, owed a fiduciary duty under JEDEC's patent policy, to disclose to JEDEC and other JEDEC members including Hynix, patents and pending patent applications that might be involved in the work that JEDEC was undertaking with respect to the standardization of SDR SDRAM and DDR SDRAM technology." The Court noted that a claim of constructive fraud requires that the parties "stand in a fiduciary relationship." However, in this case there was no basis for finding that Rambus and Hynix shared a fiduciary relationship solely by virtue of their JEDEC membership. This was because JEDEC is a standard setting body whose goal is to set open standards and avoid standardizing technologies subject to patents. To find that the members in a standard setting organization owed a fiduciary duty to each other would be inconsistent with the purpose of such an organization. When it comes to Hynix's and Rambus's license agremeent that could give rise to a fiduciary relationship, the Court noted that relationships between buyers and sellers of goods and services are generally incompatible with fiduciary obligations, and since the License Agreement contained a clause that explicitly provided that no partnership or joint venture relationship is created by the License Agreement, the License Agreement could not be reasonably construed to be other than a commercial contract. (Hynix Semiconductor Inc., Hynix Semiconductor America, Inc, Hynix Semiconductor U.K. Ltd, and Hynix Semiconductor Deuchland GmbH v. Rambus, Inc, 441 F.Supp.2d 1066 (N.D. Cal 17 July 2006)).

[367] Rambus, Inc. v. Infineon Technologies AG, Infineon Technologies North America, Corp., Infineon Technologies Holding North America, Inc, 318 F.3d 1081, 65 U.S.P.Q.2d 1705 (Fed. Cir. 2003); Lemley, at 66-67 (2002).

[368] Rambus, Inc. v. Infineon Technologies AG, Infineon Technologies North America, Corp., Infineon Technologies Holding North America, Inc,. 318 F.3d 1081, 65 U.S.P.Q.2d 1705 (Fed. Cir. 2003).

When it came to the DDR-SDRAM standard, the Federal Circuit agreed with the district court's ruling and came to the conclusion that the duty to disclose only arose in the context of the formal consideration of a standard and not during discussions held previously, and that in this case JEDEC did not begin the formal work on the successor to SDRAM i.e. the DDR-SDRAM standard, until December 1996: Rambus had formally withdrawn from JEDEC on 17 June 1996. Thus, Rambus was not held to have violated its duty to disclose even though the suggestions it made were ultimately incorporated into the standard. The court further stated that the obligation to disclose did not cover the participant's future plans or intentions, *i.e.* in terms of filing or amending patent applications. In its decision the Federal Circuit also heavily criticized JEDEC's patent policy for its staggering lack of defining details, thereby leaving members with "vaguely defined expectations as to what they believe the policy requires". According to the court, a policy that does not define clearly what, when, how and to whom the members must disclose does not provide a firm basis for the disclosure duty necessary for a fraud verdict.[369]

Basically, success with a fraud allegation in the U.S. depends on whether the company has had an obligation to disclose its rights, whether it has purposefully violated such an obligation, and whether non-disclosure could be considered to create expectations of non-infringement. For this reason, fraud cannot typically be used as a defense in cases involving accidental non-disclosure or in third-party submarine-patent cases.

As far as Europe is concerned, and the possibility of basing one's defense against standard setters' submarine patents on fraud, it should be noted that in Finland, for instance, fraud has been criminalized, and regulations concerning fraud are included in the Penal Code (Chapter 36, Sections 1 - 3). The Finnish Penal Code, Chapter 36, Section 1.1 provides that a person who, in order to obtain unlawful financial benefit for himself or in order to harm another, deceives another or takes advantage of an error of another so as to have this person do something or refrain from doing something, and in this way causes economic loss to the deceived person or to the person whose benefits this person is able to dispose, shall be sentenced for fraud to a fine or to imprisonment for at most two years. Even though this section may appear relevant, juridical persons cannot be charged on this basis.[370] As a consequence, fraud would not be the most prominent grounds for legal action in Finland.

Another situation in which fraud could play a role is in the conclusion of a contract. It is a generally recognized principle under contract law that a contract is not binding if one party has been led to conclude it by the other party's fraudulent representation, whether by word or conduct, or fraudulent non-disclosure of any information that, in accordance with good faith and fair dealing, it should have disclosed. In Finland this principle is incorporated into Section 30 of the Contracts Act without any specification of what constitutes such "fraudulent inducement". The possibility of exiting an agreement on this basis does not appear to be very relevant in this context, however.[371]

---

[369] Rambus, Inc. v. Infineon Technologies AG, Infineon Technologies North America, Corp., Infineon Technologies Holding North America, Inc,. 318 F.3d 1081, 65 U.S.P.Q.2d 1705 (Fed. Cir. 2003).

[370] Hallituksen esitys Eduskunnalle laiksi rikoslain muuttamisesta (HE 2/2003 vp).

[371] Hemmo, at 359-363 (2003a); Commission on European Contract Law, Article 4.107 (2002); UNIDROID, Article 3.8 (1994).

## X. DISCUSSION AND CONCLUSIONS

Patents that read on an interoperability standard and surface after the technology has been adopted without knowledge of lurking rights may, depending on the type and importance of the standard in question, create problems in the marketplace, harming both companies and consumers. These patents do not benefit society either if the information about the invention has not diffused throughout the industry, this being one of the main rationales behind the patent system. Nonetheless, the patent holders' rights are strong, and as a general rule they are in a position to refuse licensing altogether, or to demand as high a licensing fee as they wish, which may ultimately lead to the need to abandon the standard altogether.

As far as cooperative standard-setting coordinated by standards organizations and bodies is concerned, the goal is usually to guarantee that everyone is able to participate in the standardization process, and that everyone is able to implement the elected standard. In order to make sure that a standard could be used as widely as possible, and that compatible products and services could be created, many standardization organizations have written IPR or patent policies that require, or at least encourage, their members and potential non-member participants to disclose all their essential patents, possibly also their pending patent applications, and to make an irrevocable statement that they will waive their essential rights, license them on a royalty-free basis, or on fair, reasonable and non-discriminatory terms (RAND). This guarantees access to the technology, at least in theory, even if the standard incorporated patented technology. On the other hand, in order to diminish patent-related perplexities and to promote openness, patent-free standards are often preferred over patented ones.

Since patent disclosures may negatively affect what technology is chosen for a standard, companies may have an incentive to hide their rights, and thus to manipulate the standardization process in the desired direction. Sometimes, essential rights may also remain unnoticed, even if companies have attempted to do their best in following the practices of the standard-setting organization. Third-party patent rights may pose problems too: patent policies cannot obligate these patent holders to identify their rights, although some of them do prod the members and participants into disclosing their knowledge of potential third-party rights.

It has often been assumed that antitrust (U.S.) and competition (Europe) laws will help in alleviating problems patents may pose in relation to standardization. In reality, neither the Sherman Act nor the EC Treaty seems to provide much help in the submarine-patent dilemma. Only in exceptional circumstances could withholding patent information be regarded as monopolization, attempted monopolization (U.S.), or abuse of dominant position (EU). As to the refusal to license and the essential-facilities doctrine, application is limited in both Europe and the U.S., and only rarely is there a cure to hold-up problems resulting from the rights of standard-setters or third parties. On the other hand, in Europe, requiring overly high licensing fees could be regarded as excessive pricing, and thus as an abuse of dominant position, provided that the patent holder controls a relevant market share. This is not usually the case in the U.S., however, where the starting point is that monopoly pricing does not constitute violation of the Sherman Act.

Then again, the Federal Trade Commission (FTC) Act, Section 5, which prohibits unfair and deceptive business practices in or affecting commerce, could be considered a rather useful tool in combating misleading conduct during standardization. However, even though the threshold for establishing a violation of the FTC Act is lower than that required for the Sherman Act, Section 2

to apply, the recent argumentation presented by the FTC in its rulings has largely followed the latter. Thus, in the end it may be difficult to prove that the company has violated the disclosure obligation and that the behavior has not merely been inadvertent or simply negligent - in other words that there has been material misrepresentation, omission or practice that could be deemed deceptive in the standard-setting context. Furthermore, such practice must have or it must have been likely to cause harm to the competition and ultimately consumers. Unfortunately, there is no equivalent EU-level regulation that would be applicable in similar situations, and national laws regulating unfair business practices deal basically with unfair marketing practices. Even if they were applied if a company failed to disclose its essential rights, the remedy would probably not be sufficient: while the violation of antitrust and competition laws could result in injunctive relief or compulsory licensing and (treble) damages among other things, the Market Court only has the power to prohibit the patentee from continuing an unfair practice. It may also reinforce its decision by imposing a conditional fine, and the district court may award damages if there are especially weighty reasons that speak for such a liability or if the violation has been caused intentionally or in gross negligence, and is thus punishable by law. In sum, antitrust and competition laws, and laws concerning unfair business practices, do offer some help but they do not even come close to solving the problems with submarine patents and standards, particularly where third-party patentees or patent-holding companies failing to disclose their rights accidentally are concerned.

In terms of patent-law-based defenses and offences, regular routes to patent-invalidation and non-infringement declarations are in use. In cases in which submarine patents are held by third parties or standard setters, the doctrine of laches is an available defense in the U.S. and some European countries if there has been unreasonable delay in filing the patent-infringement suit or in patent prosecution. Meanwhile, the applicability of the equitable estoppel and implied license doctrines depends on whether the standard user has had reason to believe that the patent holder does not intend to enforce its rights, or that it has permitted their use. There is no need to show that the patent holder has intended to mislead others willfully in order to plead such a defense, but there does need to be some kind of affirmative statement, action, inaction or silence, provided that there has been an obligation to speak and that the infringer has relied on such conduct. Whether this is the case when the patent holder has failed to disclose its essential rights during the standard setting, be it by accident, negligently or willfully, depends on the patent policy and the practices followed by the standard-setting organization, and on whether the other participants could have thus relied on the patentee's conduct.

In addition to the above, the patent-misuse doctrine could possibly be applied in the U.S. if public welfare was considered to be at stake, such as if the patent holder had willfully abused the standard-setting process. Correspondingly, a compulsory license could be granted in Finland, for instance, if considerable public interest so required. It seems unlikely, however, that the courts would grant a compulsory license on this basis in the context of interoperability standards. This is because considerable public interest has traditionally been interpreted to entail such issues as government security and access to drugs and food. On the other hand, the possibility to be granted a compulsory license on the basis of commercial exploitation of a patented invention or preparations thereof prior to its grant publication could carry some significance at least in theory. Such grant would be justified particularly in situations in which the patentee has not disclosed its rights properly. In case the commercial exploitation or preparations thereof took place before the patent was filed, prior user rights may protect the company from patent holder's actions.

A further means of addressing the submarine-patent problem in the U.S. in cases in which the patent holder has participated in standard setting and has not disclosed his rights would be to accuse the patentee of fraud and to claim accrued damages and punitive damages on that basis. It is not easy to succeed with such a claim, as under the Virginia State Law, for example, there must be clear and convincing evidence of the false representation of a material fact that was made intentionally and knowingly and with the intent to mislead. Furthermore, the misled party must have reasonably relied on such a false representation, and must suffer damages from it. Consequently, fraud can be used effectively as a defense only if there has been a clear obligation to disclose, and the non-disclosure has been purposeful. Then again, the Finnish legislation on fraud is even more toothless: even though it is possible to file a fraud-based claim under the Penal Code, its relevant sections do not apply to juridical persons, and it is clear that the desired results would not be achieved in most cases by charging a private person.

The benefit of enforcing current patent policies and their disclosure obligations in particular as contracts is marginal. Imposing a positive obligation to disclose is not typically sufficient because the problem basically arises after the patent holder has come clean with its rights and begins to enforce them. It is also difficult to construe the damages, and another hurdle in the enforcement of contractual obligations to disclose is that even if the patent policy could be considered to construe a binding and enforceable contract, it has typically been entered into between the standard-setting organization and its members or other participants. Therefore, even if the other members and participants were deemed to be third-party beneficiaries and thus to have a standing to sue, this option would not usually be available to parties uninvolved in setting the standard. In any case, contracts can provide only weak remedies with respect to submarine patents, and they have no role whatsoever when the patent holder is a third party. Thus, the legal tools illustrated further in Appendices 2.1 – 2.3 are limited, and are applicable mainly if the patentee has breached the patent policy by intentionally concealing the existence of its essential rights.

Is there then a need to patch up the legal framework that is applicable to solving the problems with submarine patents and standards? As I have illustrated in the Background section and in the sections entitled, "The Main Causes of Submarine-patent Problems and Ways of Reducing Them" and "Recent Policy Considerations with Respect to Intellectual Property Rights and Interoperability", the question involves multiple dimensions. First of all, general improvements in the patent system that might help in overcoming some of the difficulties of finding out about relevant patents beforehand would be welcome, and they would also be likely to diminish the risk of submarine patents irrespective of who the patent holder is. Furthermore, limiting the issuance of preliminary and permanent injunctions when the patent holder is a patent-trolling company is also likely to be helpful because these are the companies that are the most likely candidates for creating severe problems with respect to open standards: other companies are in many cases highly dependent on one another and may therefore be able to reach consensus sooner. Secondly, with proper interpretation of the prevailing statutes it would be possible to effectively discourage the abuse of the standard-setting procedure provided that the standard-setting organizations took care of developing clearer policies and better contract structures. For instance in situations in which the patent subject to litigation reads on a standard and the patent holder has taken part in the standardization and has not operated in accordance with the rules of the standard setting organization, this factor could be taken into account when determining whether an injunctive order is in place or whether the remedy should be limited to reasonable remuneration affirmed by the court.

The magnitude of economic and societal losses is influenced by the standard in question. Standards which are constantly developed and modified after their original publication are not as problematic as standards which maintain their main characteristics their entire life. Also the economic effects of different types of standards and their effective lives vary influencing the severity of the problem. The magnitude of the losses depend on whether essential rights are noticed during the standard setting, immediately after publication of the technical specifications, or after the standard is being widely used and it has ceased to be feasible to change to another technology or to circumvent the infringement by modifying the standard later on. Therefore, in addition to making general improvements that would help to alleviate the submarine-patent problem, there is a need to focus particularly on the last-mentioned situations, and to improve the possibilities of issuing a compulsory license the terms of which are determined by the courts or holding a patent unenforceable if doing so would serve the public interest.

Since the submarine-patent dilemma is mainly the product of an unbalanced patent system, the appropriate medium for such a possibility would be the patent law itself, even though a stricter, but still properly balanced, approach against the anti-competitive use of patent rights claiming interoperability standards by a dominant company could also be implemented. Therefore, I would not object the idea of allowing patent-law based compulsory licensing in situations that concern interoperability and in which the issuance of a license is in the public interest as was suggested in relation to the late software patent directive proposal. Similarly, implementation of some kind of a equitable estoppel doctrine into the European patent laws could prove beneficial.

To avoid misunderstandings, it should be elaborated that I am not purporting a compulsory license that could be awarded in all types of situations involving interoperability concerns and being in the public interest one way or another, but rather a carefully structured tool to avoid serious economic and societal losses that could result from submarine patents. The patent holder's ability to protect his rights and benefit from them should not be impeded more than necessary. It should further be noted that in reality such inclusion might have only minimal applicability, because the process for being granted a compulsory license is burdensome and the license is only valid in the country in question. On the other hand, the possibility might influence the patentees' actions during and after standard setting and thus have practical significance.

## References

### Books

Aimo O. Aaltonen, *Sopimattomasta menettelystä elinkeinotoiminnassa* (Suomalaisen Lakimiesyhdistyksen julkaisuja, B-sarja. N:o 198, 1985).

Mikko Alkio & Christian Wik, *Kilpailuoikeus* (Talentum 2004).

Philip E. Areeda & Herbert Hovenkamp, *Fundamentals of Antitrust Law* (Aspen Publishers, 3rd edition, 2005).

H.G. Beale (General ed.) *Chitty on Contracts, Volume 1, General Principles* (The Common Law Library, Sweet & Maxwell 2004).

Christopher Bellamy & Graham Child, *European Community Law of Competition* (Sweet & Maxwell, 5th edition, 2001).

Knut Blind, *The Economics of Standards, Theory, Evidence, Policy* (Edward Elgar 2004).

Henry Chesbrough, *Open Innovation. The New Imperative for Creating and Profiting from Technology* (Harvard Business School Press 2003).

Donald S. Chisum, Craig A. Nard, Herbert F. Schwartz, Pauline Newman & F. Scott Kieff, *Principles of Patent Law, Cases and Materials* (Foundation Press, 3rd edition, 2004).

