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FACTORS THAT MODERATE INTELLECTUAL PROPERTY STRATEGY
A Case Study of Two Companies in the Software Sector

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Factors that moderate intellectual property strategy
“He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me.”

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SUMMARY

This thesis is a case study of two companies within the software sector. It investigates how certain factors moderate company strategy with regards to intellectual property, focusing especially on the patenting system as a protection mechanism for software. The sectoral system of innovation theory is used as a framework when analysing the empirical material. Six selected propositions are investigated, and I found that the primary function of the patenting system, to protect the patented object from imitation, is not a significant factor in IP strategy for the two companies. The patent system is used in different ways that seem consistent with company size. The most important factor seems to be the importance of having the ability to negotiate with competitors. Initiative to apply for patents mostly comes from the top management; this seems to be based on the ideals and attitudes most of the technology developers in both companies have towards the patenting system. Organisational structure in the two companies clearly enables technological change and thus encourages innovation, and the investigated companies are recognised as highly innovative. I find that respondents within the two companies to an extent reject patents as accurate indicators of innovation, which presents a significant challenge for the common practice of using of patents as innovation indicators.
PREFACE

The ESST master program has taught me very much. I have evolved on a personal level and have gained insight within a very interesting cross disciplinary field of knowledge. Through the three semesters that the master program consists of, there have been many people that have contributed to the final result of the study; the master thesis. The various contributors to the teaching schedule deserve big thanks for inspiring and interesting lectures. Magnus Gulbrandsen has been an excellent lecturer within the second semester and an encouraging supervisor for this thesis. Many thanks also to the ESST administration Ole Ronny Tveite-Strand and Olav Wicken for providing administrative and professional guidance whenever needed. I am also very grateful for the encouraging and co-operative interview respondents that have been a part of the process.

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1 INTRODUCTION

The general theme of this master thesis is to identify and analyze the different factors influencing two software companies’ approach towards intellectual property (IP) protection strategies. I focus on identifying how an institution like the patent system affects how software companies choose their IP strategy. My research question is which factors influence a company's decision to patent software, and what the patents are used for? Software patents is a current debate of interest within the software industry, and this thesis clarifies what lies behind the decision to protect knowledge in the software sector, and thus gives a nuanced picture of the decision to patent software being so much more than a binary choice of yes or no.

There exists a great deal of literature within the theme innovation and patenting, as patents are commonly used as indicators of innovation activity in various surveys. Despite this, there is developed little research and literature regarding the software sector and the underlying issues leading to the decision to patent and further towards an IP strategy. To be able to explore this theme I developed an analytical framework based on the theory of sectoral innovation systems by F. Malerba. In this type of innovation system, institutions such as intellectual property rights shape organisations and individuals’ actions. The organisations and individuals in turn generate and exchange knowledge leading to innovation (Malerba, 2005b). To understand how the systemic conditions on macro level influence a company’s strategic IP choices on micro level, it is necessary to investigate how a company choose their IP strategy and which factors are weighted in this process.

A common perception is that the decision to protect intellectual property or not is a more or less binary decision, but is merely shaped by different natural factors within the field of intellectual property rights (IPR). My analytical framework consists of selected propositions that
describe which factors influence a software company’s IP strategy and choices. These six factors are visualized in my theoretical framework.

1.1 Why write about this theme?

Research within the topic of the knowledge economy and how it affects the world is increasing within different scientific environments today. The term knowledge economy can be confusing, but I define it as a descriptive term of the changing nature of the world’s economy. Today’s economy is progressing towards the fact that natural physical resources are no longer the sole basis of economic growth. It is being replaced by the ability to create intangible ideas leading to production of new products or services based on what is already applied. This in turn leads to reduced costs because the production is already in place, and new ideas exploit the production in different ways leading to increased profit based on existing production solutions (Foshaug, 2008; Harison, 2008).

Patents are one form of IPR that has been around for a long time, and it is a system based on the assumption that it promotes innovation. One of the present challenges within the patent system is that the traditional property right on a natural resource is different from a patent on a product or a solution emerging from a new idea based on existing knowledge. When knowledge is dispersed it leads to innovation – and the fact that patents restricts access to information and knowledge could mean that the system inhibit and/or slow down the pace of innovation and knowledge diffusion (Foshaug, 2008). The software sector is an example of a high technology business with rapid innovation pace. Internet makes information easy accessible and simple to share. Resources are unlimited and based on digital information which is increasingly easy to access. In this context I argue that it is important to visualise what kind of relationship the software sector has with intellectual property rights, and what priorities are made.
Building blocks of the thesis

This thesis consists of seven chapters. The chapter of introduction presents a brief overview of the topic and a short introduction of theme and research questions. Further the chapter of theoretical framework follows. This chapter reviews central literature and related topics which will be linked further with the empirical chapter. Following the theoretical framework is chapter number three which contains a presentation of research and design of the thesis. I present justification for choosing the case study method, and briefly write about interviews, ethics, and finally about validity and reliability. Chapter four is the context section where I go through topics and themes relevant for the research questions, in addition to present the two companies used as cases. The following number five is the empirical part where I present and analyse my findings in relation to the previous presented literature and propositions in chapter number two. In the final chapter I conclude and suggest possibilities for further research within the theme of the thesis. After the conclusion the bibliography and an appendix follows.
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2 THEORETICAL FRAMEWORK

In the following chapter I will present the theoretical framework used in this thesis. I explain why I have chosen the sectoral system of innovation theory and what it consists of. Further I elaborate on innovation and institutions within the software sector, the patenting institution in specific. Additional and alternative protection functions are described and the open source debate is accounted for. Finally I present six propositions I expect to find in the two companies investigated.

Intellectual property is a term commonly used in business, but it can for many seem like an abstract phrase and is important to define it for this thesis. Intellectual property is a collective term for creations of the mind used in commerce. The term is divided in two categories: Industrial property and Copyright. Industrial property is e.g. inventions (patents), trademarks, industrial designs, and geographic indications of source. Copyright includes literary and artistic works, and architectural designs (WIPO, 2010). During the last fifty years the knowledge-based economies, also called the weightless economies, has emerged. Knowledge-based goods are mostly based on intangible modes of distribution and use rather than on physical elements. The growth of patent applications in the new industries shows a growing attempt by innovators to strengthen their legal rights over ideas (Foshaug, 2008; Harison, 2008, p. 84).

The sectoral systems of innovation framework will be useful for analysing the different factors that affects the decision-making process and thus the business strategy in regards to protection. The decision lays the ground for intellectual property protection e.g. patenting or not, which in turn among other things affects the innovation capabilities and provides facts for the use of patents as innovation indicators in surveys. Malerba states that “a sectoral system approach provides the identification of ‘system failures’ and the related variables which should
be policy targets” which is the case of the patent system as an institution (2005b, p. 79). Further I make use and analyse a study on why companies patent (Blind, Edler, Frietsch, & Schmoch, 2006), to investigate the traditional incentive hypothesis of the patent system and innovation, where it is believed that the patent system works as an incentive for competitors to do more research and thus leading to increased innovation. I do this in order to go deep in to the relevant topic of interest and analyse the factors that affect and control the decision within such a significant, but young and heterogeneous sector as the software sector. This literature is useful in the analysis of the empirical material because it provides an insight into understanding the relations between and the actual moderating factors and the relevant surrounding institutions. I will also present the open source debate, and investigate what the main arguments are in order to present a picture of what role the debate plays to influence IP strategy.

Firstly, I will analyse what place the patent system has in a sectoral framework and what the theory suggests that I find in the two selected cases. Secondly, I will use the six factors framework to define a company’s role on intellectual property protection strategy. The framework is illustrated in the model below.

```
Sectoral system of innovation

Patent institution

Company

Moderating factors

- Protection from imitation
- Block competitors
- Negotiations and prevention of patent infringement by third parties
- Importance of patents grows with company size
- Top management commitment
- Organisational structure enabling technological change

IP strategy

Innovation
```
The model illustrates that within a sectoral system of innovation, an institution affects actors (such as a company), which in turn creates a strategy for intellectual property protection. The strategy is affected by different factors, here illustrated by six bullet points. The model also shows that the patent institution could have a direct and indirect influence on innovation through the process of a company choosing an IP strategy and how they choose which objects to patent. In the next section I examine the theory of innovation systems and the place of institutions within such a system.

2.1 Innovation systems and institutions

The literature regarding systems of innovation is characterised by a heterogeneous research matter on the topics of different dimensions within a system of innovation. The most common systems are regarded as supernational, national and local (such as regional, local and sectoral within the geographical boundaries) (Edqvist, 1997). An innovation system consists of determinants of innovation, and these elements are closely related and linked to each other. The literature within the topic of innovation systems is based on the notion that innovation within firms rarely happens in isolation, but rather in interference with other institutions and organizations – some kind of system exists for innovation to emerge. The system innovation approach is widely acknowledged and used, and Edqvist (2005) points out several strengths of the approach. Among other things, he indicates that the approach places a lot of emphasis on knowledge leading towards innovation as a central part of the system. He also claims that the approach is holistic, in the sense that it tries to incorporate the various determinants in an innovation process, trying to exclude as little as possible. As a consequence of knowledge playing a central part in the system, in regards to not only firms, but also other actors within innovation in the making, it is further important to focus on innovation not being a linear process but a case of communication loops and interdependence leading towards innovation (Edqvist, 2005). What is even more interesting is that this system approach as a theoretical
framework also focuses on clarifying what role institutions play for innovation. Coriat and Weinstein (2004) points out that institutions regulate uncertainties and define structure under which the economy and actors operate upon. They separate between two types of institutions, for clarification and structural purposes, within the loosely defined concept rules of the game. One type is the institutions that provides accepted or imposed rules of the game upon the actors. The patent system is an example of this because it has a national base and a national form of application common for all agents or companies within the national borders. The other type is the ones that are the result of negotiations between different actors in which they agree to follow.

In regards to the focus of this thesis, it is interesting to see what Coriat and Weinstein say about institutions worthy of attention in regards to innovation. Scientific and technological knowledge provides basic goods for innovation, and they state “the system of intellectual property rights – inasmuch as it defines the conditions to capture rents from innovations – is of crucial importance here” (Coriat & Weinstein, 2004, p. 332). They further define the important innovation aspect as the decisions made nationally that defines appropriability conditions for innovations. This clearly indicates the importance of incorporating innovation as a key point when deciding on a strategy for intellectual property within a firm, and clarifies the strong link between the two terms. Further I present how the sectoral system of innovation is defined, and which building blocks it consists of.

**The building blocks of a sectoral system of innovation and production**

When writing about the software sector it is beneficial to clarify the definition of a sector. A sector is characterised and unified generally by a technology field or a group of products. It can be defines in many ways, but Franco Malerba defines a sector as “a set of activities which are unified by some related product groups for a given or emerging demand and which share some basic knowledge” (2005b, p. 65). The sectoral system theory is based on several well known
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Theories within social sciences. The two main theories is the innovation system approach (Edqvist, 2005; Lundvall, 2010), and also the evolutionary theory as a broad approach towards learning and knowledge. A sectoral system evolves as learning and knowledge change over time. The system changes and transforms through the co-evolution of its different elements. The different elements coexist together and are interdependent upon each other. The different elements are placed in three main building blocks that constitute a sectoral system. These are knowledge and technologies, actors and networks, and institutions.

When separating any sectors apart the difference between knowledge and technologies are apparent. Thus the object of sectoral boundaries is more at focus by which they change over time within companies with rapid innovation (Malerba, 2005b). The software sector is known as a sector with a vast and differentiated knowledge base, where IPR, standards and alliances play a major role for innovation. The knowledge base is a prerequisite for the knowledge and technologies being developed within companies and a sector as a whole, and differs across sectors in terms of domains, cumulativeness and appropriability conditions. The knowledge base in the software sector could be classified as distributed in the way that many companies in the software sector are multi-technology firms (Granstrand, Patel, & Pavitt, 1997).

Actors and networks are also an important building block in a sectoral innovation system. A sector is defined by Malerba (2005b) as composed of heterogeneous agents that are either organisations or individuals. These different organisations may be firms and non-firm organisations. The specific attention to non-firm organisations is especially important within the sectoral system theory. The various agents are characterised by specifics such as learning processes, competencies, beliefs, goals, organisational structure and behaviours. The agents in turn interact through various processes of communication, exchange, cooperation, competition and command. They are connected through market and non-market relationships.

When it comes to institutions the system approach towards innovation has put institutions in its place influencing innovation activities because institutions are the basic
structure of any economy. Institutions are an important factor because the different agents and their actions to reach a goal are shaped by institutions. The agents’ form of communication, such as their cognition, actions and interactions, are directly shaped by the relevant institutions. The term institutions describes norms, routines, and practices in addition to e.g. rules, standards and laws (Malerba, 2005b). It is commonly recognised as “the rules of the game”. The patent system is an example of an institution playing a major role in a sector such as software. It is a fact that the patent system favours some sectors and is more challenging within others. A traditional example is to compare e.g. the pharmaceutical sector and the software sector. Where a medicine consists of a specific set of compounds, a software process or solution is based on previous technology and is complex and intangible.