T. Anthony Downes*, Textbook on Contracts* (Blackstone Press Limited 1987).

Alan L. Durham*, Patent Law Essentials. A Concise Guide* (Quarum books 1999).

Josef Falke, *Rechtliche Aspecte der Normung in der EG-Mitgeliedstaatedn und der EFTA* (Band 3: Deutchland, European Communities 2000).

William F. Fox, Jr, *International Commercial Agreements, A Primer on Drafting, Negotiating and Resolving Disputes* (Kluwer Law International, 3rd edition, 1998).

Michael Furmston, *Law of Contract* (Butterworths LexisNexis, 14th edition, 2001).

Ove Granstrand, *The Economics and Management of Intellectual Property, Towards Intellectual Capitalism* (Edward Elgar 1999).

Roger E. Grant*, Contemporary Strategy Analysis*, at 345 (Blackwell Publishing, 5th edition, 2005).

Peter Grindley, *Standards, Strategy and Policy* (Oxford 1995, reprinted 2002).

Pirkko-Liisa Haarmann, *Immateriaalioikeus* (Talentum 2006).

Kristiina Harenko, Valtteri Niirainen & Pekka Tarkela, *Tekijänoikeus -kommentaari ja käsikirja* (WSOYpro 2006).

Christopher Heath & Laurence Petit (eds), *Patent Enforcement Worldwide*, *A Survey of 15 Countries* (IIC Studies, Vol 23, 2005).

- Fritz Blumer, *The Enforcement of Patent Rights in Switzerland*, 205-229.
- Christopher Heath, *Comparative Overview and the TRIPS Enforcement Provisions*, 5-65.
- Hans Marshall, *The Enforcement of Patent Rights in Germany*, 109-138.

Keijo Heinonen, *Innovaatio-oikeus* (Edita 1999).

Mika Hemmo, *Sopimusoikeus I* (Talentum 2003a).

Mika Hemmo, *Sopimusoikeus II* (Talentum 2003b).

Pia Hurmelinna-Laukkanen, *Dynamics of Appropriability – Finding a Balance between Efficiency and Strength in the Appropriability Regime* (Acta Universitatis Lappeenrantaensis 228, 2005).

Adam B. Jaffe & Josh Lerner, *Innovation and Its Discontent,. How Our Broken Patent System Is Endangering Innovation And Progress, And What to Do about It* (Princeton University Press 2004).

H. Jackson Knight, *Patent Strategy for Researchers and Research Managers* (John Wiley & Sons, Inc 2001).

Laurence Koffman & Elizabeth Macdonald, *The Law of Contract* (Tolley, 4th edition, 2001).

Morgens Koktvedgaard & Marianne Levin, *Lärobok i Immaterialrätt* (Norstedts Juridik AB, 6th edition, 2002).

Valentine Korah, *Intellectual Property Rights and the EC Competition Rules* (Hart Publishing 2006).

William M. Landes & Richard A. Posner, *The Economic Structure of Intellectual Property Law* (The Bellknap Press of Harvard University Press 2003).

Robert P. Merges & John F. Duffy, *Patent Law and Policy: Cases and Materials* (LexisNexis, 3rd edition, 2002).

Robert P. Merges, Peter S. Menell & Mark A. Lemley, *Intellectual Property in the New Technological Age* (Aspen Publishers 2003).

David G. Messerschmitt & Clemens Szyperski, *Software Ecosystem* (The MIT press 2003).

Anthony Miele, *Patent Strategy: The Manager's Guide to Profiting from Patent Portfolios* (John Wiley & Sons, Inc 2000).

Kalle Määttä, *Oikeustaloustieteen aakkoset* (Helsingin yliopiston oikeustieteellisen tiedekunnan julkaisut 1999).

Marcus Norrgård, *Intermistiska förbud i immaterialrätten* (Kauppakaari 2002).

Rainer Oesch & Heli Pihlajamaa, *Patenttioikeus, Keksintöjen suoja* (Talentum 2003).

Jechen Pagenberg & William R. Cornish (ed), *Interpretation of Patents in Europe, Application of Article 69 EPC* (Carl Heymanns Verlag 2006).

Ilkka Rahnasto, *Intellectual Property Rights, External Effects, and Anti-trust Law* (Oxford University Press 2003).

Jan Ramberg & Christina Hultmark, *Allmän avtalsrätt* (Norsteds Juridik AB, 5th edition, 2000).

Kevin G. Rivette & David Kline, *Rembrants in the Attic. Unlocking the Hidden Value of Patents* (Harvard Business School Press 2000).

Ari Saarnilehto, *Sopimusoikeuden perusteet* (Talentum 2005).

Roger E. Schechter & John R. Thomas, *Intellectual Property, The Law of Copyrights, Patents and Trademarks* (Handbook Series, Thomson West 2003).

Harm Schepel & Josef Falke, *Legal Aspects of Standardisation in the Member States of the EC and EFTA* (Vol 1, Comparative report, European Communities 2000).

Harm Schepel & Josef Falke, Legal Aspects of Standardisation in the Member States of the EC and EFTA (Vol 2 ,Country Reports, European Communities 2000)

- Marja-Leena Mansala, *Legal Aspects of Standardisation in Finland,* 175-229.
- Jeanne Champigneulle Mihailov, *Les aspects juridiques de la normalisation en droit francais,* 231-322.

Suzanne Scotchmer, *Innovation and Incentives* (The MIT Press 2004).

Carl Shapiro & Hal R. Varian, *Information Rules* (Harvard Business School Press 1999).

John Smith, *The Law of Contract* (Sweet & Maxwell, 4th edition, 2002).

David J. Teece, *Managing Intellectual Capital* (Oxford University Press 2000).

Guy Tritton, Richard Davis, Michael Edenborough, James Graham, Simon Malynicz & Asley Roughton, *Intellectual Property in Europe* (Sweet & Maxwell 2002).

Ian Walden & John Angel, *Telecommunications Law and Regulation* (Oxford 2005).

- Alan Cunningham, *Telecommunications, Intellectual Property, and Standards,* 341-375.
- Ian Walden, *The International Regulatory Regime*, 463-500.

## Research Papers and Journals

David A. Balto & Andrew M. Wolman, *Intellectual property and Antitrust: General Principles* (IDEA The Journal of Law and technology, Vol. 43, Number 3, 2003).

Roger D. Blair & Thomas F. Cotter, *Strict Liability and Its Alternatives in Patent Law* (Berkeley Technology Law Journal, Vol. 17, Issue 2, Spring 2002), <http://btlj.boalt.org/data/articles/17-2_spring-2002_blair.pdf> (last visited 3/1/07).

Julie E. Cohen, *Reverse Engineering and the Rise of Electronic Vigilantism: Intellectual Property Implications of "Lock-Out" Programs* (Southern California Law Review, Vol 68, 1995, 1091-1202).

Julie E. Cohen & Mark A. Lemley, *Patent Scope and Innovation in the Software Industry* (California Law Review, Vol 89, Number 1, 2001).

Wesley M. Cohen, Richard R. Nelson & John P. Walsh, *Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not*) (NBER Working Paper Series, Working Paper 7552, 2000).

M.A. Cunningham, *Preliminary Injunctive Relief in Patent Litigation* (IDEA: The Journal Of Law and Technology, No 2, 1995), <http://www.idea.piercelaw.edu/articles/35/35_2/7.Cunningham.pdf> (last visited 18/1/07).

Michal S. Gal, *Monopoly Pricing as an Antitrust Offense in the U.S. and the EC: Two Systems of Belief about Monopoly?* (Antitrust Bulletin, New York University Law and Economics Research Paper Series, Working Paper No. 04-01, 2004), <http://law.haifa.ac.il/faculty/lec_papers/gal/mgal_excessive_pricing.pdf> (last visited 28/1/07).

Diana Good, *How Far Should IP Rights Give Way to Standardisation: The Policy Positions of ETSI and the EC* (European Intellectual Property Review, Vol 14, Number 9, 1992, 295-297).

Robert W. Hahn, *A Primer on Competition Policy and the New Economy* (AEI-Brookings Joint Center for Regulatory Studies, Working paper No 01-3, 2001), <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=286918> (last visited 28/12/06).

Bronwyn H. Hall & Rosemarie Ham Ziedonis, *The Patent Paradox Revisited: An Empirical Study of patenting in the U.S. Semiconductor Industry, 1979-1995* (RAND Journal of Economics, Vol 32, Number 1, Spring 2001, 101-128).

John Hudson & Philip Jones, *Measuring the efficiency of stochastic signals of product quality* (Information Economics and Policy, Vol 13, Issue 1, 2001, 35-49).

Philip Jones & John Hudson, *Standardization and the costs of assessing quality* (European Journal of Political Economy, Vol 12, Issue 2, 1996, 355-361).

Samuel Kortum & Josh Lerner, *What is Behind the Recent Surge in Patenting* (Research Policy, Vol 28, Number 1, 1999, 1-22).

Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations* (Boalt Hall Working Papers in Public Law, Paper 24, 2002), <http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1027&context=boaltwp> (last visited 28/12/06).

Mark A. Lemley & Kimberly A. Moore, *Ending Abuse of Patent Continuations* (Law and Economics Working Paper Series, Paper No. 03-52. George Mason University School of Law, 2003).

Gregory V. S. McCurdy, *Intellectual Property and Competition: Does the Essential Facilities Doctrine Shed Any New Light?* (European Intellectual Property Review, Volume 25, Issue 10, 2003, 472-480)

Robert P. Merges, *As Many as Six Impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform* (Berkeley Technology Law Journal, Vol 14, 1999, 577-615).

Kimberly A. Moore, *Judges, Juries and Patent Cases - An Empirical Peek Inside the Black Box* (Michigan Law Review, Vol. 99, 2000, 365-409)

William A. Morrisson, *The Impact of the Creation of the Court of Appeals for the Federal Circuit on the Availability of Preliminary Injunctive Relief Against Patent Infringement* (Indiana Law Review, Vol 23, 1990).

Janice M. Mueller, *Patent Misuse Through the Capture of Industry Standards* (Berkeley Technology Law Journal, Volume 17, Issue 2, Spring 2002), <http://btlj.boalt.org/data/articles/17-2_spring-2002_mueller.pdf>(last visited 28/1/07).

Ulla-Maija Mylly, *Yhteentoimivuus – yhteinen päämäärä? Näkökohtia edesmenneestä ohjelmistopatenttidirektiiviehdotuksesta* (In Ari Saarnilehto (ed.). *Teollisoikeudellisia kirjoituksia VII*, Turun yliopiston oikeustieteellisen tiedekunnan julkaisuja, Yksityisoikeuden sarja A:115, 2006, 35-78).

Marcus Norrgård, *Väliaikaiset kiellot patenttioikeudessa* (Defensor Legis, No 6, 2004, 1063-1079).

Robert Pitofsky, *Antitrust and Intellectual Property: Unresolved Issues at the Heart of the New Economy* (Berkeley Technology Law Journal, Vol 16, Number 2, Spring 2001).

Robert Pitofsky, Donna Patterson & Jonathan Hooks, *The Essential facilities Doctrine under U.S. Antitrust Law* (Antitrust Law Journal, Vol 70, 2002, 443-462).

Richard A. Posner, *Antitrust in the New Economy* (University of Chicago Law & Economics, Olin Working Paper No. 106, 2000).

Tapio Rantala, *Kohtuullisen käyttökorvauksen määrittäminen patentinloukkaustilanteessa* (Defensor Legis, Number 2, 2005, 284-302).

Pamela Samuelson & Suzanne Scotchmer, *The Law and Economics of Reverse Engineering*, at 30-35 (Yale Law Journal, Vol 111, 2002).

Mark Shurmer & Gary Lea, *Telecommunications Standardization and Intellectual Property Rights: a Fundamental Dilemma?* (StandardView, Vol 3, No 2, June 1995).

Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools and Standard Setting* (2001), <http://faculty.haas.berkeley.edu/shapiro/thicket.pdf> (last visited 28/12/06).

Aura Soininen, *Patents and Standardization in the ICT Sector: Are Submarine Patents a Substantive Problem or a Red Herring?* (International Journal of IT Standards & Standardization Research, Vol 5, Issue 1, January-June 2007, 41-83).

Aura Soininen, *The Software and Business-Method Patent Ecosystem: Academic, Political, Legal and Business Developments in Europe and the U.S.*(IPR Series B, Number 1, 2005b).

Roger Tuckett, *Access to Public Standards: Interoperability Revisited* (European Intellectual Property Review, Vol 14, Number 12, 1992, 423-427).

Lennarth Törnroth, *Datorprogram och patentskydd - utvecklingen av svensk rättspraxis i belysning av främst EPO-praxis* (Nordiskt Immateriellt Rättskudd, No 1, 1999, 86-98).

J.J.S Watts & B. Baigent, *Intellectual Property, Standards and Competition Law: Navigating a Minefield*, at 837 (IEEE, 2002, 837-842).

## Studies and Reports

*A Year in the Life of a High Tech Standard Setting Organization, Section of Antitrust Law* (2002).

- Mark A. Flagel & Michael J. Lawrence, *Strategic Considerations when Asserting Defenses against a Claim for Infringement of a Patent that Reads on an Industry Standard,* 43-63.
- Richard S. Taffet, *Patented Technology and Standard Setting: A standards development organization view*, 5-29.
- Joseph P. Lavelle & Melissa J. Gunthner, *Standard Setting Activity Offensive Claims*, 30-45.

Knut Blind, Rainer Bierhals, Nikolaus Thumm, Kamal Hossain, John Sillwood, Eric Iverser, Rik van Reekum, & Bruno Rixius, *Study on the Interaction between Standardisation and Intellectual Property Rights* (EC Contract No G6MA-CT-2000-02001, 2002), <http://www.isi.fraunhofer.de/p/Downloads/kb_final_report.pdf> (last visited 28/12/06).

- Eric Iversen, *The Relationship between IPR and Standard Development Organisations,* 40-55
- Knut Blind & Nikolaus Thumm, *Survey of the Relationship between IPR and Standardisation and Contractual Problems in RTD Projects*, 59-82.

FTC, *To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy* (2003), <http://www.ftc.gov/os/2003/10/innovationrpt.pdf> (last visited 29/12/06).

EC, *Commission Evaluation Report on the Transfer of Technology Block Exemption Regulation No 240/96. Technology Transfer Agreements under Article 81* (En COMP/REG. 240/96, 2001), <http://ec.europa.eu/comm/competition/antitrust/technology_transfer/en.pdf> (last visited 14/1/07).

Robert Hart, Peter Holmes & John Reid, *The Economic Impact of Patentability of Computer Programs* (Report to the European Commission, Study Contract ETD/99/B5-3000/E/106, 2000).

Kati Lassila, *Ekvivalenssiselvitys Suomessa ja muissa maissa* (KTM Julkaisuja, 22/2004 Elinkeino-osasto, 2004) <http://ktm.elinar.fi/ktm_jur/ktmjur.nsf/0/D8904795875D9F1DC2256ECB0030C75B/$file/jul22elo_2004.pdf> (last visited 29/12/06).

NAS, *A Patent System for the 21st Century* (April 2004), <http://www.nap.edu/books/0309089107/html/> (last visited 18/9/06).

G. M. Peter Swann, *The Economics of Standardization* (Final report for Standards and Technical Regulations, Directorate Department of Trade and Industry, University of Manchester 2000), <http://www.dti.gov.uk/files/file11312.pdf> (last visited 3/1/07).


## Magazines


Amit Asaravala, *Forgent Sues Over JPEG Patent* (Wired News, 24 April 2004), <http://www.wired.com/news/business/0,1367,63200,00.html> (last visited 28/12/06).

David Berlind, *IBM drops Internet Patent Bombshell* (ZDNet.com, 16 April 2002a), <http://techupdate.zdnet.com/techupdate/stories/main/0,14179,2861528,00.html> (last visited 28/12/06).

David Berlind, *The Hidden Toll of Patents on Standards* (ZDNet.com, 25 April 2002b) <http://news.zdnet.com/2100-9595_22-891852.html> (last visited 28/12/06).

Richard Clark, *Concerning Recent Patent Claims* (JPEG, 19 July 2002), <http://www.jpeg.org/newsrel1.html> (last visited 28/12/06).

Robin Cover (Ed), *Patents and Open Standards* (Cover Pages, 2006), <http://xml.coverpages.org/patents.html#examples> (last visited 27/7/06).

Paul Devinsky & Stephen A. Becker, *USPTO to Bar: We Are Drowning in Continuation* (IPFrontline.com, 4 April 2006), <http://www.ipfrontline.com/depts/article.asp?id=10240&deptid=4> (last visited 5/7/06).