This section has explored what a sectoral system of innovation consists of, but for a company to develop and grow, innovation is crucial. In the next section I will look at innovation and institutions characteristics within the software sector.

### 2.2 Innovation and institutions in the software sector

Within a sector Malerba defines innovation as “a process which involves systematic interactions among a wide variety of actors for the generation and exchange of knowledge relevant to innovation and its commercialisation” (2005b, p. 66). For the importance of illustration I refer to the following figure to show how innovation is affected by the different building blocks. Knowledge and technologies influence the knowledge base of actors and networks. Institutions shape agents which in turn facilitate innovation.
Innovation is derived as a result from technological change, and the software sector has certain specifics when it comes to technological change. It is in this sector difficult to separate radical and incremental innovation apart as the innovations are more or less cumulative. It is difficult to draw a line where the technological change stops being incremental and start being radical and vice versa. However, when it comes to how knowledge is gained Steinmueller states that “knowledge [in the software sector] is gained through imitation and experimentation, in problem solving related to specific and situated bottlenecks or innovative ideas” (2004, p. 221). Technological change in this sector is difficult to structure and analyse, because it is all interconnected somehow, and it is more or less cumulative. Knowledge builds on other knowledge and communication is difficult to put in to a system. Steinmueller further says “innovation performance in the software industry is influenced by the prevalence of incremental change occurring in a complex systemic context in which there is rarely a well specified “trajectory” of improvement” (2004, p. 223). The communication of information leading to innovation is dispersed and somewhat untraceable within the software sector. Despite this, the software sector facilitates rapid innovation and represents a high technology business with significant innovative capabilities. Innovation and new ideas is usually incremental and built on the existing core technology. There is a current debated issue of whether software source code should be
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accessible to everyone or strictly owned by the companies that develop software technology. In the following section the open-/closed source debate is investigated.

Open-/closed source debate

The main characteristics differentiating the profit seeking software companies and the open source followers is the degree of openness within the source software code; the degree of transparency. According to Deek & McHugh (2008) the vision for the open source movement is to keep software transparent so that everyone can understand and further develop the software technology. The terms around open/closed source software are not fully standardised, and are used in different contexts with different meanings. Generally speaking closed source software means software where the source code is not available. It can also be known as proprietary software, indicating a copyright limitation. Within this topic it is important to separate between the fact that software products are not sold, but are licensed. A proprietary software product is copyrighted and indicates ownership of the software, which in turn is licensed to customers that can use the software under specific terms. This is what specifically separates open source software from proprietary software – the fact that customers use the licensed product within specific restraints. Whereas with open source software; the user essentially could become a co-developer with access to the source code.

The two opposites have coexisted for a couple of decades and evolved side by side, since the 1970s. The most familiar open source software program worldwide today is the operating system Linux. It can be used on various computers and is on some levels a challenger to Windows operating systems (Evans & Layne-Farrar, 2004). The open source movement has followers all over the world, but has challenges in certain areas. Two main issues are the challenges with developing user interfaces which are user friendly enough for the mass market, in addition to developing formal business models related to the free distribution of software for the users (Steinmueller, 2004).
Where the open source favours accessible source code, the patenting system favours a protective mechanism to ensure appropriability conditions and enables the patent holder to have control over who copies what. In the next section the patent institution is looked at in relation to the software sector.

**The patent institution within the software sector**

To patent software is a fairly new field of knowledge, dating back to 1986 where a trial in USA laid the ground for further guidelines regarding software patents. USA has been the leading country in this field where other areas has adopted the same regulations in similar form heavily inspired by USA. Within Europe, the EU Council Directive on the Legal Protection of Computer Programs adopted more or less the guidelines made by United States Patent and Trademark Office (USPTO) in 1996. The key principles worth noticing with regards to software patents is the distinction between what Harison defines as “the patented ideas and the non-patentable (but copy-protected) expressions that are imbedded in software technologies and goods” (2008, p. 69). Interestingly, Harison also states what he defines as the overall aim of software patenting “to protect ideas and principles embedded in software that are not covered by copyrights” (2008, p. 70).

The patent system is an institution that has a great deal of influence within software companies, especially the major ones. The institution has a significant effect on companies and a great deal of consideration is put into how they want to use the system. The software sector has over time adjusted to the patent system and within the sector today some inventions are patented, but far from all. This is probably because the intellectual property strategy is usually debated and decided on management level. Moral as well as economic circumstances have to be discussed and taken in to account when deciding on a strategy. The most common ways to separate software patent strategies is to divide between defensive and offensive/aggressive. Most of the market leaders within the software sector have a combination of both strategies, leaning
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towards one. For smaller companies to decide a patent strategy can be a case of whether they can afford to patent, and what should be patented. As the patent system is such an intricate institution, the economic aspect is significant especially for companies with limited funds because they would need external help when applying for a patent. It seems that the patent institution has different meanings for companies of different size. Other alternatives for software patents are discussed in many professional environments and copyright is a solution used by many which I will explore in the next section.

Copyright

Within the software patent debate some say that copyright should be sufficient protection of software. Therefore it is important to define what a copyright is and what it is used for. Jones and Benson (2002) define copyright as literally the right to copy, or more precisely the right to control copying of an idea being in a tangible, concrete form. The copyright is given to someone who creates original works and it gives ability to control copying the work for a specific period of time. For further clarification it is important to remember what Deek and McHugh says, “Copyright protects only the tangible implementation or expression of an idea, not the idea in itself” (2008, p. 224). The idea cannot just be a thought, it has to be expressed in some way and exist somewhere, like in a document, carved as a sculpture etc. Even though the copyright enables the owner to deny someone to copy the work, it is more common to licence out copyrights because it is a way to make money and spread the work. A software copyright is an extension of copyright law to machine readable software. Curtis says in his book After the Software Wars that “Copyright law protects someone from stealing words or code, but if you can prove that you came up with it via independent means, you have a sufficient defence” (2009, p. 106). Coloured by his attitude towards patenting and copyrights Curtis argues that copyrights are sufficient protection and that patents encourages people to “rest on their laurels” – an argument commonly used in the software patenting controversy. The controversy is recognised
by arguments of what the system is supposed to be used for, and whether it is a good solution to protect software or not. Some say that patents promotes development, some say otherwise. The very nature of software is often argued to be incremental and therefore mostly un-patentable, many claim otherwise. Economic aspects are also a significant part of the debate, as some say patents increase value of the product and others say that patents cause loss of R&D funds.

An alternative to copyright is the term *copyleft*. This is what can be seen as an opposite to copyright. It is a form of license that makes sure that what is originally made of open source remains free. The original creator of a work can with a copyleft license give anyone permission to use and distribute the work, but only under the same licenses it was originally created. Mustonen defines the practice of copyleft as “Copylefting a program means that the programmer, beside copyrighting the program, also signs a General Public License (GPL) granting everyone the right to use, modify and distribute the program on the condition that the licensee also grants similar rights over the modifications he has made” (2003, p. 3). It is important to distinguish that copyleft in itself is not a license but a collective term, and it enables the author to choose what license he or she wants to use, and then makes sure that it is used through all future distribution of the work. Different attitudes within companies clearly play a role when deciding whether to use patents, copyright or copyleft. In the next section I present which factors that I can expect to find when investigating the gathered empirical material.

### 2.3 Moderating factors

To identify moderating factors that influence a company’s IP strategy, it is natural to look at what moderates innovation in a sectoral system of innovation. The system of patenting, copyright and trademark is an important institution in the software sectoral system. As mentioned before in section 2.1, institutions influence firms as they constitute the rules that companies follows in their business. But it is also the other way around, some organisations may shape the institutions. So what are the most important factors in the decision to protect
intellectual property in the software industry? Does the patenting institution in the software sector work as intended; to encourage technological development and innovation? Below I review what the current literature has presented on this topic and what can be expected to find at companies in the software sector.

**Protection from imitation**

The traditional motive to patent and the most common reason for patenting is to protect the patented object from imitation. A patent is often used to protect what is most important, i.e. the core of a product. Within the software sector it is common to patent the source code for a software product, to prevent other companies from using the same code as the basis of other software products. A patent gives the applicant a legal document which gives him/her sole rights of commercially exploitation of the patented object. Companies primarily want to protect their investments in an invention, and make sure that the appropriability conditions are as good as possible. Blind et al. conducted a study in 2006 where they investigate among other things, the motives to patent. They look at this considering both sector and company size. In their literature review they present five studies and one OECD survey previous conducted in this area, and compares these. It is clear that they divide between the traditional motive and other strategic motives, but finds that the motives are equal across all sectors examined. They come to the conclusion that “Protection from imitation is far and away the most important reason to patent for all sectors, and we find no significant sector differences” (2006, p. 664). They also claim that in all the studies discussed in the paper, the classical motive of protection from imitation is the most important. They further explain “the core motive to patent is the protection of own inventions from imitation, i.e. the traditional patent motive. The strategic motive, which is in the forefront of most investigations, is to block competitors” (2006, p. 657).

Blind et al. further states that as a consequence of these propositions, the priority of other formal property rights is significantly lower. They find that companies that actively use
patents clearly prioritize patents before any other protective function which are used to secure own assets and its appropriability conditions (2006, p. 661).

**Competition blocking**

With regards to the strategic side of a patent strategy it is common to divide between the use of patents for an offensive or defensive purpose (Blind, et al., 2006). When developing a patent portfolio a company has to be aware of what kind of strategy they want for their assets. A defensive strategy can be developed to make sure that all opportunities for further development of the product line and thus also commercialisation is secured. The portfolio then prevents competitors from patenting and using them against the company. The defensive strategy basically works as a snowplough keeping the development road open (Ramsay, 2003). An offensive strategy is different in the way that it is more aggressive. It is designed to hinder the competitors design freedom and ability to compete in a specific area. In other words hinder competitors applying technological developments. To block competitors is the second most important reason to patent, and does not correlate significantly to company size according to Blind et al. (2006, p. 663).

**Negotiations and prevention of patent infringement by third parties**

The study done by Blind et al. contradicts itself at some point where it says that protection from imitations is most important in all the studies regardless of sector, but later explain that “With reference to sectors, it stands out that the computer branch and the telecommunication branch quote negotiations and the prevention of patent infringements by third parties as the most important motives” (Blind, et al., 2006, p. 657). There is no further elaboration or definition of this statement or what the computer branch is, and I interpret it to include the software industry. This proposition contradicts the first to an extent, but is highly relevant because the computer branch is mentioned and the software sector is by definition a part of the computer branch if it is defined in general and not separated by hardware/software technology.
Importance of patents grows with company size

When a company decides to patent an object it can be for many reasons and Blind et al. (2006, p. 661) state that the larger a company is, the patents become increasingly more important. Large companies often have own patent departments, enabling increased focus on patents as suppose to small companies which have to deal with the whole complex patent process themselves, or being dependent on assistance from third parties. To apply for patents for one reason or another requires a level of expert knowledge small or medium sized companies may not possess. It can also become a question of economics; patent applications are expensive and may not appropriate the desired return for the patented object.

Top management commitment

Within successful innovations the terms top management commitment and management involvement is often considered a key factor. Innovation can be an uncertain process that does not lead to quick money – it is a time consuming process that in some cases requires long term commitment (Tidd & Bessant, 2009, p. 102). For the persons working with innovations it can feel helpful when the management is positive and supports the process, which can give an indication of support and approval for the work being done. On the opposite side – when top management commitment is absent, the motivation for innovative activities can decline.

Organisational structure enabling technological change

When it comes to innovation and patenting it is important to see that no matter how well the system is adjusted, it is unlikely to succeed with innovation if the organisational structure does not enable technological change. The surrounding context also has to be favourable to increase the possibilities for innovation and patents. Tidd & Bessant points out that the organisational structure often is recognised by the tasks the organisation performs – and the more innovation happens. When the tasks are simple and routine based the chances of innovation happening are small, in contrast to a company where complex tasks requiring complex decisions where
possibilities for innovation emerges more easily (2009, pp. 107-108). It is connected with an increased level of non-programmed decision making and the need for a loose and flexible structure.
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3 RESEARCH DESIGN AND METHODS

In the following chapter I present the research design of this thesis and the method used. I discuss the use of interviews and ethics, in addition to validity and reliability within a case study.

To decide whether to use the case study method or not, it is important to investigate what is best for the thesis and research question. Other scientific methods might favor other types of research and science fields. A case study is not the only option for an ESST master thesis, but it is the most common, because the study is based on social science investigating a present complex social phenomenon in relation to literature and theory. A case study is a linear but iterative process, and begins with looking at literature and posing a research question. Then in turn gather data and presenting and analysing the findings. It is a quite rigorous process and requires following the steps to secure validity. The method has strengths and limitations like most other methods, but when the investigator knows about these, a case study method can be very successful. Other types of methods that could be alternatives for a social scientist could be, among others, an experiment, a survey, an archival analysis or a history (Yin, 2009). The most straightforward way of establishing what method could be used is to define the research question and look at what type of question it is – favoring different methods for different forms of questions. Yin (2009) describes the difference between the different types of research questions. The question “how” is explanatory and the question “what” is exploratory, each questions can be answered with a case study. He furthermore says that the case study is preferred in examining contemporary events, and includes interviews of persons involved in the events. The case study’s unique strength is its ability to deal with a full variety of evidence (Yin, 2009, p. 11). It is also beneficial to be aware that the different methods not necessarily exclude each other; they could be combined in a study to illustrate different parts of the research question.
3.1 Justification of design and method