Paul Festa, *Web patent critics spotlight old technology* (CNET News.com. 31 October 2003), <http://news.com.com/Web+patent+critics+spotlight+old+technology/2100-1028_3-5100693.html?tag=nl> (last visited 28/12/06).

Nancy Gohring, *Qualcomm Files a Second Suit against Broadcom* (InfoWorld, 21 October 2005), <http://www.infoworld.com/article/05/10/21/HNqualcommsecondsuit_1.html> (last visited 8/3/06).

Matthew Hicks, *JPEG Hits New Patent-Infringement Snag* (Eweek.com 22 April 2004), <http://www.eweek.com/article2/0,1759,1572323,00.asp> (last visited 6/9/06).

Jessica Holzer, *Supreme Court Buries Patent Trolls* (Forbes.com 16 May 2006), <http://www.forbes.com/home/businessinthebeltway/2006/05/15/ebay-scotus-patent-ruling-cx_jh_0516scotus.html> (last visited 18/1/07).

Eric D. Kirsch, *International Standards Participation: Lessons from Townshend & Dell* (International lawyers network, The bullet"iln", Vol 1, Issue 2, 2000), <http://www.ag-internet.com/push_news_one_two/internationalstandards.htm> (last visited 28/12/06).

Robert Lemos, *Finding Patent Truth in JPEG Claims* (CNET News.com, 23 July 2002), <http://news.com.com/Finding+patent+truth+in+JPEG+claim/2100-1001_3-945686.html> (last visited 28/12/06).

Steve Malone, *Microsoft loses Eolas Supreme Court appeal* (PC Pro, 1 November 2005), <http://www.pcpro.co.uk/news/news/79431> (last visited 28/12/06).

Steve Malone, *US Patent Office upholds Eolas patent* (PCPRO, 30 September 2005), <http://www.macuser.co.uk/macuser/news/hot-topics/news/78163> (last visited 1/1/07).

John Markoff, *Patent Claim Strikes an Electronics Nerve* (The New York Times, 29 July 2002).

Adrian Mello, *Will Patent Disputes Spoil the Web's Success?* (ZDNet, 11 April 2002), <http://techupdate.zdnet.com/techupdate/stories/main/0,14179,2861091,00.html> (last visited 28/12/06).

M. Howard Morse, *Standard Setting and Antitrust: The Intersection Between IP Rights and the Antitrust Laws* (IP Litigator, May/June 2003, 17-25).

James Niccolai, *Patent Office Rejects Forgent's JPEG Claims*, *Forgent to Appeal USPTO's Decision to Reject 19 of the 47 Claims in a JPEG-related Patent* (IDG News Service, InfoWorld, 30 May 2006), <http://www.infoworld.com/article/06/05/30/78731_HNjpegpatents_1.html> (last visited 1/1/07).

Jennifer Reingold, *Patently Aggressive* (Fast Company, Issue 102, January 2006), <http://www.fastcompany.com/magazine/102/patents.html> (last visited 28/12/06);

Red Herring, *JPEG Patent Reexamined* (Red Herring, 3 February 2006), <http://www.redherring.com/Article.aspx?a=15582&hed=JPEG+Patent+Reexamined&sector=Industries&subsector=Computing> (last visited 28/12/06).

Lisa Rein, *The W3C, P3P and the Intermind Patent* (XML.com 3 November 1999), <http://www.xml.com/pub/a/1999/11/p3p/index.html> (last visited 28/12/06).

Ronald J. Riley, *Pressure on the American Patent System, Part 2: The Real Cause of Submarine Patents* (About.com), <http://inventors.about.com/library/weekly/aa072897.htm> (last visited 27/12/06).

Wylie Wong, *IBM ebXML Patent Plan Royalty-free* (ZDNet.com, 18 April 2002), <http://techupdate.zdnet.com/techupdate/stories/main/0,14179,2861940,00.html> (last visited 28/12/06).

## Standardization Organizations

ANSI, *About ANSI Overview* (year n/a), <http://www.ansi.org/about_ansi/overview/overview.aspx?menuid=1> (last visited 14/1/07).

ANSI, *ANSI Essential Requirements: Due process requirements for American National Standards / ANSI Patent Policy* (2006), <http://public.ansi.org/ansionline/Documents/Standards%20Activities/American%20National%20Standards/Procedures,%20Guides,%20and%20Forms/ER0106.doc> (last visited 14/1/07).

ANSI, *Guidelines for Implementation of the ANSI Patent Policy* (2003), <http://publicaa.ansi.org/sites/apdl/Documents/Standards%20Activities/American%20National%20Standards/Procedures,%20Guides,%20and%20Forms/PATPOL.DOC> (last visited 14/1/07).

ETSI, *ETSI Guide on Intellectual Property Rights* (2006b), <http://www.etsi.org/legal/documents/ETSI_Guide_on_IPRs.pdf> (last visited 14/1/07).

ETSI, *ETSI Rules of Procedure / ETSI IPR Policy* (2006a), <http://www.etsi.org/legal/documents/ETSI_IPRPolicy.pdf> (last visited 14/1/07).

ETSI, *Official Application Form for Full Membership* (year n/a), <http://www.etsi.org/about_etsi/membership/documents/FULL_MEMBERSHIP.DOC> (last visited 15/1/07).

ETSI, *Why should I join ETSI?* (2004), <http://www.etsi.org/about_etsi/membership/home.htm> (last visited 27/12/06).

ETSI, *Who is ETSI?* (year n/a), <http://www.etsi.org/about_etsi/5_minutes/home.htm> (last visited 14/1/07).

IETF, *A Mission Statement for the IETF* (2004), <http://www.ietf.org/rfc/rfc3935.txt> (last visited 14/1/07).

IETF, *Intellectual Property Rights in IETF Technology* (2005), <http://www.ietf.org/rfc/rfc3979.txt> (last visited 14/1/07).

IETF, *Overview of the IETF* (year n/a), <http://www.ietf.org/overview.html> (last visited 14/1/07).

ITU-T, *Common Patent Policy for ITU-T/ITU-R/ISO/IEC* (year n/a), <http://www.itu.int/ITU-T/dbase/patent/patent-policy.html> (last visited 14/1/07).

ITU-T, *General Information on ITU-T* (year n/a), <http://www.itu.int/ITU-T/info/itu-t/info.html> (last visited 14/1/07).

ITU-T, *Guidelines for Implementation of ITU-T Patent Policy* (2005), <http://www.itu.int/ITU-T/dbase/patent/files/glp20051102.pdf> (last visited 14/1/07).

JEDEC, *About JEDEC* (year n/a), <http://www.jedec.org/Home/about_jedec.cfm> (last visited 14/1/07).

JEDEC, *The JEDEC Patent Policy* (2003), <http://www.jedec.org/home/patent_related/JEDEC_Patent_Policy_Stmt.pdf> (last visited 14/1/07).

Amy A. Marasco (ANSI), *IPR and Standards* (Presentation at AIPLA, 30 October 2003).

OASIS, *About OASIS* (year n/a) <http://www.oasis-open.org/who/> (last visited 14/1/07).

OASIS, *OASIS Intellectual Property Rights (IPR) Policy* (2005a), <http://www.oasis-open.org/who/intellectualproperty.php> (last visited 14/1/07).

OASIS, *Membership Application and Agreement* (2005b), <http://www.oasis-open.org/join/membership-agreement.pdf> (last visited 15/1/07).

VESA, *Intellectual Property Rights (IPR) Policy* (2005), <http://www.vesa.org/Policies/VP200B.pdf> (last visited 14/1/07).

VESA, *Membership and Committee Application* (2006), <http://www.vesa.org/Join/memapp3.pdf> (last visited 15/1/07).

VESA, VESA Organization (yean n/a), <http://www.vesa.org/Organization/index.htm> (last visited 14/1/07).

W3C, *About W3C* (year n/a), <http://www.w3.org/Consortium/> (last visited 14/1/07).

W3C, *World Wide Web Consortium Presents US Patent Office with Evidence Invalidating Eolas Patent* (29 October 2003), <http://www.w3.org/2003/10/28-906-briefing.html.en> (last visited 1/1/2007).

W3C, *World Wide Web Consortium Clears Patent Hurdle for Web Privacy* (28 October 1999), <http://www.w3.org/1999/10/28-P3P-IntermindPatentAnalysis-PressRelease.html> (last visited 28/12/06).

W3C, *Member Agreement* (2005), <http://www.w3.org/2005/03/Member-Agreement> (last visited 15/1/07).

W3C, *Patent Policy* (2004), <http://www.w3.org/Consortium/Patent-Policy-20040205/> (last visited 14/1/07).

## Conferences and Work Shops

DOJ/FTC, *Hearings on: Competition and Intellectual Property Law and Policy in the Knowledge Based Economy, Standard Setting* (18 April 2002).

- Ian S. Forrester, *Competition and Intellectual Property Law and Policy in the Knowledge-Based economy: Comparative Law Topics* (Presentation, DOJ/FTC Hearings, Washington, D.C, 22 May 2002).
- John T. Lang, *Compulsory Licensing of Intellectual Property in European Community Antitrust Law* (For the DOJ/FTC Hearings, Washington D.C. May 2002), <http://www.ftc.gov/opp/intellect/020522langdoc.pdf> (last visited 30/1/07).
- Allen M. Lo (Jupiter Networks, Inc), *A Need for Intervention: Keeping Competition Alive in the Networking Industry in the Face of Increasing Patent Assertions Against Standards* (FTC/DOJ Hearings on Competition and Intellectual Property Law and Policy In the Knowledge-based Economy – Standard Setting and Intellectual Property, 18 April 2002).
- Scott. K Peterson (Hewlett-Packard Company), *Consideration of Patents during the Setting of Standards,* at 1 (for FTC and DOJ Roundtable, *Standard setting Organizations: Evaluating the Anticompetitive Risks of Negotiating IP Licensing Terms and Conditions Before A Standard Is Set*, 6 November 2002, 2002a), <http://www.ftc.gov/opp/intellect/021106peterson.pdf> (last visited 28/12/06).

Maurits Dolmans, *Standards for Standards* (Paper for American Bar Association, Section of Antitrust Law, Spring meeting 2002), <http://www.ftc.gov/opp/intellect/020522dolmans.pdf> (last visited 28/1/07).

Björn Hjelm, *Standards and Intellectual Property Rights in Age of Global Communications – A Review of the International Standardization of Third Generation Mobile System* (Fifth IEEE Symposium Computers and Communications, Antibus-Juan Les Pins, France, 3-6 July 2000), <http://arxiv.org/ftp/cs/papers/0109/0109105.pdf> (last visited 18/9/06).

Aura Soininen, *Open Standards and the Problem with Submarine Patents* (Proceedings of the 4th International Conference on Standardization and Innovation in Information Technology (SIIT2005), 21-23 September 2005, Geneva, Switzerland, 2005a, 231-244).

## Regulatory and Governmental Materials, Other Official Organizations

Betenkning angående Nordisk patentlovgivning (NU 1963:6).

Commission on European Contract Law, *The Principles of European Contract Law/ Lex Mercatoria* (2002), <http://www.jus.uio.no/lm/eu.contract.principles.parts.1.to.3.2002/doc#228> (last visited 11/1/2007).

Committee on Legal Affairs, II Recommendation for Second reading, <Titre>on the Council common position for adopting a directive of the European Parliament and of the Council on the patentability of computer-implemented inventions </T<DocRef>(11979/1/2004 – C6-0058/2005 – 2002/0047(COD)) F</DocRef><RefStatINAL</RefStatus>, A<NoD6-0207/2005, 21 June 2005) <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+REPORT+A6-2005-0207+0+DOC+WORD+V0//EN&language=EN> (last visited 22/1/07).

Council Directive 91/250/EEC of 14 May 1991 on the legal protection of computer programs.

Council Directive 2004/48/EC of the European Parliament and of the Council of 29 April 2004 on the enforcement of intellectual property rights.

Council Directive 2005/29/EC of the European Parliament and of the Council of 11 May 2005 concerning unfair business-to-consumer commercial practices in the internal market and amending Council Directive 84/450/EEC, Directives 97/7/EC, 98/27/EC and 2002/65/EC of the European Parliament and of the Council and Regulation (EC) No 2006/2004 of the European Parliament and of the Council ('Unfair Commercial Practices Directive').

Council of ministers, Common Position (EC) No 20/2005 of 7 March 2005 adopted by the Council, acting in accordance with the procedure referred to in Article 251 of the Treaty establishing the European Community, with a view to adopting a Directive of the European Parliament and of the Council on the patentability of computer-implemented inventions (2005).

DOJ/FTC, *Antitrust Guidelines for the Licensing of Intellectual Property* (1995), <http://www.ftc.gov/bc/0558.pdf> (last visited 27/7/06).

EPO, *Guidelines for Examination in the European Patent Office* (2005), <http://www.european-patent-office.org/legal/gui_lines/e/index.htm> (last visited 14/1/07).

European Commission, *DG Competition Discussion Paper on the Application of Article 82 of the Treaty to Exclusionary Abuses* ("Discussion Paper", 2005).

European Commission, *Guidelines on the Applicability of Article 81 of the EC Treaty on Horizontal Cooperation Agreements* (Official Journal C 003, 6 January 2001).

European Parliament, *Report on the Proposal for a Directive of the European Parliament and of the Council on the Patentability of Computer-implemented Inventions* (COM (2002)92 – 5C-0082/2000 – 2002/0047 (COD), <RefStatus>FINAL,</RefStatus> <NoDocSe>A5-0238/2003, 18 June 2003). <RefStatus></RefStatus><

FTC, *FTC Policy Statement on Deception* (14 October 1983) <http://www.ftc.gov/bcp/policystmt/ad-decept.htm> (last visited 5/1/07).

Hallituksen esitys Eduskunnalle Eurooppapatenttien myöntämisestä tehdyn yleissopimuksen uudistamiskirjan ja patenttilakisopimuksen hyväksymisestä ja laeiksi sopimusten lainsäädännön alaan kuuluvien määräysten voimaansaattamisesta sekä patenttilain muuttamisesta (HE 92/2005 vp).

Hallituksen esitys Eduskunnalle laeiksi sopimattomasta menettelystä elinkeinotoiminnassa ja markkinatuomioistuimesta annetun lain muuttamisesta (HE 114/1978 vp.).

Hallituksen esitys Eduskunnalle laeiksi teollis- ja tekijänoikeuksia koskevan lainsäädännön muuttamisesta (HE 26/2006 vp.).

Hallituksen esitys Eduskunnalle laiksi tekijänoikeuslain ja tekijänoikeuslain muuttamisesta annetun lain voimaantulosäännöksen 2 momentin muuttamisesta (HE 211/1992 vp).

Hallituksen esitys Eduskunnalle laiksi patenttilain muuttamisesta (HE 139/1979 vp).

Hallituksen esitys Eduskunnalle patenttilain 3 §.n muuttamisesta (HE 225/2005 vp.).

Hallituksen esitys Eduskunnalle patenttilainsäädännön uudistamisesta (HE 101/1966 vp.).

Hallituksen esitys Eduskunnalle laiksi rikoslain muuttamisesta (HE 2/2003 vp.).

OECD, *Compendum of Patent Statistics* (2005), <http://www.oecd.org/dataoecd/60/24/8208325.pdf> (last visited 13/6/06);

UNIDROIT, *Principles of International Commercial Contracts / Lex Mercatoria* (1994), <http://www.jus.uio.no/lm/unidroit.international.commercial.contracts.principles.2004/> (last visited 11/1/2007).

WIPO, *Standards, Intellectual Property Rights and Standards-setting Process,* <http://www.wipo.int/sme/en/documents/ip_standards.htm> (last visited 6/12/2006).

WTO, *TRIPS and Health, Frequently Asked Questions, Compulsory licensing of pharmaceuticals and TRIPS* (2005) <http://www.wto.org/English/tratop_e/trips_e/public_health_faq_e.htm> (last visited 2271/07).

WTO, *Declaration on the TRIPS Agreement and Public Health* (DOHA WTO Ministerial, WT/MIN(01)/DEC/2, 14 November 2002) <http://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_trips_e.htm> (last visited 22/1/07);

WTO, *TRIPS and Health, Frequently Asked Questions, Compulsory licensing of pharmaceuticals and TRIPS* (2005) <http://www.wto.org/English/tratop_e/trips_e/public_health_faq_e.htm> (last visited 2271/07).

## Other

Lynda L. Calderone & Tara L. Custer, *Prosecution Laches As A Defense in Patent Cases* (Flaster Greenberg 2005), <http://www.flastergreenberg.com/pdf/PatentArtic_prf3.pdf> (last visited 30/1/07).

Barry P. Golob & Amy El Schoenhard, *Patent Re-examination Procedure as a Litigation Strategy,* <http://www.buildingipvalue.com/05_NA/075_078.htm> (last visited 1/1/07).

Forgent Networks, *Intellectual property, '672 patent cases* (2006), <http://www.forgent.com/ip/672cases.shtml> (last visited 28/12/06).

Nokia, *Leading Mobile Wireless Technology Companies Call on European Commission to Investigate Qualcomm's Anti-competitive Conduct* (Press releases, 28 October 2005a), <http://www.nokia.com/NOKIA_COM_1/Press/sidebars_new_concept/Press_releases/281005_tp_leading_mobile_wireless_technology_companies.pdf> (last visited 28/12/06).

Nokia, *Leading Mobile Wireless Technology Companies Call on European Commission to Investigate Qualcomm's Anti-competitive Conduct* (Conference call, 28 October 2005b), <http://europe.nokia.com/BaseProject/Sites/NokiaCom_CAMPAIGNS_57710/CDA/Categories/PressEvents/_Content/_Static_Files/transcript.pdf> (last visited 28/12/06).

Nicholas Papastavros & Timothy Mungovan, *Rambus Cleared: FTC Standard-Setting Misconduct claims Dismissed* (Nixon Peabody, LLP. Technology and Intellectual Property Alert, March 2004), <http://www.nixonpeabody.com/linked_media/publications/TIPA_03052004.pdf> (last visited 8/1/06).

PC-Tel, Inc*, Annual Report 2001* (2002), <http://files.shareholder.com/downloads/PCTI/82495000x0x22268/E95326A3-990F-42D0-8609-ADF71E6ADA98/2001AR.pdf> (last visited 8/1/06).

Bruce Perens, *The Problem of Software Patents in Standards*, <http://perens.com/Articles/PatentFarming.html> (last visited 28/12/06);

PUBPAT (a), *JPEG Patent Claim Surrendered: Forgent Networks Ends Assertion of Patent Challenged by PUBPAT* <http://www.pubpat.org/jpegsurrendered.htm> (last visited 2/1/07).

PUBPAT (b), About PUBPAT <http://www.pubpat.org/About.htm> (last visited 6/9/06).

## Case Law

### Case Law of U.S. Courts and Competition Authorities

A.C. Aukerman Co. v. R.L. Chaides Construction Co, 960 F.2d 1020, 22 USPQ2d 1321 (Fed. Cir., 1992).

Alaska Airlines, Inc v. United Airlines, Inc, 948 F.2d 536, 60 USLW 2327, 1991-2 Trade Cases P 69,624 (9th Cir., 1991).

Allied Tube & Conduit Corp v. Indian Head Inc, 486 U.S. 492, 108 S.Ct. 1931, 100 L.Ed.2d 497, 56 USLW 4539, 1988-1 Trade Cases P 68,062 (Supreme Court, 1988).

Amazon.com Inc v. Barnesandnoble.com Inc, 239 F.3d 1343, 57 U.S.P.Q.2d 1747 (Fed. Cir., 2001).

American Medical Systems, Inc. v. Medical Engineering Corp. 6 F.3d 1523, 28 U.S.P.Q.2d 1321 (Fed. Cir., 1993).

American Securit Co. v. Shatterproof Glass Corp., 268 F.2d 769, 122 USPQ 167 (3d Cir., 1959).

Apex Elec. Mfg. Co. v. Altorfer Bros. Co., 238 F.2d 867, 111 U.S.P.Q. 320 (7th Cir., 1956).

Aspen Skiing Co. v. Aspen Highlands Skiing Co., 472 U.S. 585, 105 S.Ct. 2847, 86 L.Ed.2d 467, 53 USLW 4818, 1985-2 Trade Cases P 66,653 (Supreme Court 1985).

Associated Press v. United States, 326 U.S. 1, 65 S.Ct. 1416, 89 L.Ed. 2013, 1 Media L. Rep. 2269 (Supreme Court, 1945).

Atari Games, Corp. v. Nintendo of America, Inc., 975 F.2d 832, 61 USLW 2203, 1992-2 Trade Cases P 69,969, 1992 Copr.L.Dec. P 26,978, 24 U.S.P.Q.2d 1015 (Fed. Cir., 1992).

Chair Co. v. Infanti Chair Mfg. Corp., 60 F.3d 770, 34 U.S.P.Q.2d 1822 (Fed. Cir., 1995).

Bauer & Cie v. O'Donnell, 229 U.S. 1, 33 S.Ct. 616, 57 L.Ed. 1041, 50 L.R.A.N.S. 1185, Am.Ann.Cas. 1915A,150 (Supreme Court, 1913).

B. Braun Med. Inc. v. Abbot Labs, 124 F.3d 1419, 43 U.S.P.Q.2d 1896 (Fed. Cir., 1997).

Broadcom Corporation v. Qualcomm Incorporated, Slip Copy, 2006 WL 2528545, Civil Action No. 05-3350 (D.N.J., 31 August 2006).

Cel-Tech Communications**,** Inc. v. Los Angeles Cellular Tel Co., 20 Cal. 4th 163, 83 Cal.Rptr.2d 548, 973 P.2d 527 (1999).

Computer Associates International Inc v. Altai Inc, 982 F.2d 693, 61 USLW 2434, 119 A.L.R. Fed. 741, 37 Fed. R. Evid. Serv. 348 (2nd Cir., 17 December 1992).

C.R. Bard, Inc v. M3 Systems, Inc, 157 F.3d 1340 (Fed.Cir., 1998).

Cristopher Specht, John Gibson, Michael Fagan, Sean Kelly, Mark Gruber, and Sherry Weindorf v. Netscape Communications Corporation and America Inline, Inc, 306 F.3d 17, 48 UCC Rep.Serv.2d 761 (2nd Cir., 1 October 2002).

Crystal Semiconductor Corp. v. TriTech Microelectronics Intern., Inc., 246 F.3d 1336, 57 U.S.P.Q.2d 1953 (Fed. Cir., 2001).

Eastman Kodak Co. v. Image Technical Services, 504 U.S. 451, 112 S.Ct. 2072, 119 L.Ed.2d 265, 60 USLW 4465, 1992-1 Trade Cases P 69,839 (Supreme Court, 1992).

EBay Inc et al. v. MercExhange L.L.C., 126 S.Ct. 1837 (Supreme Court, 2006).

Engel Indus., Inc v. Lockformer Co., 96 F.3d 1398, 65 USLW 2273, 40 U.S.P.Q.2d 1161 (Fed. Cir., 1996).

ESS Technology Inc v. PC-Tel Inc, Not Reported in F.Supp.2d, 1999 WL 33520483, Docket No. C 99-20292 (N.D. Cal., 9 November 1999).

Eolas Technologies Incorporated and the Regents of the University of California v. Microsoft Corporation, 399 F.3d 1325, 73 U.S.P.Q.2d 1782 (Fed. Cir., 2005).

Harold R. Bowers v. Baystate Technologies, Inc, 302 F.3d 1334, 2002 Copr.L.Dec. P 28,479, 64 U.S.P.Q.2d 1065 (Fed.Cir., 2002).

High Tech Medical Instrumentation, Inc. v. New Image Indus., Inc., 49 F.3d 1551, 33 U.S.P.Q.2d 2005 (Fed. Cir., 1995).

Hynix Semiconductor Inc., Hynix Semiconductor America, Inc, Hynix Semiconductor U.K. Ltd, and Hynix Semiconductor Deuchland GmbH v. Rambus, Inc, 441 F.Supp.2d 1066 (N.D. Cal., 17 July 2006).

Hyundai Electronics Indus. Co. v. Rambus, Inc., No. C 00-20905 RMW (N.D. Cal., 19 January 2001).

Image Technical Services v. Eastman Kodak Co., 125 F.3d 1195, 1997-2 Trade Cases P 71,908, 44 U.S.P.Q.2d 1065, 97 Cal. Daily Op. Serv. 7197 (9th Cir., 26 August 1997)

In re Independent Service Organizations, 203 F.3d 1322, 2000-1 Trade Cases P 72,795, 2000 Copr.L.Dec. P 28,026, 53 U.S.P.Q.2d 1852 (Fed. Cir., 2000).

In re Northwest Airlines, Not Reported in F.Supp.2d, 2004 WL 1278459 (D.Minn., 6 June 2004).

In the Matter of Dell Computer Corporation, Decision and Order, Docket No. C-3658 (FTC, 20 May 1996).

In the Matter of Rambus Incorporated, Complaint, Docket No. 9391 (FTC, 18 June 2002).

In the Matter of Rambus Incorporated, Initial Decision, Docket No. 9391 (FTC, 23 February 2004).

In the Matter of Rambus Incorpoted, Opinion of the Commission, Docket No. 9302 (FTC, 2 August 2006).

In the Matter of Union Oil Company of California, Opinion of the Commission, Docket No. 9305 (FTC, 27 July 2005).

Intergraph Corp. v. Intel, Corp., 195 F.3d 1346, 1999-2 Trade Cases P 72,697, 52 U.S.P.Q.2d 1641, 40 UCC Rep.Serv.2d 107 (Fed. Cir., 1999).

Keystone Retaining Wall Sys. Inc. v. Westrock Inc., 792 F.Supp. 1552, 1991-2 Trade Cases P 69,677, 22 U.S.P.Q.2d 1001 (D. Ore., 1991).

Lorain Journal Co. v. United States, 342 U.S. 143, 72 S.Ct. 181, 96 L.Ed. 162, 1 Media L. Rep. 2697 (Supreme Court, 1951).

MacCullough Tool Co. v. Well Surveys, Inc., 343 F.2d 381, 145 U.S.P.Q. 6 (10th Cir., 1965).

Mallincrodt Inc. v. Medipart Inc, 976 F.2d 700, 61 USLW 2204, 24 U.S.P.Q.2d 1173 (Fed.Cir., 1992).

Mayers v. Asics Corp, 974 F.2d 1304, 24 U.S.P.Q.2d 1036 (Fed. Cir., 1993).

MCI Communications Corp v. AT&T Co, 708 F.2d 1081, 1983-2 Trade Cases P 65,520, 1982-83 Trade Cases P 65,137, 12 Fed. R. Evid. Serv. 590 (7th Cir., 1983).

Meyers v. Asics Corp., 974 F.2d 1304, 24 U.S.P.Q.2d 1036 (Fed. Cir., 1992).

MercExhange, L.L.C. EBay Inc., 401 F.3d 1323, 74 U.S.P.Q.2d 1225 (Fed. Cir., 2005).

Morton Salt Co. v. G.S. Suppiger, 314 U.S. 488 62 S.Ct. 402, 86 L.Ed. 363, 52 U.S.P.Q. 30 (Supreme Court, 1942).

National Lockwasher Co. v. George K. Garrett Co., 137 F.2d 255, 58 USPQ 460 (3d Cir., 1943).

New England Braiding Co. v. A.W. Chesterton Co., 970 F.2d 878, 23 U.S.P.Q.2d 1622 (Fed. Cir., 1992).

Nokia Corp. and Nokia, Inc v. Qualcomm, Inc, No. CIV A 06-509-JJF, Slip Copy, WL 2521328 (D.Del., 29 August 2006).

Otter Tail Power Co. v. United States, 410 U.S. 366, 97 P.U.R.3d 209, 93 S.Ct. 1022, 35 L.Ed.2d 359, 1973-1 Trade Cases P 74,373 (Supreme Court, 1973).

Potter Instrument Co. v. Storage Technology Corp, 1980 U.S. Dist. LEXIS 1438, 207 U.S.P.Q. (BNA) 763 (E.D. Va., 1980) Aff'd, 641 F.2d 190 (4th Cir., 1981), cert. denied, 454 U.S. 832 (1981).

Rambus, Inc v. Infineon Technologies AG, Infineon Technologies North America, Corp., Infineon Technologies Holding North America, 318 F.3d 1081, 65 U.S.P.Q.2d 1705 (Fed. Cir., 2003).

Rambus Inc v. Infineon Technologies AG, Infineon Technologies North America Corp., and Infineon Technologies Holding North America, Inc., 155 F.Supp.2d 668 (E.D.Va., 9 August 2001).

Rambus Inc v. Infineon Technologies AG, Infineon Technologies North America Corp., and Infineon Technologies Holding North America, Inc., 164 F.Supp.2d 743 (E.D.Va., 9 August 2001).

Register.com, Inc v. Verio, Inc, 356 F.3d 393, 69 U.S.P.Q.2d 1545 (C.A.2 (N.Y.) 23 January 23, 2004)

Reebok Int'l Ltd v. J. Baker Inc, 32 F.3d 1552, 31 U.S.P.Q.2d 1781 (Fed.Cir., 1994).

Rite-Hite Corp. v. Kelley, Inc., 56 F.3d 1538, 64 USLW 2032, 35 U.S.P.Q.2d 1065 (Fed. Cir., 1995).

Roche Prods., Inc. v. Bolar Pharm. Co., 733 F.2d 858, 221 U.S.P.Q. 937 (Fed.Cir., 1984).

Rosemount Inc v. United States Int'l Trade Commi'n, 910 F.2d 819, 12 ITRD 1561, 15 U.S.P.Q.2d 1569, 8 Fed. Cir. (T) 149 (Fed. Cir., 1990).

Samsung Electronics Co. Ltd. v. Rambus, Inc., Original Complaint, Civil Action No. 3:05W406 (D.Vir., 7 June 2005).

SanDisk Corp. v. Lexar Media, Inc., Docket No. C 98-01115 (N.D.Cal., 17 October 2000).

Sega Enterprises Ltd v. Accolade, Inc., 977 F.2d 1510, 61 USLW 2254, 1992 Copr.L.Dec. P 27,001, 24 U.S.P.Q.2d 1561 (9th Cir., 20 October 1992).

Senza-Gel Corp. v. Seiffhart, 803 F.2d 661, 231 U.S.P.Q. 363, 1986-2 Trade Cases P 67,307 (Fed. Cir., 1986).

Smith International Inc. v. Hughes Tool Co, 718 F.2d 1573, 219 U.S.P.Q. 686 (Fed. Cir., 1983).

Sony Computer Entertainment, Inc. v. Connectix Corp, 203 F.3d 596, 180 A.L.R. Fed. 655, 2000 Copr.L.Dec. P 28,022, 53 U.S.P.Q.2d 1705, 00 Cal. Daily Op. Serv. 1106, 2000 Daily Journal D.A.R. 1601 (9th Cir., 10 February 2000).

Stambler v. Diebold, Inc, 11 U.S.P.Q.2d (BNA) 1709 (E.D.N.Y., 1988), aff'd, 878 F.2d 1445 (Fed. Cir., 1989).

Sun Microsystems Inc, File No. 011-0006 (FTC, 9 November 2001).

Symbol Technologies Inc. v. Lemelson Medical, Education & Research Foundation, 277 F.3d 1361, 61 U.S.P.Q.2D (BNA) 1515 (Fed. Cir., 2002).

Symbol Technologies, Inc et al. v. Lemelson Medical, Education & Research Foundation, LP et al., 422 F.3d 1378, 76 U.S.P.Q.2d 1354 (Fed. Cir., 2005).

Ticketmaster v. Tickets.com, Not Reported in F.Supp.2d, 2000 WL 525390 (C.D.Cal.), 2000 Copr.L.Dec. P 28,059, 54 U.S.P.Q.2d 1344 (C.D. Cal., 27 March 2000).

Townshend v. Rockwell International Corp. and Conexant Systems, Inc., Not Reported in F.Supp.2d, 2000 WL 433505, 2000-1 Trade Cases P 72,890, 55 U.S.P.Q.2d 1011 (N.D. Cal., 28 March 2000).

Transamerica Computer Co v. IBM Corp, 698 F.2d 1377, 1982-83 Trade Cases P 65,218 (9th Cir., 15 February 1983).

United States v. Dentsply v. Dentsply Int'l Inc, 399 F.3d 181, 2005-1 Trade Cases P 74,706 (3rd Cir., 24 February 2005).

United States v. E.I. du Point de Nemours & Co., 351 U.S. 377, 76 S.Ct. 994, 100 L.Ed. 1264 (Supreme Court, 1956).

United States v. Grinnell Corp, 384 U.S. 563, 86 S.Ct. 1698, 16 L.Ed.2d 778 (Supreme Court, 1966).

United States v. Microsoft Corp, 253 F.3d 34, 346 U.S.App.D.C. 330, 2001-1 Trade Cases P 73,321 (D.C. Cir., 28 June 2001).

United States v. Terminal Railroad Ass'n, 224 U.S. 383, 32 S.Ct. 507, 56 L.Ed. 810 (Supreme Court, 1912).