For my thesis I have thoroughly considered which method to use and determined that the case study method is the most appropriate for my research question. I have chosen to use a multiple case design analysing two companies within the same sector. When using a multiple case design the two cases must be chosen carefully “so that it either (a) predict similar results (a literal replication) or (b) predicts contrasting results but for anticipatable reasons (a theoretical replication)” (Yin, 2009, p. 54). This thesis is based on the first, an assumption that despite the two cases different view to the use of patents, the priorities will be similar as other sectoral similarities. This is anticipated because of the fact that the knowledge base is a significant part which unifies a sector, and that the patent system is based on protecting knowledge. I can expect that sectoral similarities on a macro level influences patent strategy similarly on a micro level. The first case is the headquarters of search technology in the world wide company Microsoft; FAST. The other is the Norwegian company Opera Software developing the Opera web browser for a variety of platforms. Both cases deal with software and technology on an advanced level. Based on the sectoral theory I expect to find similarities within the two companies.

FAST and Opera were chosen because of both similarities in technology and differences in their point of view on patenting. They are similar in many other areas and operate in the software sector. They are both high technology companies with rapid innovation. FAST represent an interesting history and has experience from being an independent company to now a Microsoft Subsidiary. To gather empirical data in these companies I have used in-depth interviews which are explained further in the next section.

3.2 Interviews

The thesis investigate which factors influence a company’s decision to patent software, and what the patents are used for. This is a contemporary phenomenon over which I have no control, and
this type of task favours the case study method. I chose qualitative interviews as the data gathering method most suitable for the research question. My interviews has been in the form of a guided conversation, I have made sure to stay on the relevant topic, making sure to cover all my questions, but not necessarily in the order of my interview guide. The main interviews have been conducted as in-depth interviews with key respondents within the companies. Additional context interviews have been conducted with same type of interview guide, but more liberal in relation to what the respondent believe is important and also according to the respondents field of knowledge about the topic. The key respondents have all been generally positive towards my research and have been interested in reading the final result. The interviews have duration of one hour in average, and express the respondent’s view of the relevant topics. As the interviewer it is my challenge to listen carefully and be aware of opportunities to ask important follow-up questions. Often the follow-up questions give more specific answers and valuable information. The follow-up questions give the opportunity for the respondent to elaborate thoroughly on a specific topic that could lead to other relevant questions, allowing the respondent to fully express themselves.

Within the companies the respondents that were interviewed were people with knowledge about current or previous intellectual property strategy within the companies and/or departments. Experience with the whole process of patenting and knowledge to the system as a whole was weighted as important. The same interview guide was used throughout the interviews to ensure that the same questions were replicated within the two cases.

**Ethics**

Within qualitative research the in-depth interview is the most common form of data collection, and many researchers use it as their primary method. The in-depth interview separates from other types of interviews because its focus lies within depth and not width. It is a very personal setting where I believe it is important to look towards ethics. The human interaction during the
Factors that moderate intellectual property strategy

Interview affects the people present, and also the knowledge created in the interview affects the perception of the situation (Kvale, Brinkmann, Anderssen, & Rygge, 2009, p. 80). During an interview situation questions regarding both ethics and moral can arise. During the interviews I have conducted, I have explained for what purpose the interview is done and the basic design of the thesis. I have informed the respondents how I intend to use the interview as a part of my data collection and that I will analyse it according to relevant theory. The interviews have been recorded on tape and consent has been given from all respondents. They were consulted regarding quoted material and gave feedback before the study was made public. I have informed that I thrive towards being objective, and that my intention is merely to open the black box behind the decision to protect intellectual property. This will contribute to the literature and be interesting for the respondents as well.

The debate regarding open source discussed in this thesis reflects my position as an objective observer. With regards to the thesis as a whole, I am not an expert within the discussed fields and this is an advantage for me and the interview respondent. I have observed the debate and describe the different views without being biased from one point or another. The software business consists of people with an open mind and is generally open towards new technology and ideas. This has been beneficial for me in my work with both contacting respondents and conducting the interviews.

3.3 Validity and reliability

Within the case study method the terms validity and reliability is commonly referred to. The terms are similar but describe different aspects of the case study with regards to quality of the research and how scrupulous the study is done. Reliability is a term that relates to whether the result that is produced in a study could be reproduced with the same result by another researcher. In other words increased reliability is achieved by thoroughly describing clearly how the case study has been conducted – so that if someone were to conduct the same study, the
result would be the same. When the methods are see-through and has high reliability, it reduces the impression of biases. This thesis secures validity through clarifying the thesis process beginning with research on literature and context, and then creation of the theoretical framework. Further data was gathered through interviews and the empirical evidence was investigated. The results are presented in chapters five and six. It is described where the interviews were conducted, in which companies and what questions were asked. Validity, on the other hand, refers to whether the study measures what the researcher set out to measure. Yin (2009, pp. 41-45) separates validity into three categories; construct, internal and external. Internal validity concerns mostly explanatory studies where a researcher explain why something happened, and further taking into account that something else could have caused it to happen. Within this thesis it is important to see that the results are based on selected propositions, and the way companies prioritise the use of patents could be additionally caused by market and competition related aspects of their business strategy. Construct validity is a form of internal validity that deals with how the researcher is subjective towards the data collection, and that the researcher should set goals before collecting empirical data. To increase construct validity it is beneficial to establish a chain of evidence and use multiple sources of evidence. In this case I have strived towards objectivity to make sure to communicate that my goal is not to point out whether something is done in a right or wrong way. My position as an independent student without a significant opinion towards patents has strengthened my objectivity towards the interviews and analyse of the data collection. External validity on the other hand concerns whether the results of a study can be generalized towards a broader theory. When using a multiple case study it is more likely that the results can be generalized, then when using a single case. I have used two cases that can imply patterns that relates to the software sector as a whole, but the topic needs more investigation before the results can be confirmed as systemic sectoral similarities.
Until now, the two former chapters have presented and justified my theoretical framework and the methodology used. For the next two chapters I will present surrounding context and empirical material for further analysis and conclusions.
4 CONTEXT

In the following chapter I present the two companies chosen for this case study: FAST and Opera. In addition I will look at the Norwegian patent system, and discuss the common method of using patent applications as indicators of innovation.