Vault Corp. v. Quad Software Ltd., 847 F.2d 255, 57 USLW 2016, 1988 Copr.L.Dec. P 26,293, 7 U.S.P.Q.2d 1281 (5th Cir., 20 June 1988).

Wang Laboratories Inc. v. Mitsubishi Electronics America Inc and Mitsubishi Electric Corporation, 103 F.3d 1571, 41 U.S.P.Q.2d 1263 (Fed. Cir., 1997).

Whelan Associates, Inc v. Jaslow Dental Lab, Inc, 797 F.2d 1222, 55 USLW 2094, 230 U.S.P.Q. 481, 1986 Copr.L.Dec. P 25,978, 21 Fed. R. Evid. Serv. 571 (3rd Cir., 4 August 1986).

Western Elc. Co. v. Stewart-Warner Corp., 631 F.2d 333, 208 U.S.P.Q. 183, 1980-81 Trade Cases P 63,724 (4th Cir., 1980).

Windsurfing Int'l, Inc. v. AMF, Inc, 782 F.2d 995, 54 USLW 2420, 228 U.S.P.Q. 562 (Fed. Cir., 1986).

Zenith Radio Corp. v. Hazeltine Research, Inc., 395 U.S. 100, 89 S.Ct. 1562, 23 L.Ed.2d 129, 161 U.S.P.Q. 577 (Supreme Court, 1969);

Zenith Radio Corp. v. Hazeltine Research, Inc., 401 U.S. 321, 91 S.Ct. 795, 28 L.Ed.2d 77, 14 Fed.R.Serv.2d 1169, 1971 Trade Cases P 73,484 (Supreme Court, 1971).

**Case law of European Commission, European Court of First Instance, European Court of Justice**

European Commission v. Microsoft Corp., Case COMP/C-3/37.792 (European Commission, 24 March 2004).

Action brought on 7 June 2004 by Microsoft Corporation against the Commission of the European Communities (Case T-201/04) (Official Journal of the European Union, C 179, 10 July 2004, 18-19).

Order of the President of the Court of First Instance, Case T-201/04 R Microsoft Corporation (Court of First Instance, 22 December 2004).

European Commission v. Microsoft Corp., Fixing the definite amount of periodic penalty payment imposed on Microsoft Corporation by decision C(2005)4420 final and amending that Decision as regards the amount of the periodic penalty payment, COMP/C-3/37.792 (European Commission, 12 July 2006).

European Commission v. Microsoft Corp., Imposing a periodic penalty payment pursuant to Article 24(1) of Regulation No 1/2003 on Microsoft Corporation, COMP/C-3/37.792 (European Commission, 10 November 2005).

Europemballage Corporation and Continental Can v. Commission, Case 6/7 [1973] ECR 215 [1973] CMLR 199.

Hoffman La Roche & Co v. Commission, Case 85/79 [1979] ECR 461 [1979] 3 CMLR 211.

Volvo AB v. Erik Veng (U.K.) Ltd, Case 238/87 [1988] ECR. 6211 [1989] 4 CMLR. 122.

Radio Telefis Eireann (RTE) and Independent Television Publications Ltd (ITP) v Commission, Joined cases C-241 and 242/91P, [1995] ECR 1-743, [1995] 4 CMLR 718

Tiercé Ladbroke v. Commission, Case T-504/93, [1997] ECR II-923, [1997] 5 CMLR 309.

Oscar Bronner GmbH & Co. KG v Mediaprint Zeitungs- und Zeitschriftenverlag GmbH & Co. KG, Mediaprint Zeitungsvertriebsgesellschaft mbH & Co. KG and Mediaprint Anzeigengesellschaft GmbH & Co. KG, Case T-7/97, [1998] ECR I-7817, [1999] 4 CMLR 112

IMS Health GmbH & Co KG v. NDC Health, Case C-418/01[2004] 4 CMLR1543 (preliminary ruling).

General Motors v. Commission, Case 26/75, [1975] ECR 1367, [1976] 1 CMLR 95.

United Brands v. Commission, Case 27/76, [1978] ECR 207 [1978] 1 CMLR 429

British Leyland v. Commission, Case 226/84, [1986] ECR 3263 [1987] 1 CMLR 184.

**Case Law of the European Patent Office Boards of Appeal**

Electronic auctions/ARIBA (T 0872/04).

Undeliverable mail/PITNEY BOWES (T 0388/04).

Auction method/HITACHI (T 0258/03).

Controlling pension benefits system/PBS PARTNERSHIP (T 0981/95).

General-purpose management system/SOHEI (T 0769/92).

**Case Law of Courts in Finland**

Beecham Group PLC and GlaxoSmithKline Oy v. Oy Gea Ab, Docket No. S02/24447 (Helsinki district court, 16 May 2003).

CCPI Inc and Foseco International Limited v. Bet-Ker Oy, Docket No. S03/1226 (Helsinki Court of Appeals, 1 April 2004).

Farmos Yhtymä Oy v. Imperial Chemicals Industries Ltd, Docket No. S 78/4349 (Helsinki Court of Appeals, 27 march 1979).

Hexal A/S v. Pfizer Inc, Docket No, S 04/4418 (Helsinki district court, 22 September 2006).

AS Hässle and AstraZeneca Oy v. Ratiopharm Oy, Docket No. S03/723 (Helsinki Court of Appeals, 7 April 2004).

KKO 1981 II 184, Docket No. S 80/1146 (Supreme Court, 29 December 1981).

KKO 1980-I-3, Docket No. A79/540 (Supreme Court, 31 December 1980).

KKO: 2003:118, Oy Langh Ship Ab v. Flinter Groningen B.V and Wijnne Wijnne & Barends Cargadoors- en Agentuurkantoren B.V., Docket No. S2003/101 (Supreme Court, 12 December 2003).

KKO: 2003:127, Oy LMP Patents Ltd Ab v. Porin kaupunki, Docket No. S2001/489 (Supreme Court, 18 December 2003).

KKO: 2004:32, Docket No. S2003/590 (Supreme Court, 29 March 2004).

KKO: 2005:105, Rediviva Oy on Fiskars Oyj Abp, Docket No. S2004/489 (Supreme Court, 29 September 2005).

Kone Oy v. Labsystems Oy, Docket No. S 88/612 (Helsinki Court of Appeals, 9 May 1990).

Oy Kyro Ab v. Valotila Oy, Docket No. S 94/868 (Helsinki Court of Appeals, 27 June 1996).

Oy Kyro Ab v. V.E. Lipponen, Docket No. S 94/869 (Helsinki Court of Appeals, 27 June 1996).

Oy Kyro Ab v. Jaakko-Tuote Oy, Docket No. S 95/451 (Helsinki Court of Appeals, 8 August 1996).

Oy Lars Lundin Patent Ab, MacGregor-Navire Oy v. Oy Larsen Marin Ab, Docket No. S 91/747 (Helsinki Court of Appeals, 25 November 1992).

Lännen Tehtaat Oy v. Growmet Oy, Docket No. S 92/1558 (Helsinki Court of Appeals, 20 January 1993).

MAO: 42/03, Mineral Technologies, Inc. v. Oy Aga Ab, Docket No. 4/2002 (Market Court, 28 February 2003).

MT:2001:015, Lamor Corporation Ab vastaan Oy LMP Patents Ltd Ab, Docket No. 4/2001 (Market Court, 15 October 2001).

MT: 2001:002, Sonera Oyj ja Sonera SmartTrust Oy vastaan Oy Technopol Ltd ja Behruz Vazvan, Docket No. 6/2000 (Market Court, 12 February 2001).

Molok Oy v. Mr. Keski-Liikala, Docket No. S 99/79 (Supreme Court, 31 August 2000, case was handed back to the Court of Appeals).

Mursula Oy v. Metsäpuu Oy, Docket No. S 88/1414 (Helsinki Court of Appeals, 30 May 1990).

Pfizer Inc. and Pfizer Oy v. Oy Hexal Ab, Docket No. S 05/2601 (Helsinki Court of Appeals, 16 February 2006).

Raute Oy and Durand-Raute Industries Ltd v. Plymachine Oy, Docket No. S 91/565 (Helsinki Court of Appeals, 27 November 1991).

Scüco International KG v. Purso Oy, Docket No. S 01/277 (Helsinki Court of Appeals, 4 September 2001).

Sonera Systems Oy v. Harjuvaara, Juselius, Saivosalmi, Salojää and VF Partner Oy, Docket No. R 99/661 (Helsinki Court of Appeals, 28 December 1999).

Swep Oy v. Moppi Oy, Docket No. S 93/9 (Helsinki Court of Appeals, 22 November 1994).

Thomesto Oy v. Sunit Oy, Docket No. S 92/2394 (Helsinki Court of Appeals, 4 April 1995).

Thomesto Oy v. Sunit Oy, Docket No. S 94/1417 (Helsinki Court of Appeals, 4 April 1995).

Tesa AG v. Oy Lindell Ab, Docket No. S 05/678 (Helsinki district Court, 28 February 2005).

Veli Reijonen Oy v. Punkaharjun kunta, Docket No. S 1984/793 (Helsinki Court of Appeal, 3 December 1986).

Vierumäen Teollisuus Oy v. Metsäliitto SW Oy, Docket No. S 00/1619 (Helsinki Court of Appeals, 28 December 2000).

Warner-Lambert Company LLC and Pfizer Oy v. Ranbaxy Laboratories Limited, Docket No S 04/3156 (Helsinki Court of Appeals, 16 February 2006).

**Case Law of Courts in Germany**

Jesco Schwarzer, 17 W (pat) 31/03 (Bundesgerichtshof, 28 September 2004).

Logikverifikation, X ZB 11/98 (Bundesgerichtshof, 13 December 1999).

Rentabilität eines medizinischen Geräts, 21W (pat) 12/02 (Bundespatentgerich, 6 May 2003).

Sprachanalyseeinrichtung, X ZB 15/98 (Bundesgerichtshof, 11 May 2000).

Suche fehlerhafter Zeichenketten/Tippfehler (Bundesgerichtshof, 17 October 2001).

**Case Law of Courts in UK**

Aerotel Ltd v. Telco Holdings Ltd, Telco Global Distribution Ltd and Telco Global Ltd, EWCA Civ 1371 (Court of Appeals, 17 October 2006).

In the matter of Application No. 9204959.2 by Fujitsu Limited, EWCA Civ 1174 (Court of Appeals, 6 March 1997).

Clarke v. Dunraven A.C, 59; S. & T. 28 (Supreme Court, 1897).

## Appendix 1.1. Patent Policies

| | Main Objectives | Disclosure Provision | Non-members | Violation of the Policy | Other |
|---|---|---|---|---|---|
| **ANSI Patent Policy** | According to the Policy there is no objection in principle to drafting a proposed American National Standard in terms that include the use of a patented item, if it is considered that technical reasons justify this approach. | **See section 3.1.1. Statement from patent holder** according to which prior to approval of such a proposed American National Standard, the Institute shall receive from the identified party or patent holder (in a form approved by the Institute) either: assurance in the form of a general disclaimer to the effect that such party does not hold and does not currently intend holding any invention the use of which would be required for compliance with the proposed American National Standard or assurance that:<br>• a license will be made available without compensation to the applicants desiring to utilize the license for the purpose of implementing the standard; or<br>• a license will be made available to applicants under reasonable terms and conditions that are demonstrably free of any unfair discrimination. | - | - | The Patent Policy is part of "ANSI's Essential Requirements: Due Process requirements for American National Standards"<br>Compliance (or non-compliance) with the Patent Policy is one of the criteria to be considered by ANSI's Board of Standards Review ("BSR") in determining whether to approve (or withdraw approval of) an American National Standards. |

## Appendix 1.2. Patent Policies

| | Main Objectives | Disclosure Provision | Non-members | Violation of the Policy | Other |
|---|---|---|---|---|---|
| **ANSI Guidelines (2003)** | Guidelines are intended to assist voluntary standards developers, and those that participate in the standards development process, in understanding and implementing the ANSI Patent Policy.<br><br>The Guidelines seek to encourage the early disclosure and identification of patents that may relate to standards under development, so as to thereby promote greater efficiency in standards development practices. | **See section III. A. Early Disclosure of Patent Rights** according to which<br>• early disclosure of patents is likely to enhance the efficiency of the process used to finalize and approve standards. Early disclosure permits notice of the patent to the standards developer and ANSI in a timely manner, provides participants the greatest opportunity to evaluate the propriety of standardizing the patented technology, and allows patent holders and prospective licensees ample time to negotiate the terms and conditions of licenses outside the standards development process itself.<br>• during the development period, standards developers may wish to adopt procedures whereby one or more requests are made to participants for the disclosure of patents that may be required for use of standards in process, and clarifies how these requests could be carried out.<br>• setting up such procedures is not to suggest that a standards developer should require any participant in the development process to undertake a patent search of its own portfolio or of any other. The objective is to obtain early disclosure concerning the existence of patents, where known.<br>• it is generally desirable to encourage disclosure of as much information as possible concerning the patent, including the identity of the patent holder, the patent's number, and information regarding precisely how it may relate to the standard being developed.<br>• to assist in international standardization, a standards developer may deem it appropriate to encourage the disclosure of relevant unexpired foreign patents. Similarly, a standards developer may wish to encourage participants to disclose the existence of pending U.S. patent applications relating to a standard under development. Of course, in such a situation the extent of any disclosure may be more circumscribed due to the possible need for confidentiality and uncertainty as to whether an application will mature into a patent and what its claimed scope will ultimately be. | **See section III. A. Early Disclosure of Patent Rights** in which it has been mentioned that a standards developer may also consider taking steps to make it clear that any participant in the process -- not just patent holder -- is permitted to identify or disclose patents that may be required for implementation of the standard. | | By definition, guidelines are suggestions -- adherence is not essential for standards developers to be found in compliance with ANSI's Patent Policy. Rather, this is an effort to identify possible procedures that a standards developer may wish to adopt, either in whole or in part, for purposes of effectively implementing the Patent Policy. Additional or different steps may also be selected for such purposes. |

## Appendix 1.3. Patent Policies

| | Main Objectives | Disclosure Provision | Non-members | Violation of the Policy | Other |
|---|---|---|---|---|---|
| **ITU-T Patent Policy** | According to the Policy it must be ensured that<br>• recommendations, their applications, use, etc. are accessible to everybody.<br>• a commercial (monopolistic) abuse by a holder of a patent embodied fully or partly in a recommendation must be excluded. To meet this requirement in general is the sole objective of the code of practice.<br>• the detailed arrangements arising from patents (licensing, royalties, etc.) are being left to the parties concerned, as these arrangements might differ from case to case. | **See section 1** according to which<br>Any ITU-T member organization putting forward a standardization proposal should, from the outset, draw the attention of the Director of TSB to any known patent or to any known pending patent application, either their own or of other organizations, although the TSB is unable to verify the validity of any such information. | - | - | Defined as "Code of Practice". Can be found at the ITU-T web site. |

## Appendix 1.4. Patent Policies

| | Main Objectives | Disclosure Provision | Non-members | Violation of the Policy | Other |
|---|---|---|---|---|---|
| **Guidelines for Implementation of ITU-T Patent Policy (2005)** | Intented to assist the Telecommunication Standardization Bureau (TSB), the Study Groups and those who participate in the development of ITU-T Recommendations, in their understanding and implementation of the ITU-T Patent Policy.<br><br>Encourages early disclosure and identification of patents or pending patent applications that may relate to Recommendations under development. | **See section 2.4. Disclosure** according to which<br>• The term "from the outset" implies that such information should be disclosed as soon as possible, i.e. as soon as it is becoming clear that an evolving draft recommendation will, in fact, fully or partly include elements protected by patent rights.<br>• Information should be provided on a "best effort" basis but there is no requirement for patent searches. | Third parties can also submit a "Patent Statement and Licensing Declaration" to the TSB. Furthermore, any ITU-T Member should draw attention of the TSB to any known patent or pending patent application, which is held by any ITU-T non-member organization, and whose use would be required to implement an ITU-T recommendation. The TSB will contact the non-member organization to submit a corresponding "Patent Statement and Licensing Declaration". | - | Supplements ITU-T Patent Policy (Policy takes precedence)<br><br>Sets out the procedures for chairmen (They shall ask, at the beginning of each meeting, whether anyone has knowledge of patents or pending patent applications) |