4.1 FAST – a Microsoft subsidiary

The Norwegian company FAST is an interesting case for this thesis because it tells the story of a company both before and after it became a part of the Microsoft Cooperation. It was previously known as FAST Search & Transfer, and now goes by FAST – a Microsoft subsidiary. The high technology firm develops enterprise search technology and offers the core search platform FAST ESP, accompanied by different search solutions based on this core. The technology can be used for external and internal search as well as OEM (Original Equipment Manufacturer) – where the platform is embedded in a solution from another provider. The firm was founded in 1997 and launched their first commercial product in 1999. The first IPO (Initial Public Offering) took place in 2001 and the company had a rapid growth further. In 2003 the company decided to focus on enterprise search and sold their internet division to Overture Services Inc – which was later acquired by Yahoo!. In 2004 they release FAST ESP and continue to grow until 2007. Microsoft completed the acquisition of the company in 2008. As of 2008 they have about 750 employees at different locations around the world with the head quarters based in Oslo, Norway (Wikipedia, 2010a). ¹

¹ The information from Wikipedia has been checked and confirmed by FAST.
4.2 Opera Software ASA

The Norwegian high technology company Opera Software develops the well known Opera web browser available for numerous platforms, operating systems and embedded internet products. For this thesis it is interesting to see how Opera has a radically different approach towards patenting compared to FAST. On Opera’s website they announce their vision where it is presented that the company believes in a patent-free web. The short but concise statement reads:

"Opera Software does not believe innovation in the software industry is protected or encouraged by software patents. In particular, we believe interoperability on the Internet should be encouraged, and we actively work to ensure that software patents do not stand in the way of interoperability. As a highly innovative company, Opera Software comes up with many ideas and concepts that are patentable. In some situations, we will apply for software patents as a way to protect ourselves from attacks by other aggressive patent holders (Opera Software ASA, 2010b)."

The Opera web browser is developed for computers, mobile phones, game consoles among many other devices. In total the different browser solutions has over 120 million users worldwide, and the company thrives to be the provider of the best internet experience regardless of device (Opera Software ASA, 2010a). The company was founded in 1995 after initiating as a project within the large Norwegian telecom company Telenor. In 1997 the first version of Opera for the Windows operating system was released, and a year after they started development for other platforms, to take advantage of a growing market within internet-connected handheld devices. Version 4.0 was released in 2000 and included a new technology core which enabled further utilisation for many other platforms and devices.

All the web browser versions through 4.0 were trialware products, which mean that after a trial period the product has to be purchased for further usage. With the 5.0 version released in 2000, the trial period was terminated. The users were then given two alternative solutions: a free version with advertisement banners, and one licensed version without advertisements. In 2005
the company decided to offer a licence and advertisement free browser for higher education institutions. This further led to the 8.5 version released later in 2005, where the advertisements were terminated completely. Financing was enabled through revenue from Opera’s default search provider Google (Wikipedia, 2010b). ²

4.3 The present Norwegian patent system

Although the American patents are the primary standard approach for software patents for FAST, it is still beneficial to clarify what the Norwegian patent system consist of. The figure below illustrates the difference between intellectual property and an intellectual property right.

![Image of intellectual property and intellectual property right]

It is easiest to explain the different protection mechanisms starting with an actual product. One can protect the actual mechanism of the product with a patent (if patentable). In addition one can protect the actual appearance of the product with design rights. One can also protect the actual name of the product with trademark rights. Within the software business it is more troublesome, because the products are not physical, but codes and algorithms in a much more abstract and intangible form. Thus when a software company applies for a patent, it requires very skilful caseworkers to evaluate the patentability of the relevant application.

The patent system was created for a few purposes. A patent applicant gives the society access to his/hers knowledge so that others can utilise it to solve their problems. The applicant is given twenty years of sole rights to commercially exploit the invention, as a security for his/hers investments. The system is a way of motivating research and development promoting innovation instead of copying other solutions. For a more worldwide historical perspective on the patent system and innovation see Granstrand (2005).

² The information from Wikipedia has been checked and confirmed by Opera.
With a patent the applicant is given a legal document which gives sole right of all commercial usage. This includes production, marketing, sales, usage, license and import. It is important to point out that a patent is not a secret. The application is publicly available eighteen months after the date of application. This means that anyone that contacts the patent board can see the contents of the application. With regards to patent application it is important to clarify what actually is patentable and what criteria there are for a patent to be granted. This is presented below.

**What is patentable?**

An invention can be a product, an approach or a form of usage. For the invention to be patentable, it has to be of a technical character, have a technological effect and be reproducible. In addition, it has to be new, significantly different from present technology and industrially usable. The interesting aspect of a patent, and a significant bottleneck for the system, is that the invention cannot be public before the application is submitted. The possibility to have a patent is thereby undermined by e.g. publishing in periodicals or giving a lecture. In the software business it is often the case that an invention is used long before it could be patented. What is special with an American patent, is that their system has what is called a “grace period”. This is an opportunity to publish own results up to one year before submission of a patent application – without undermining the possibility to apply. There also exists another difference between the American and the Norwegian patent system. In America it is enough to be able to prove that the applicant was the first to invent, while in Norway (and in Europe) the valid application is the first to file an application.

Another aspect of patents is the time it takes from application is filed to a patent is granted. In Norway this period is estimated to be around twenty months. From there on it is up to the patent holder to uphold the patent by an annual fee to the patent board. If no payment is received with regards to the patent, it is made public for everyone to use. The fact that anyone
can access the patents has been the basis of using patents as an indication of innovativeness. Further I discuss the connection between patents and innovation as it is a common way to present innovative capabilities within specific areas.

4.4 Patents as indicators of innovation

Patents are commonly used worldwide as an indication of e.g. a country or a region’s innovative capabilities. When it comes to the software sector, it is interesting to see whether the patents actually reflect inventiveness, or if companies use patents for a different purpose then what is originally intended by the system. The patent data represents easy access to information from most countries and the patenting system is more or less integrated all over the world, but differences in law and practises across countries limit the comparability. The topic of whether patents provide an accurate picture of innovation activities is currently a debated theme. There are several pros and cons arguing for and against this sort of use. OECD (2008) presents the Compendium of Patent Statistics where they provide an overview of the most current patent statistics within regions and new technologies, as well as an overview of patents in relation to development and ownership, international co-operation, and protection of inventions. In this context it is natural to look at the advantages and disadvantages of using patents this way. A source at the Norwegian Industrial Property Office (Patentstyret) informs that it is e.g. common to use patent applications instead of granted patents because the applications provide a closer link to R&D within the calendar year. The issue with this kind of use is that not all patents are granted, and the time from when an application is filed to when the product or process is applied can vary. The employee further says that in relation to Norway, the Norwegian industry has through time been based on raw materials, and has traditionally not used patents a lot. In the situation where a Norwegian company has little international competition, it can be protected from markets where competitors use patents actively. But despite the low number of patent applications in Norway through the years, it is clear that something is changing. The informant
Factors that moderate intellectual property strategy

says that small and medium sized Norwegian companies with international markets are currently quite active when it comes to applying for patents. This statement is supported by an online article from the Norwegian website hegnar.no saying that Norwegian companies founded less than five years ago represents 21 percent of the total amount of patent applications originating from Norway during the period of 2005–2007 at the European Patent Office (Jacobsen, 2010).