## Appendix 1.5. Patent Policies

| | Main Objectives | Disclosure Provision | Non-members | Violation of the Policy | Other |
|---|---|---|---|---|---|
| **ETSI IPR Policy (2006)** | **See section 3 Policy Objectives**<br>• Seeks to reduce the risk to ETSI, Members and others applying ETSI standards and technical specifications, that investment in the preparation, adoption and application of standards could be wasted as a result of an essential IPR for a standard or technical specification being unavailable.<br>• Seeks to balance between the needs of standardization for public use in the field of telecommunications and the rights of the owners of IPRs.<br>• Provides that IPR holders whether members of ETSI and their affiliates or third parties, should be adequately and fairly rewarded for the use of their IPRs in the implementation of standards and technical specifications. | **See section 4 Disclosure of IPRs** according to which<br>• Each **member** shall use its reasonable endeavours, in particular during the development of a standard or technical specification where it participates, to inform ETSI of essential IPRs in a timely fashion.<br>• In particular, a member submitting a technical proposal for a standard or technical specification shall, on a bona fide basis, draw the attention of ETSI to any of that member's IPR which might be essential if that proposal is adopted.<br>• 3) The above obligation does not imply any obligation on members to conduct IPR searches. | **See section 6.1** according to which when an essential IPR relating to a particular standard or technical specification is brought to the attention of ETSI, the Director-General shall immediately request the owner to give within three months an undertaking in writing that it is prepared to grant irrevocable licences on fair, reasonable and non-discriminatory terms and conditions under such IPR to at least the following extent: manufacture (includes have made rights), sell, lease or otherwise dispose of equipment so manufactured, repair, use, or operate equipment, and use methods. The undertaking may be made subject to the condition that those who seek licences agree to reciprocate. | Any violation of the policy is deemed as a breach of that member's obligations to ETSI. The ETSI General Assembly has the authority to decide the action to be taken in accordance with the ETSI Statutes | ETSI Patent Policy is part of ETSI Rules of Procedure, Annex 6, and therefore they are binding on all ETSI members. |

## Appendix 1.6. Patent Policies

| | Main Objectives | Disclosure Provision | Non-members | Violation of the Policy | Other |
|---|---|---|---|---|---|
| **ETSI Guidelineson Intellectual Property Rights (IPRs) (2005)** | Intended to help ETSI members and any other party involved in ETSI's standardization activities to understand and implement the Institute's IPR Policy | **See section 2. Importance of timely disclosure of Essential IPRs** according to which<br>• Members having IPR portfolios should improve their internal IPR co-ordination processes to ensure, as far as possible, that their participants in Technical Bodies are aware of any alleged-essential IPR the company may have (related to the on-going work on a particular ETSI standard or technical specification), that they understand their obligations, and that they know how to discharge them.<br>• In complying with the requirements of timeliness, members are recommended to make IPR disclosures at the earliest possible time following their becoming aware of IPRs which may be essential.<br>• Members are not obliged to inform ETSI of any updates to their essential IPRs, but they are nevertheless encouraged to update and complete their information statements. | | | Procedures for Calls for IPRs and recordation and reporting of information on IPRs are defined in the Guidelines (the members must be reminded of their duty to submit IPR disclosures, and a formal call for IPR disclosures must be made by the Chairman at the beginning of each meeting, See section 2.3 Technical Body Chairmen's duties). |

## Appendix 1.7. Patent Policies

| | Main Objectives | Disclosure Provision | Non-members | Violation of the Policy | Other |
|---|---|---|---|---|---|
| **VESA Intellectual Property Rights (IPR) Policy** | Designed to avoid inadvertent adoption of Specifications that would Necessarily Infringe the Patent claim of either VESA Members or third parties. | **See section 4. Assurances regarding IPR** according to which<br>• Assurances are required at the time that a Submission is made that IPR inherent in the Submission, if incorporated into a Specification is made available under license. When Submission of Technology Form is not required, no Member or Participant shall knowingly make a Submission that includes Necessary Claims under s Specification without disclosing such Patent claim(s).<br>• A "Call for Patents" shall be made at the beginning of every in-person, and as deemed appropriate by the Chair, any telephonic or electronic meeting of a Technical Committee, Task Group or other process group and at appropriate times in the course of collaboration, as determined by standing procedures. In response to a Call for Patents, Participants are asked to identify any Necessary claims of which they may be aware under a draft Specification, whether it is owned by the Participant, the Member it represents, or any third party. There is no penalty for a disclosure that proves to be inaccurate, absent a wilful and knowing intention to deceive. The duty to respond to a call for patents relates only to the present knowledge of the Participant.<br>• Prior to the final approval of a Specification, Members and Non-member Participants claiming to have Necessary Claims with respect to such Specification are required to submit IPR Response Forms which are binding upon the Member or non-member Participant that submits (or fails to submit) it. In order to permit all Members to perform such internal IPR investigations as they may wish, IPR Response Forms shall not be required to be returned in less than 28 days from the date at which the call is made.<br>• If a Member or Non-member Participant has an economic interest in or expects to gain economic benefit from another company's Necessary Claim(s) and knows of such claim(s), then the Member or the Non-member participant is required to disclose such claims as though they were the owner of such claim(s), unless such Member or Non-member Participant is subject to a non-disclosure agreement obligation as to such Necessary Claim(s). | **See section 6. Patents Revealed After Adoption** according to which<br>in the event that, following adoption of a Specification, a Patent owner alleges that it owns Necessary Claim(s) under a Specification, the Patent owner is asked to license its rights to all would-be Implementers on RAND terms.<br><br>If a license is not obtainable from the owner of Necessary Claims, then no Member is bound by any commitment made under the policy to provide a license to its own Necessary claim(s) to such Patent owner under the Specification in question, and such previous licenses may be revoked. | Each Member and Non-member Participant is a third party beneficiary of the duty of good faith imposed by the IPR Policy. In the event of any breach of this duty of faith by a Member or Non-member Participant with respect to the adoption of a given Specification and the bringing of an infringement action against any implementer of the same Specification, such Implementer shall be entitled to assert such breach as an affirmative defense for the avoidance of any financial or other obligation to such Member or non-member participant with respect to its implementation of such Specification. | In the event of any conflict with other VESA policies regarding IPR, this policy takes precedence. |

## Appendix 1.8. Patent Policies

| | Main Objectives | Disclosure Provision | Non-members | Violation of the Policy | Other |
|---|---|---|---|---|---|
| **JEDEC Patent policy (2003)** | While there is no restriction against drafting a proposed standard in terms that include the use of a patented item if technical reasons justify the inclusion, committees should avoid standardization that refers to a product on which there is a known patent unless all the relevant technical information covered by the patent or pending patent is known. | **See section 8.2. Reference to patented products in JEDEC standards and publications** according to which<br>• If the committee member indicates that the standard requires the use of patented items, then the committee chairperson must receive a written assurance from the organization holding rights to such patents that a license will be made available.<br>• The chairperson must call to the attention of all those present the obligation of all participants to inform the meeting of any knowledge they may have of any patents, or pending patents, that might be involved in the work they are undertaking. | | | JEDEC Patent policy is included in Section 8 of JEDEC Manual No. 21-L, and a summary thereof can be found in Annex A. |
| **JEDEC Patent policy application guidelines (2003)** | Describes the application of the JEDEC patent policy | • Committee discussion of pending or existing patents is a permissible activity and is encouraged when the committee feels that the patented item or process represents the best technical basis for a standard.<br>• Discussion of a pending or existing patent does not constitute an acknowledgement of the validity of the patent because validity is based on prior art and determination of who firms made the invention or applied for the patent.<br>• The JEDEC patent policy applies to situations involving the discovery of patents that may be required for use of a standard subsequent to its adoption, and the initial issuance of a patent after the adoption of a standard. | | | Included in JEDEC Manual No. 21-L Annex B (informative) |

## Appendix 1.9. Patent Policies

| | Main Objectives | Disclosure Provision | Non-members | Violation of the Policy | Other |
|---|---|---|---|---|---|
| **Intellectual Property Rights in IETF Technology (2005)** | Intended to benefit the Internet community and the public at large, while respecting the legitimate rights of IPR holders. | See **section 6. IPR Disclosure** according to which<br>• IPR disclosures are required by the contributors and IETF Participant's with respect to IPRs they own directly or indirectly and believe to cover or ultimately cover his or her contribution<br>• Disclosure is required with respect to IPR the contributor or IETF Participant reasonably and personally knows his/her employer or sponsor (if any) may assert.<br>• An IPR discloser is requested to withdraw a previous disclosure if a revised Contribution negates the previous IPR disclosure, or to amend a previous disclosure if a revised Contribution substantially alters the previous disclosure.<br>• If a person has information about IPR that may Cover IETF Contributions, but the participant is not required to disclose it on above grounds (e.g., the IPR is owned by some other company), such person is encouraged to notify the IETF as soon as reasonably possible after the person realizes the connection.<br>• The IPR disclosure must be made as soon as reasonably possible after the Contribution is published in an Internet Draft unless the required disclosure is already on file. If a Contributor first learns of IPR in its Contribution after the Contribution is published in an Internet-Draft, a disclosure must be made as soon as reasonably possible after the IPR becomes reasonably and personally known to the Contributor. Participants who realize that a Contribution will be or has been incorporated into a submission to be published in an Internet Draft, or is seriously being discussed in a working group, are strongly encouraged to make at least a preliminary disclosure. That disclosure should be made as soon after coming to the realization as reasonably possible, not waiting until the document is actually posted or ready for posting.<br>• There are cases where individuals are not permitted by their employers or by other factors to disclose the existence or substance of patent applications or other IPR. Since disclosure is required for anyone submitting documents or participating in IETF discussions, a person who does not disclose IPR for this reason, or any other reason, must not contribute to or participate in IETF activities with respect to technologies that he or she reasonably and personally knows to be Covered by IPR which he or she will not disclose. Contributing to or participating in IETF discussions about a technology without making required IPR disclosures is a violation of IETF process. | IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights that may cover technology that may be required to implement the standard. | | The provisions described in other cells can be found in a document that describes Internet Best Current Practices for the Internet Community. |

## Appendix 1.10. Patent Policies

| | Main Objectives | Disclosure Provision | Non-members | Violation of the Policy/ Other |
|---|---|---|---|---|
| **OASIS Intellectual property Rights (IPR) Policy (2005)** | According to OASIS IPR FAQs the Policy was designed; to help ensure that, licenses to implement OASIS Standards and specifications are available from members; to provide flexibility to support the breadth of the membership, the variety of specifications under development, and the needs of the marketplace; to encourage the submission of existing technical work into the open standards process; to assure that all members are protected and bound by clearly articulated policies; and to help safeguard organizations from unintended exposure by employees participating as Individual members. | **See section 8 Disclosure** according to which<br>• each TC Party shall disclose to OASIS in writing the existence of all patents and/or patent applications owned or claimed by such TC Party that are actually known to the TC Member directly participating in the TC, and which such TC Member believes may contain any Essential Claims or claims that might become Essential Claims upon approval of an Committee Specification or Standard as such document then exists.<br>• each TC Party whose TC Members become aware of patents or patent applications owned or claimed by a third party that contain claims that might become Essential Claims upon approval of an OASIS Committee Specification or OASIS Standard should disclose them, provided that such disclosure is not prohibited by any confidentiality obligation binding upon them. It is understood that any TC Party that discloses third party patent claims to OASIS does not take a position on the essentiality or relevance of the third party claims to the specification.<br>• it is understood and agreed that such TC Party(s)' TC Member(s) do not represent that they know of all potentially pertinent claims of patents and patent applications owned or claimed by the TC Party or any third parties.<br>• disclosure requests are included with all public review copies of OASIS Committee Specifications or Standards (including drafts of such specifications). All OASIS Parties are encouraged to review these specifications and make appropriate disclosures.<br>• a disclosure request and the obligation to disclose do not imply any obligations on the recipients of disclosure requests (collectively or individually) or on any OASIS Party to perform or conduct patent searches. Nothing in this Policy nor the act of receiving a disclosure request for a draft or approved OASIS Committee Specification or OASIS Standard, regardless of whether it is responded to, shall be construed or otherwise interpreted as any kind of express or implied representation with respect to the existence or non-existence of patents or patent applications which contain Essential Claims, other than that such TC Party has acted in good faith with respect to its disclosure obligations.<br>• Any disclosure of Disclosed Claims shall include (a) in the case of issued patents and published patent applications, the patent or patent application publication number, the associated country and, as reasonably practicable, the relevant portions of the applicable draft or approved OASIS Committee Specification or OASIS Standard; and (b) in the case of unpublished patent applications, the existence of the unpublished application and, as reasonably practicable, the relevant portions of the applicable draft or approved OASIS Committee Specification or OASIS Standard. | Where the OASIS TC Administrator is formally notified of rights, or claimed rights with respect to entities other than Obligated Parties, the OASIS President shall attempt to obtain from the claimant of such rights a written assurance that upon approval as an OASIS Committee Specification or OASIS Standard any Licensee will be able to obtain the right to implement, use, and distribute the technology or works when implementing, using, or distributing technology. | |

## Appendix 1.11. Patent Policies

| | Main Objectives | Disclosure Provision | Non-members | Violation of the Policy / Other |
|---|---|---|---|---|
| **W3C Patent Policy (2004)** | To assure that Recommendations produced under this policy can be implemented on a Royalty-Free (RF) basis. | See **section 6. Disclosure** according to which<br>• Disclosure is required when both of the following are true: a) an individual in a Member organization receives a disclosure request; and b) that individual has actual knowledge of a patent which the individual believes contains Essential Claim(s) with respect to the specification for which disclosure is requested.<br>• Disclosure requests will be included in the "Status of This Document" section of each Recommendation track document as it reaches each new maturity level (Working Draft, Last Call Working Draft, Candidate Recommendation, Proposed Recommendation, Recommendation). Separate requests may be issued by the W3C to any party suspected of having knowledge of Essential Claims.<br>• Disclosure statements must include: the patent number, but need not mention specific claims and the Working Group and/or Recommendation to which it applies<br>• In the case of laid-open or published applications, the Member's good faith disclosure obligation extends to unpublished amended and/or added claims that have been allowed by relevant legal authorities and that the Member believes to be Essential Claims. To satisfy the disclosure obligation for such claims, the Member shall either: disclose such claims, or identify those portions of the W3C specification likely to be covered by such claims.<br>• If a W3C Member includes claims in a patent application and such claims were developed based on information from a W3C Working Group or W3C document, the Member must disclose the existence of such pending unpublished applications.<br>• Satisfaction of the disclosure requirement does not require that the discloser perform a patent search or any analysis of the relationship between the patents that the Member organization holds and the specification in question.<br>• Disclosure of third party patents is only required where the Advisory Committee Representative or Working Group participant has been made aware that the third party patent holder or applicant has asserted that its patent contains Essential Claims, unless such disclosure would breach a pre-existing non-disclosure obligation.<br>• The disclosure obligation is an ongoing obligation that begins with the Call for Participation. Full satisfaction of the disclosure obligation may not be possible until later in the process when the design is more complete. In any case, disclosure as soon as practically possible is required.<br>• The disclosure obligation terminates when the Recommendation is published or when the Working Group terminates.<br>• Invited experts or members of the public participating in a Working Group must comply with disclosure obligations to the extent of their own personal knowledge. | | |

## Appendix 2.1. Legal Means

| Means | | Applicability to non-disclosure | Applicability to third party patentees | Remedy | Notes |
|---|---|---|---|---|---|
| Antitrust/Competition Regulation | Sherman Act, Section 2 (U.S. Federal Law) | - Could apply if the company has achieved or has been likely to achieve monopoly power in properly defined markets by hiding its essential rights.<br>- There must be antitrust injury. | - Provided that the refusal to license by a monopolist could be regarded as abusive. | e.g. Injunctive relief; Criminal penalties; Treble damages and attorney's fees (private litigation) | Could be enforced by the competition authorities or by private parties claiming damages. Applicable only in exceptional circumstances. |
| | EC Treaty, Section 82 (EU) | - Could apply if the company's failure to disclose is considered abusive and the company was in a dominant position. | - Provided that the company is in a dominant position and that the refusal to license or posing over-extensive licensing fees could be regarded as abusive. | e.g. Injunctive relief; Fines; Penalty payments; Damages (private litigation) | Could be enforced by the competition authorities or by private parties in national courts. Applicable only in exceptional circumstances. |
| | FTC Act, Section 5 (U.S. Federal Law) | - Material and deceptive misrepresentation, omission or practice is required. No need to show market power.<br>- There should be a requirement to disclose one's rights, and the non-disclosure should affect the selection of a standard.<br>- Case law seems to require intentional misconduct (inadvertent or merely negligent non-disclosure would probably not suffice). | Not generally. | e.g. "Cease and desist" order | Only the FTC has the power to act on the basis of the FTC regulation. |
| | Unfair Business Practices Act (U.S. State law) | - Varies from state to state.<br>- Could typically be applied in similar situations as Federal antitrust laws (See Sherman Act, Section 2, and FTC Act, Section 5). | Not generally. | e.g. Disgorgement of unjust enrichment; Other equitable relief | |
| Unfair Business Practices Regulation | Unfair Business Practices Act, Sections 1 and 2 (Finland) Act of Torts, Chapter 5, Section 1 (Finland) | - Could apply when there has been a violation of a good business practice defined e.g. by the patent policies<br>- Requires false or misleading statements that are likely to affect the demand or supply of a product or harm the business of another, and these are punishable if conducted on purpose or through gross negligence<br>- Damages may be issued under the Act of Torts if the violation has been intentional. | - | e.g. Prohibition to continue or repeat unfair practices; Conditional fine; Damages under Tort Law | The Council of Fair Trading may give its non-binding opinion; The Market Court decides the cases invoked on the basis of Unfair Business Practices Act. The district court may issue damages. |

## Appendix 2.2. Legal Means

| Means | | Applicability to non-disclosure | Applicability to third party patentees | Remedy | Notes |
|---|---|---|---|---|---|
| Patent Law | EPC, Patents Act (Finland) | - Patent invalidation on the basis of lacking novelty, inventive step, industrial applicability or technical character among others. | Yes | Invalidity of a patent | Litigation takes place in national courts, patent opposition proceedings available at the EPO or national patent offices. |
| | Patents Act (U.S.) | - Patent invalidation on the basis of lacking novelty, inventive step, or usefulness among others. | Yes | Invalidity of a patent | Litigation takes place in federal court, re-examination may be initiated in the USPTO. |
| | Laches (U.S.) | - Applicable in case of unreasonable or inexcusable delay in bringing an infringement suit or if there has been unexplained delay at the patent prosecution (prosecution laches). | Yes | Bars the patent holder from recovering damages that have incurred before the lawsuit was filed. | |
| | Patent misuse (U.S.) | - Applicable if the patent holder attempts to leverage the advantage of a patent into something beyond its intended boundaries with anticompetitive effects.<br>- Could be applied if the refusal to license is detrimental to public welfare. Such situation could be present if the patent holder has intentionally and willfully concealed the existence of his rights. | Not generally. | Unenforceability of a patent until the effects of misuse have dissipated. | |
| | Equitable estoppel (U.S.) | - Applicable if there has been misleading conduct (statement, action, inaction, silence when there is an obligation to speak) indicating that the patent holder does not intend to enforce his rights.<br>- There needs to be reliance on such a conduct and material prejudice must result. | Not in the absence of communication between the patent holder and the potential infringer. | Unenforceability of a patent | |
| | Implied License (U.S.) | - Applicable if the patent holder's conduct has reasonably suggested a grant or consent or permission to utilize its patent. | Not in the absence of communication between the patent holder and the potential infringer. | Unenforceability of a patent/license | |
| | Compulsory Licensing (Finland) | - Applicable if there is considerable public interest at stake, or if the party has begun to practice the invention before its grant without knowledge of the patent and there are special reasons for the grant. | Yes | Compulsory license the terms of which are determined by the court. | Cumbersome process and rarely applied in practice. |

## Appendix 2.3. Legal Means

| Means | | Applicability to non-disclosure | Applicability to third party patentees | Remedy | Notes |
|---|---|---|---|---|---|
| **Fraud** | Tort/ Civil Fraud (U.S. State Laws) | - Varies from state to state<br>- Under Virginia law an explicit duty to speak up and to disclose the rights in question is typically required.<br>- Fraud must be intentional and conducted knowingly, thus there must be intent to mislead.<br>- The claimant must have relied on the misrepresentation and it has to have suffered damages. | - | Varies from state to state, but include e.g. damages, and punitive damages | - Patent Policies, guidelines and SSO practices are central<br>- Usually used as a defense in patent infringement cases because one of the elements is to demonstrate that there was a need to disclose that particular patent/patent application (claim construction). Thus, the cases could be trialled in federal court. |
| | Criminal Law (U.S. Federal and State Laws) | - Varies from state to state | - | Fine or incarnation | Both corporations and individuals can be charged by the government. |
| | Penal Code, Chapter 36, Sections 1 to 3 (Finland) | - Deception must have been conducted for the purpose of gaining unlawful financial benefit, or in order to harm another. Economic loss must also follow. | Not applicable | Fine or imprisonment | Relevant sections apply only to individuals. |
| | Contracts Act, Section 30 (Finland) | - Non-disclosure could, depending on the circumstances, be deemed as fraudulent inducement to enter an agreement. | Not applicable | Grounds for exiting an agreement, Damages | Not directly relevant for dealing with the submarine-patent dilemma. |
| **Contracts** | Contract Provisions and Contract Laws | - Applicability depends on a) whether the policy has been intended to construe contractual obligations or merely to serve as a guideline/recommendation to the standard setting participants, b) whether the policy can be construed as a binding contract between the parties, and c) whether the obligations posed in the policy and interpreted in the light of its wording and other interpretation material such as guidelines for their implementation apply to the specific situation.<br>- Standard organizations and possibly also their members have a standing to sue. Other third-parties are not generally in a position to invoke the contract. | Not applicable | Agreed consequences; Damages;<br>Positive obligation to disclose. | |

# APPENDICES

# APPENDIX 1

Interview Questions, San Francisco Bay Area Companies

INTERVIEWS

## Defining the Operation Model of Your Company

### Basic information

Year of foundation _____

Turnover in 2003 _____

Turnover consists of _____% sales of merchandise _____% sales of services

Average number of personnel_____

Countries of operation

_____

_____

Your company's position within its value network (how dependent are you on your suppliers etc.)_____

_____

_____

_____

_____

Your company's position in relation to its competitors (e.g. market leader, challenger, one of the many small companies, specialized without actual competitors) _____

_____

Main competitive advantages in your company (e.g. technology, marketing know-how, manufacturing, distribution)

_____

_____

Your position in the company _____

### Inputs of Your Company's Innovation (products, processes) Process (R&D)

1) What percentage of the R&D you invested in last year was conducted within your company? _____

   Has this percentage increased or decreased from 3 years ago? _____

2) What percentage of the R&D you invested in last year was done in collaboration with someone? _____

   Has this percentage increased or decreased from 3 years ago? _____
   With whom did you cooperate, and to what extent (e.g. university, supplier, distributor, complementor, competitor)? _____

   _____

   What have been the main reasons to initiate collaboration? _____

   _____

   What has been the most typical form of collaboration?_____

   _____

   Has collaboration with certain "group" in your value network become more important within the last 3 years?
   If yes, please identify the "group"_____

3) What percentage of your R&D activities last year was based on external technology?_____

   Has this percentage increased or decreased from 3 years ago?_____

Tel: + 358 9 4511
Fax: + 358 9 694 9768
Email: info@hiit.fi
Web: www.hiit.fi

Mailing address:
Helsinki Institute for Information Technology,
P.O.Box 9800,
FIN-02015 HUT, Finland

Street address:
Tammasaarenkatu 3,
Helsinki,
Finland

HELSINKI INSTITUTE FOR INFORMATION TECHNOLOGY

4) Is your company actively investing in, partnering and/or acquiring start-ups _____

Has "collaboration" with start-ups become more important within the last 3 years? _____

If yes, why?_____

5) How does the cooperation with various companies in your value network affect your R&D directions, your products and services?_____

_____

_____

## Outputs of Your Company's Innovation (products, processes) Process

1) What percentage (approximately) of the sales of your products and services last year came from internally developed technologies? _____

Has this percentage increased or decreased from 3 years ago? _____
Do you often have to license patents from other companies in order to be able to manufacture a product/offer a service you have developed within your company? _____

2) What percentage (approximately) of the sales of your products and services last year came from technologies licensed from other companies/universities? _____

Has this percentage increased or decreased from 3 years ago? _____

3) What percentage (approximately) of your net income last year came from technology licensed out to other companies (to be used in their products and services)? _____

Has this percentage increased or decreased from 3 years ago? _____

4) What percentage (approximately) of your last year's licensing income came from pure patent licensing (only patents, no other deliverables)? _____

Has this percentage increased or decreased from 3 years ago? _____

## (Un)successful projects

1) How many internal R&D projects were terminated in 2003? _____

Has this number increased or decreased from 3 years ago? _____

2) What is the extent that in-licensed technologies never get to be used in your company's products or services?

_____

Has this increased or decreased from 3 years ago? _____

3) What percentage of the R&D projects that have been terminated earlier have been reviewed at a later date? _____

Has this percentage increased or decreased from 3 years ago?_____

What were the main factors for the review(s)? _____

_____

4) What percentage of the terminated R&D projects subsequently were offered to external parties for further development? _____

Has this percentage increased or decreased from 3 years ago? _____

5) To what extent that out-licensed technologies/patents never generate royalties? _____

Has this increased or decreased from 3 years ago?_____

Tel: + 358 9 4511
Fax: + 358 9 694 9768
Email: info@hiit.fi
Web: www.hiit.fi

Mailing address:
Helsinki Institute for Information Technology,
P.O.Box 9800,
FIN-02015 HUT, Finland

Street address:
Tammasaarenkatu 3,
Helsinki,
Finland

HELSINKI INSTITUTE FOR INFORMATION TECHNOLOGY

## Attitudes and Practices in Your Company, Features of Your Business Environment

Please, indicate the point in scale 1-5 according to which statement better describes the attitudes and practices followed in your company, and the features of your business environment?

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| The smart people in our field work for us | ☐ | ☐ | ☐ | ☐ | ☐ | Not all the smart people work for us. We need to work with smart people inside and outside our firm |
| There is a lot of venture capital available in our field | ☐ | ☐ | ☐ | ☐ | ☐ | Venture capitalists are not very active in our field |
| University research is not very important for us | ☐ | ☐ | ☐ | ☐ | ☐ | Universities provide valuable ideas and research results for us |
| To profit from R&D, we must discover, develop, and ship technology, products etc. ourselves | ☐ | ☐ | ☐ | ☐ | ☐ | External R&D can create significant value; internal R&D is needed to claim some portion of that value |
| If we discover it ourselves, we will get it to market first | ☐ | ☐ | ☐ | ☐ | ☐ | We don't have to originate the research to profit from it |
| Building a better business model is better than getting to market first | ☐ | ☐ | ☐ | ☐ | ☐ | The company that gets (product) innovations to market first will win |
| If we make the best use of internal and external ideas, we will win | ☐ | ☐ | ☐ | ☐ | ☐ | If we create the most and the best ideas in the industry, we will win |
| Labor mobility is high in our field | ☐ | ☐ | ☐ | ☐ | ☐ | Labor mobility is low in our field |
| Time to market is short in our field (months) | ☐ | ☐ | ☐ | ☐ | ☐ | Time to market is long in our field (years) |
| Product lifecycles in our field are long | ☐ | ☐ | ☐ | ☐ | ☐ | Product lifecycles in our field are short |
| R&D costs in our field are high | ☐ | ☐ | ☐ | ☐ | ☐ | R&D costs in our field are low |
| Manufacturing costs in our field are low | ☐ | ☐ | ☐ | ☐ | ☐ | Manufacturing costs in our field are high |
| Returns on investments are received at the early phases of the product lifecycle | ☐ | ☐ | ☐ | ☐ | ☐ | Returns on investments are received during the entire product lifecycle |
| Most of our innovations are systemic | ☐ | ☐ | ☐ | ☐ | ☐ | Most of our innovations are autonomous |
| There are a lot of start-ups in our field | ☐ | ☐ | ☐ | ☐ | ☐ | Most companies in our field are incumbents |
| We should control our IP, so that our competitors don't profit from our ideas | ☐ | ☐ | ☐ | ☐ | ☐ | We should profit from others' use of our IP, and we should buy others' IP whenever it advances our own business model |

Tel: + 358 9 4511
Fax: + 358 9 694 9768
Email: info@hiit.fi
Web: www.hiit.fi

Mailing address:
Helsinki Institute for Information Technology,
P.O.Box 9800,
FIN-02015 HUT, Finland

Street address:
Tammasaarenkatu 3,
Helsinki,
Finland

HELSINKI INSTITUTE FOR INFORMATION TECHNOLOGY

## Obtaining returns, information and knowledge

### Technology Exploitation

What percentage of (product and process) innovations developed by your company is commercialized through the following?

| | 0-10% | 10-20% | 20-40% | 40-60% | 60-80% | 80-100% |
|---|---|---|---|---|---|---|
| | 2001 2004 | '01 '04 | '01 '04 | '01 '04 | '01 '04 | '01 '04 |
| Internal exploitation (direct investment in production and/or marketing of technology-based products) | ☐☐ | ☐☐ | ☐☐ | ☐☐ | ☐☐ | ☐☐ |
| Technology licensing (to other comp.) | ☐☐ | ☐☐ | ☐☐ | ☐☐ | ☐☐ | ☐☐ |
| Creation of new innovative firms (units, spin-offs) | ☐☐ | ☐☐ | ☐☐ | ☐☐ | ☐☐ | ☐☐ |
| Joint Ventures | ☐☐ | ☐☐ | ☐☐ | ☐☐ | ☐☐ | ☐☐ |
| Other, please specify (_____) | ☐☐ | ☐☐ | ☐☐ | ☐☐ | ☐☐ | ☐☐ |
| Not commercialized at all | ☐☐ | ☐☐ | ☐☐ | ☐☐ | ☐☐ | ☐☐ |

### Protecting and Sharing Information and Knowledge

### Appropriability Mechanisms Used and Their Efficacy

Consider the following mechanisms and answer the following questions by writing the most suitable number from 1 to 5 in the corresponding cell.

| Mechanism | How easy it is for your company to obtain this type of protection for your product or process innovations?<br>1 = very easy<br>5 = very difficult | How well does this mechanism protect your product and process innovations from imitation?<br>1 = very well<br>5 = poorly | How important is this mechanism in creating returns for your company (e.g. how much it creates licensing returns, how much it enhances learning or bargaining power)?<br>1= very important<br>5= moderately important | How frequently is this mechanism used in your company?<br>1 = almost all of our products and services are covered with it<br>3 = only most important innovations are covered<br>5 = it is used very rarely or not at all |
|---|---|---|---|---|
| Patent | | | | |
| Trade secret | | | | |
| Trademark | | | | |
| Copyright | | | | |
| Long-term employment contracts | | | | |
| Non-disclosure agreements with | | | | |

Tel: + 358 9 4511
Fax: + 358 9 694 9768
Email: info@hiit.fi
Web: www.hiit.fi

Mailing address:
Helsinki Institute for Information Technology,
P.O.Box 9800,
FIN-02015 HUT, Finland

Street address:
Tammasaarenkatu 3,
Helsinki,
Finland

HELSINKI INSTITUTE FOR INFORMATION TECHNOLOGY

| | | | | |
|---|---|---|---|---|
| employees | | | | |
| NDAs with other organizations | | | | |
| Non-competition contracts | | | | |
| Other types of contracts with other organizations | | | | |
| Passwords and other means to restrict access | | | | |
| Trying to keep company's key employees within the firm (e.g. providing incentives, options) | | | | |
| Controlling communication of employees (e.g. in collaboration with other firms) | | | | |
| Being first in the market | | | | |
| Continuous innovation and improvement of the technology | | | | |
| Inherent difficulty to transfer knowledge (the tacit nature of it) | | | | |
| Complexity of the technology | | | | |
| Control over complementary assets | | | | |

1) Do you use different mechanisms depending on whether you do R&D alone or in collaboration with other organizations? What are the main differences? _____

_____

_____

_____

_____

2) Are there differences depending on the type of organization your company collaborates with, e.g. university, supplier, distributor, customer, complementor, competitor? What kind of differences? _____

_____

_____

Tel: + 358 9 4511
Fax: + 358 9 694 9768
Email: info@hiit.fi
Web: www.hiit.fi

Mailing address:
Helsinki Institute for Information Technology,
P.O.Box 9800,
FIN-02015 HUT, Finland

Street address:
Tammasaarenkatu 3,
Helsinki,
Finland

HELSINKI INSTITUTE FOR INFORMATION TECHNOLOGY

3) Do you use different mechanisms depending on whether your aim is to produce and market the product yourself or to "give it away", e.g. licensing, public domain? What are the main differences? _____

_____

_____

_____

4) Have your company's attitudes towards different protection mechanisms changed during the last 3 years? If yes, how have they changed and what are the main reasons for the change? _____

_____

_____

_____

3) When you consider other types of innovations (e.g. new distribution channels, more efficient marketing), what are the main differences in utilization of various appropriability mechanisms compared to product and process innovations)?_____

_____

_____

_____

Tel: + 358 9 4511
Fax: + 358 9 694 9768
Email: info@hiit.fi
Web: www.hiit.fi

Mailing address:
Helsinki Institute for Information Technology,
P.O.Box 9800,
FIN-02015 HUT, Finland

Street address:
Tammasaarenkatu 3,
Helsinki,
Finland

HELSINKI INSTITUTE FOR INFORMATION TECHNOLOGY

**Your Company's Patent Strategy (these are the themes we are hoping to discuss during the interview, the following questions are examples of issues we are interested in, we are not expecting you to provide us with any confidential information)**

## General Questions

1) What is the role of patents in your business?
2) What is the size of your company's patent portfolio compared to other companies in your field? How has your patent portfolio developed during the last five years?
3) What percent of your company's patents is in use in your business?
4) How do you generally manage your patent activities (form of your patent strategy, who develops it and who implements it)?
5) How well is your patent strategy integrated to your business strategy?
6) How do you measure whether your "IP manager" has done a good job? What are the incentives offered to them (e.g. cost center approach/profit center approach)?