The OECD report also presents a set of arguments regarding patents and innovation in the methodology part of the report. This table points out many of the main issues regarding patents and innovation. It is clear that for almost every advantage there exists a drawback. Still they point out that by using the right methodology, the limitations can be minimised. OECD focus on using patents in addition to other science and technology indicators to address policy issues (2008, p. 34). Several of these points can be discussed and analysed further, but I am not going to point out right or wrong, I rather want to highlight the current discussions on the topic.

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Drawbacks</th>
</tr>
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<tbody>
<tr>
<td>Patents have a close (if not perfect) link to inventions</td>
<td>Not all inventions are patented</td>
</tr>
<tr>
<td>Patents cover a broad range of technologies on which there are sometimes few other sources of data (e.g. nanotechnologies)</td>
<td>The propensity to file patent applications differs significantly across technical fields</td>
</tr>
<tr>
<td>Each patent document contains detailed information on the inventive process</td>
<td>The value distribution of patents is highly skewed: many patents have no industrial application, whereas a few are of very high value</td>
</tr>
<tr>
<td>Patent data are quite readily available (now electronically) from national and regional patent offices</td>
<td>Differences in patent law and practice around the world limit the comparability of patent statistics across countries</td>
</tr>
<tr>
<td>The coverage of patent data in terms of space and time is unique (nearly all countries in the world, back to the 19th century in most OECD countries)</td>
<td>Changes in patent laws over the years call for caution when analysing trends over time</td>
</tr>
<tr>
<td></td>
<td>Patent data are complex, as they are generated by complex legal and economic processes</td>
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This section has reviewed information about patents and innovation as a way to contextualise the empirical evidence that follows in the next chapter.
In this chapter I present my empirical findings and analyse them according to the six theoretical propositions presented in the end of chapter two that presents the theoretical framework of the thesis. I discuss the theoretical propositions according to my findings on a general basis and as well as in reflection to the two companies. Firstly, I will start with the proposition that protection from imitation is the most important factor for a company to patent.

5.1 Protection from imitation

This proposition is the traditional patent purpose which protects a patented object from being copied by others. Blind et al. (2006) finds that this traditional motive is the most important in their empirical material and literature review of other studies. They do not find any sectoral differences either. The empirical evidence of this thesis suggests otherwise, within the two companies investigated it is clear that the strategic motive of negotiation is more important than the traditional protection motive. The importance of imitation protection seems to vary according to company size and market position. This is based on the experience of FAST interview respondents having been a part of a growing company, and the experience of an Opera respondent with a decade of experience in the company. A FAST representative explains to me that it can be beneficial to divide companies in to three categories to see that different motives have different priorities according to company size. The small entrepreneur companies use patents as a tool to prove to potential buyers that they are serious and that the technology is protected. When it comes to the middle ground companies patents can be used both for protection from imitation and as a form for land grab. The respondent says that “Companies within the same vertical can have the same ideas, but they may want to take ownership to some
specific concepts”. The really big companies use patents for negotiations and power balance, but also to establish a value of the patent portfolio incorporated in the overall value of the company.

When FAST was an independent company it is clear that they partially chose to patent core technology to protect it, but also to prove that they were a serious actor in the business. It seems to have a certain positive marketing effect when a technology element or process is patented because it presents as more serious that it has gone through a patent process and been granted. Patents could also for small – medium sized companies be seen as a marketing tool, the position of who is most innovative is affected by who has patents on which technology. A FAST interviewee tells me that “The customers are positive to patent-protected technology because they feel safe that no one can punish them for using it, or stop them from using it”. The customers obviously feel a kind of safety when a technology element or process is patented, as does investors and potential buyers. Patents have this effect despite the fact that software patents often are so vague that they will not hold up in the case of a law suit. A FAST respondent tells me an example from their early days.

“One of our competitors had gotten a granted patent on a specific kind of search technology. They got this before we had the technology, but we developed it anyway. We talked about how close our technology was to their patent, but it proved to be so vague that they would have problems to defend it against prior art. In addition to that, they were using some technology that we had patented. There you have the power balance factor again. They probably wouldn’t have had a case if they were to sue us”.

Within Opera the empirical evidence clearly suggests and rejects the proposition to protect from imitation is most important because of their defensive patent policy. It is actually quite the opposite, when someone more or less copies Opera’s technology they do not react unless it is very obvious and close to the core elements. They also never intentionally imitate something that someone else has patented. An Opera respondent explains to me that “It’s not possible for us to have full control over what our competitors apply patented, but we make a sufficient effort. We utilise an external consultant to search for us and we go through the
results”. For Opera it seems that it is important to have a certain control over who patents what and how they develop their technology accordingly, but they participate involuntarily in this system and thus choose not to take action when someone infringe their patents. The respondent further says that “If something alarms us in the result of the search, we take it in to consideration and might decide to do thing differently. We do not want to introduce something in our product that we know is patented, but if we don’t know, then we don’t know”. As a principle they do an effort to not copy other patented objects, and at the same time they can have a certain control over what their competitors prioritise to patent. They define search criteria internally of their choice and their consultant delivers the patents that fit the search.

Based on this empirical evidence it seems that the patent system within the software sector is not promoting its general intended function and purpose as explained in section 4.3. Malerba points out that in certain sectors institutions may constrain development or innovation (2005a, p. 394). This proves to be right in both companies investigated, where it is clear that the companies choose to relate to the institution for other purposes. It seems that the companies are constrained by the institution and they deal with it as they find it best in relation to the competitive landscape. The relevant competitors can in some areas be blocked with patents, as a company can patent a core element crucial for another company. This mechanism is discussed below.