## Patenting and acquiring patents outside your company

1) What type of inventions do you typically patent?
2) Does your company actively seek to patent technologies that might have licensing or other e.g. leveraging value? How do patenting strategies differ in these contexts compared to protective patenting?
3) When does your company decide not to apply for patents? What are the main reasons for not patenting? What is considered as an alternative for patenting?
4) Does your company actively acquire (not through licensing) patents from other firms?
5) How important role do patents play when you think about partnering with someone/buying a company etc.?

## Patents Covering Company's Own Products, Services and Processes

1) What is the percentage of patents granted/applied that cover inventions exploited commercially through your company's own production?
2) Are patents covering commercialized products/services/processes used to exclude competitors?
Do you think that patents covering commercialized products/processes/services are efficient for slowing down the development and commercialization of competing products etc? (ease of designing around etc.)
3) Does the existence of patents affect your product/service prices? If yes, how?
4) What percent of your commercial products/processes/services are not patented? How are they protected?

## Patents licensed/reassigned

1) Do you generally reassign patents? Is it typical in your field? (increasing/decreasing)
2) What is the percentage of your patents/patent applications that are licensed commercially? (incl. patent-only licenses, patents combined with other assets, cross-licenses)
3) What are the main reasons for licensing out patents/technologies? To whom do you typically license your patents?
4) What other than monetary revenue is achieved through licensing out patents/technology?
5) Does your company actively seek to license its technology/patents to others? If yes, how does your company find the potential licensees?

## Patents used for leverage

1) Do patents have leverage value to your company? (e.g. better negotiation position)
2) What kind of leverage value? Whom does your company want to have leverage over?
3) Is it typical that your company's patents are licensed to others and vice versa (cross-licensing) in order to maintain freedom of operation?
4) Have your patents been effective in avoiding litigation?
5) Do you use your patents in order to gain access to different types of innovations, knowledge assets etc. created by other companies? How? How important are patents in this respect?

Tel: + 358 9 4511
Fax: + 358 9 694 9768
Email: info@hiit.fi
Web: www.hiit.fi

Mailing address:
Helsinki Institute for Information Technology,
P.O.Box 9800,
FIN-02015 HUT, Finland

Street address:
Tammasaarenkatu 3,
Helsinki,
Finland

HELSINKI INSTITUTE FOR INFORMATION TECHNOLOGY

## Patents used for reputation, marketing etc. purposes

1) Do patents have reputation value to your company? If yes, what kind?
2) Do you think patents could have negative connotation e.g. in some markets? (e.g. because software patents are often opposed in grassroots levels)
3) Are patent awards a good way to provide incentives to employees? How is this done? What other tools are used? Are your employees rewarded according to the importance of the patent? Are they rewarded for finding good external technologies?

## Infringement

1) What kind of means are available to you in order to manage the risk of infringing on other's patents? (patent searches, infringement check points etc.)
2) If you notice that your product/process/service infringes on someone's patent, how do you generally proceed?
3) How often is your company required to license other companies' patents in order to be able to commercialize new products or services? What is the magnitude (how many patents etc.)? What do these licenses typically contain?
4) How often does it turn out ex post that your products/processes/services infringe on someone's patent? How do you generally proceed?
5) If infringement of your company's patents is detected, how do you typically proceed? What affects your decision?
If it is a question of those patented inventions that your company utilizes in its products/processes/services, would you be willing to grant a license e.g. to your competitor?
6) How actively is your company searching for patent infringements? How is it detecting infringements? Is it focusing on certain companies?

## Your Company's Technology Licensing Practices (B-to-B)

## Licensing out

1) What type of technology does your company typically license out? What type of technology you don't want to license out at all?
2) Who are the potential licensees, what is their relation to your company?
3) What types of licensing agreements do you currently use (standard agreements, everyone able to license etc.) In what type of situations do you determine your license terms beforehand? In what type of situations would you be willing grant a license to everyone? Would your company be willing to license even if the monetary compensation would be low (e.g. royalty free standardization)? What kind of situations would you regard this as beneficial?
4) What are the main differences in license terms used with your suppliers, distributors, competitors, complementors and customers?
5) How important is it to your company that its competitors are not able to access the technology?
6) Does your company typically seek to maintain control over the technology it licenses out? In what type of situations and how does it seek to maintain that control? (sublicensing, grant backs, control over technology's quality etc.)
How does your company typically deal with further developments and modifications its licensees and your company makes to the technology?
7) Under what circumstances would your company be willing to grant an exclusive license? a sole license? non-exclusive licenses? What affects these choices?
8) Does your company license software out under open source licenses? Under what licenses? When are these licenses used? Would your company be willing to license other (patented) technologies (not merely software) under non-restrictive, open source type licenses? Under what circumstances? Does your company see any benefits to this approach?
9) How does your company extract external ideas through licensing out? Is this regarded important?
10) What is the role of secrecy in licensing out?
11) What are the main risks involved in licensing out?

12) How do you see that the changing roles of one company being your competitor/complementor/customer/supplier at the same time but in different situations affect your licensing practices?
13) What is the role of learning in licensing out? Who learns and what?

## In-Licensing

1) What does your company typically license in? (e.g. complementary technologies, non-strategic technologies) What kind of technology does it want to develop in-house?
2) What is included in technology licenses? (patents, know-how, trademarks) What affects these choices?
3) What type of licensing terms does your company prefer? Why? How much control over the technology is your company willing to give the licensor? What affects these choices? Does your company usually want to have the right to sublicense and maintain further developments under its control?
4) Does your company typically seek to gain more leverage over the licensor e.g. by patenting improvements?
5) Does your company actively seek to license in new technologies?
6) Is your company utilizing open source licensed software? Under what circumstances? What types of open source licenses? What are the risks of open source? How does the company handle with those risks?
7) What is the role of learning in licensing in? Who learns and what?

## Standardization

1) Is your company active in standardization? What is the level of your activity?
2) What types of standards does your company prefer (open, proprietary, de facto)? Why?
3) Do you seek to get your patented technology incorporated into a standard? If, yes what is your motivation (royalties, cross-licensing opportunity), How? Do you continue filing patent application during standardization processes? Do you alter your patent claims to fit the standard specifications better?
4) Do you see that there are benefits in hiding patents/unpublished patent applications if the standardization organization's patent policy does not require publishing? Why?
5) Would you be willing to grant a royalty-free license to your patented technology that is essential for using a standard? What is your response to RAND terms? If you had patents that related to a standardized technology, but you had not participated in the standardization process, what would you do?
6) Do you consider standardization as a good way to get to know what the others in the industry are doing?
7) What do you consider as being the negative side of patents in the context of standardization?

Contact information:
Aura Soininen
Helsinki Institute for Information Technology/ Visiting Scholar at SIMS, UC Berkeley (until 11/22/04)
102 South Hall, Berkeley, CA 94720
Aura.Soininen@hiit.fi

Pia Hurmelinna
Lappeenranta University of Technology, Dept. of Business Administration / Visiting Scholar at SIMS, UC Berkeley (until 10/31/04)
102 South Hall, Berkeley, CA 94720
Pia.Hurmelinna@lut.fi

# APPENDIX 2

Interview Questions, Finnish ICT companies (Questions translated into English)

**Interview Questions Finnish ICT Companies**
Interviewer Aura Soininen

1) What are the main sources of the company's competitive advantage? (differentiation/prices) What are the company's core business areas?
2) The competitive environment of the firm and the role of patents in that environment?
    - What is the significance of other companies' patents to the company?
    - Are there any special characteristics that apply in the environment in which the company operates?
3) What is the role of technology and patents in the company's business operations in general?
    - Would the company have developed and commercialized its technologies even if patent protection was not available?
4) How does the company protect its technologies?
    - Evaluation of the efficiency of different protection mechanisms in order to appropriate returns on R&D investments (below). When does the interviewee consider it appropriate to utilize them?
        i. Patents
        ii. Copyrights
        iii. Secrecy
        iv. Lead time
        v. Complementary products and services
        vi. Other
5) Patent position of the company
    - How many patents and patent applications does the company have, and in which countries?
    - How has the situation evolved and why?
6) Patenting
    - Why does the company apply for patents?
    - What are the reasons for not patenting? (e.g. too expensive, the invention is published, the ease of designing around)
    - What does the company patent and why?
    - Where does the company patent and why?
    - How does the company patent (many patents/one patent) and when?
    - What number of the applied patents is eventually granted?
7) The role of patent protection (in more detail):
    - How does the company utilize its rights?
        i. Own use?

        - What share of the company's patents is at use in its products?
        - Do patents affect the product prices?
    ii. Licensing? Cross-licensing?
        - Standardization?
    iii. Do patents play a role in collaboration and partnering? What kind of a role?
    iv. Value in marketing? (in respect to shareholders and in respect to consumers)
    v. Use as collaterals?
    vi. Other
- Do patents promote innovativeness within the company, and how?
- Does the company use patents as sources of information?

8) Infringement
    a. How does the company monitor whether someone infringes its rights?
    b. How does the company monitor its competitors and how? (databases at use?)
    c. How does the company react if it becomes aware of a potential infringement?
    d. How often does the company become aware of potential infringements?
    e. What are the problems in regard to detecting infringement?
    f. How does the company make sure that it does not infringe the patents of other companies?
        i. Does it have any centralized patent mapping?
        ii. How does it evaluate whether someone's patent is relevant?
9) Patent strategy of the company:
    a. What does the patent strategy of the company include (objectives and execution)?
    b. The form of the patent strategy (written, operational/formed in practice)?
    c. Does the company have an employee invention policy? How are the remunerations graded in that policy?
    d. The organization of the company and the execution of the patent strategy?
    e. Is the patent strategy available within the company?
    f. What is the link between the company's patent strategy and its business/corporate strategy? Do shifts in business strategy affect its patent strategy, and if yes, how?
10) When does the company decide to give up its patents/patent applications and who makes those decisions?
11) Other considerations? Trends in the industry? What concerns with the development?

**ACTA UNIVERSITATIS LAPPEENRANTAENSIS**

**218**. SAINIO, TUOMO. Ion-exchange resins as stationary phase in reactive chromatography. 2005. Diss.

**219**. CONN, STEFFEN. Software tools to support managers: development and application to new product development and strategic alliance management. 2005. Diss.

**220**. TYNJÄLÄ, TERO. Theoretical and numerical study of thermomagnetic convection in magnetic fluids. 2005. Diss.

**221**. JANTUNEN, ARI. Dynamic capabilities and firm performance. 2005. Diss.

**222**. KOLA-NYSTRÖM, SARI M. In search of corporate renewal: how to benefit from corporate venturing? 2005. Diss.

**223**. SARÉN, HANNU. Analysis of the voltage source inverter with small DC-link capacitor. 2005. Diss.

**224.** HUUHILO, TIINA. Fouling, prevention of fouling, and cleaning in filtration. 2005. Diss.

**225.** VILJAINEN, SATU. Regulation design in the electricity distribution sector – theory and practice. 2005. Diss.

**226**. AVRAMENKO, YURY. Case-based design method for chemical product and process development. 2005. Diss.

**227**. JÄRVINEN, KIMMO. Development of filter media treatments for liquid filtration. 2005. Diss.

**228**. HURMELINNA-LAUKKANEN, PIA. Dynamics of appropriability – finding a balance between efficiency and strength in the appropriability regime. 2005. Diss.

**229**. LAARI, ARTO. Gas-liquid mass transfer in bubbly flow: Estimation of mass transfer, bubble size and reactor performance in various applications. 2005. Diss.

**230**. BORDBAR, MOHAMMAD HADI. Theoretical analysis and simulations of vertically vibrated granular materials. 2005. Diss.

**231**. LUUKKA, PASI. Similarity measure based classification. 2005. Diss.

**232**. JUUTILAINEN, ANNELI. Pienen matkailuyrityksen yrittäjän taival. Oppiminen yrittäjyysprosessissa. 2005. Diss.

**233**. BJÖRK, TIMO. Ductility and ultimate strength of cold-formed rectangular hollow section joints at subzero temperatures. 2005. Diss.

**234**. BELYAEV, SERGEY. Knowledge discovery for product design. 2005. Diss.

**235**. LEINONEN, KARI. Fabrication and characterization of silicon position sensitive particle detectors. 2006. Diss.

**236**. DUFVA, KARI. Development of finite elements for large deformation analysis of multibody systems. 2006. Diss.

**237**. RITVANEN, JOUNI. Experimental insights into deformation dynamics and intermittency in rapid granular shear flows. 2006. Diss.

**238**. KERKKÄNEN, KIMMO. Dynamic analysis of belt-drives using the absolute nodal coordinate formulation. 2006. Diss.

**239**. ELFVENGREN, KALLE. Group support system for managing the front end of innovation: case applications in business-to-business enterprises. 2006. Diss.

**240**. IKONEN, LEENA. Distance transforms on gray-level surfaces. 2006. Diss.

**241**. TENHUNEN, JARKKO. Johdon laskentatoimi kärkiyritysverkostoissa. Soveltamismahdollisuudet ja yritysten tarpeet. 2006. Diss.

**242**. KEMPPINEN, JUKKA. Digitaaliongelma. Kirjoitus oikeudesta ja ympäristöstä. 2006.

**243**. PÖLLÄNEN, KATI. Monitoring of crystallization processes by using infrared spectroscopy and multivariate methods. 2006. Diss.

**244**. AARNIO, TEIJA. Challenges in packaging waste management: A case study in the fast food industry. 2006. Diss.

**245**. PANAPANAAN, VIRGILIO M. Exploration of the social dimension of corporate responsibility in a welfare state. 2006. Diss.

**246**. HEINOLA, JANNE-MATTI. Relative permittivity and loss tangent measurements of PWB materials using ring resonator structures. 2006. Diss.

**247**. SALMELA, NINA. Washing and dewatering of different starches in pressure filters. 2006. Diss.

**248**. SISSONEN, HELI. Information sharing in R&D collaboration – context-dependency and means of governance. 2006. Diss.

**249**. PURANEN, JUSSI. Induction motor versus permanent magnet synchronous motor in motion control applications: a comparative study. 2006. Diss.

**250**. PERÄLÄ, KARI. Kassanhallintakäytännöt Suomen kunnissa. 2006. Diss.

**251**. POUTIAINEN, ILKKA. A modified structural stress method for fatigue assessment of welded structures. 2006. Diss.

**252**. LIHAVAINEN, VELI-MATTI. A novel approach for assessing the fatigue strength of ultrasonic impact treated welded structures. 2006. Diss.

**253**. TANG, JIN. Computational analysis and optimization of real gas flow in small centrifugal compressors. 2006. Diss.

**254**. VEHVILÄINEN, JUHA. Procurement in project implementation. 2006. Diss.

**255**. MIROLA, TUULI. Impacts of the European integration and the European Union membership on Finnish export industries – Perceptions of export business managers. 2006. Diss.

**256**. RAUMA, KIMMO. FPGA-based control design for power electronic applications. 2006. Diss.

**257**. HIRVONEN, MARKUS. On the analysis and control of a linear synchronous servomotor with a flexible load. 2006. Diss.

**258**. LIU, JUNHONG. On the differential evolution algorithm and its application to training radial basis function networks. 2006. Diss.

**259**. LAITINEN, RISTO. Development of LC-MS and extraction methods for the analyses of AKD, ASA, and rosin sizes in paper products. 2006. Diss.

**260**. KUISMA, PETRI. Seinärakenteen infrapunakontrastin pienentäminen käyttäen ilmajäähdytystä ja säteilysuojausta. 2007. Diss.

**261**. ELLONEN, HANNA-KAISA. Exploring the strategic impact of technological change – studies on the role of Internet in magazine publishing. 2007. Diss.