5.2 Competition blocking

The empirical evidence shows that the motive to block competitors is not a very significant motive to apply for patents in the software sector. This proposition is according to Blind et al. (2006, pp. 663, 657) the second most important reason for a company to apply for a patent. This is clearly not the case within software companies, as competition blocking requires patents to cover a whole technological field. The threshold to develop a technology in a different way that does the same is low.
When using patents as a way to hinder competitors from developing technology is often used as a part of an offensive IP strategy, and is a common motivation for market leaders within the software sector. With this kind of strategic use of patents it is important to see where a company operates in the competition landscape, because it is a prerequisite for using patents this way or not. Market leaders within software have a bigger incentive to block competition then market followers which can innovate on top of the market leaders’ solutions. When a company use patents as more of a blockade then as a protection, which is the case for many companies today, it is clear that the present usage is not serving the initial purpose of the system. When a patent (or multiple patents) is granted but not actually used by the patent holder, the knowledge is in a way locked in and does not contribute to the original purpose of the patent system. When a patent is not being used, the patent holder can licence it out so that other companies can acquire the knowledge and develop it further. This is not the case for many of the software patents granted today; they are filed along with many other patents and form a joint value. The fact is that the software sector has a very low barrier for developing something slightly different and the economic aspect is insignificant. It is because of this the amount of patents needed to block competitors is vast. The market leaders can practice “carpet patenting” which involves patenting many different surrounding aspects of a technology to make sure those competitors does not find a similar solution without touching a patent. This creates an enormous amount of patents being no more than a tool to slow down the development of competing software products. There are continuously ongoing trials with software patens at focus, but the number of trials in relation to amount of existing patents is quite low.

Microsoft has a patent policy that characterise a market leader, and offensive strategy is used for a power balance. Within Microsoft and other companies within the sector, the American patent system is the standard for applications. The empirical evidence suggests that the patent strategy is necessary for the market leaders because it is what “everybody else does”. A FAST representative tells me that the problem with the American patent system is that it is often
surprising that some patents go through and some patents do not. It seems that a company can send applications, some actually covering the American demands for something to be patentable and other that do not – and they wait to see which is granted and which are discarded, often with a surprising amount of trivial patents granted.

Within Opera the strategy is clearly more defensive, and to block competitors is according to the empirical evidence, not as important. Their strategy is to an extent an involuntary participation in the patent system. An Opera respondent says to me that “It’s actually a philosophical problem, because a lot of what is produced is based on previous material. In addition we see that there are a lot of silly patents that are granted especially in USA. Even though there are strict criteria for what is supposed to be patentable, we see time and time again the most trivial ideas granted”. It seems that both Opera and FAST identify the American patent system to be “butterfingered” with regards to which patents are granted and rejected. This obviously calls for an assessment of the system as a protective mechanism for software technology, and the current situation for software companies is just to deal with it and accept how others patent and react accordingly to obtain a power balance.

The systemic feature of competition blocking is most likely easier to achieve in other sectors where the product is not as complex as software. There are probably companies not being able to develop a product because another firm has patented a basic feature of the product. One can see this as a challenge within the patent system, because it contributes to slow down growth and development in society by hiding knowledge that could be utilized. This happens when a company apply for a patent to block competitors but does not develop the patent further, and in addition does not licence it out to companies that could use the patent and develop it. Steinmuller points out that “Much of the knowledge [within the software sector] relevant for innovation is derived from experience in attempting to address user needs and from the examination of designs produced by competitors” (2004, p. 209). When software patents are used to block the knowledge is somehow concealed and hence slow down the pace of
innovation because, as Steinmuller states, innovation is partly based on knowledge about which solutions competitors use and how it is developed. Cohen et al. also finds in their study that patents provide limited protection because “they can be invented around” (2000, p. 15), as is another confirmation and significant reason not to block competitors with patents in the software sector. This indicated that other factors are more important, such as the ability to negotiate with competitors which is a proposition presented below.

5.3 Negotiations and prevention of patent infringement by third parties

As pointed out by Blind et al. (2006, p. 657) in their study, the computer branch quote negotiations and prevention of patent infringement as the most important motives to use patents. I interpret the term “computer branch” in this case to be synonymous with the software sector, as the terms can be many but implies the same. The empirical evidence shows that these two motives are important factors to consider when in general deciding to produce a patent application or not. I would even go as far as saying that negotiations probably are the most important reason as to whether a company in the software sector choose to use patents. This is apparent in the interviews done at both FAST and Opera. In general it seems that one of the most important reasons why they have a patent portfolio, small or large, used as a value or not, it primarily exists because they want to have patents to negotiate with in the case of facing a trial. If this were to happen they would be able to say “We understand that we are at the case of patent infringement, but we have patented this technology which you violate”. Then they are able to come to terms without going to trial.

Within FAST the negotiation possibilities with patents are important. Before Microsoft the purpose of patents was more to protect core elements of the technology, but presently the patents serve different functions, especially used for negotiations. A representative from the company tells me that “It takes a lot to actually sue someone, but it is good to be able to say that you have precedence”. It seems to me as patents can be used to avoid confrontations in a legal
setting but does not necessarily fulfil a specific function. This is clear when she further says that “The [software] products are complex, and that’s why it’s difficult to know what to protect and what the real protection is when you actually acquire it”. It is further clear to me that patents are generally not used to prevent infringement by third parties because infringements seems to be inevitable in the software sector. An interviewee explains that “If you are a small firm in infringement of a Microsoft patent, Microsoft will not go to trial unless it is very obvious. Their function is more used for a power balance between companies. The sector is very conscious of this”. It is a fact that software technologies are similar to each other, and different parts of the technologies are patented by different companies to obtain a balance of power. The respondent also tells me that “I think it’s very difficult to decide when we infringe a patent or not”. This is the case for the whole sector as the patents are written in a complex language and form, and not easy to understand for anyone not familiar with the patent craft.

Within Opera the situation is the same, but perhaps a little more explicit. Opera has a more transparent defensive patent policy than Microsoft has. An Opera representative says to me “We have a defensive patent policy; it means that we want to have a patent portfolio to use for a defensive arsenal if someone goes after us and says we are in infringement of their patent, then we want something to reply with”. The basis of this strategy is that when a company consider going to trial against Opera, they will think twice because they probably are in infringement of one or more of Opera’s patents. The respondent explain that “Web browsers are relatively similar; similar products and same basic functionalities. When we patent something within our product the competitors might suspect or know about it, and thereby don’t sue us”. It is a power balance for them to negotiate with. Opera does not inform whether a new functionality or product that is released is patented, and they do not inform which patents are in their portfolio. The Opera employee informs that “We see that other browser companies have directly copied something we have patented, but we don’t go telling them about it”.

In a more general context it looks as if different IP strategies vary according to size, attitudes and market relations among other aspects. Malerba states that “Overall market competition and market structure [in a sectoral system of innovation] depend on the strategies and fortunes of individual companies, which are linked to different national contexts or to the international scene. Firms have diverse reactions in order to try to increase their fit and to survive in their particular environment” (2005a, p. 396) This confirms how IP strategies have developed according to the patent system and that companies’ priorities to use patents as a tool to uphold the power balance with competitors is significant for the overall competition and market structure within the sector.

Cohen et al. finds in their study that “The larger, more patent intensive firms are more likely to use them to strengthen their position as players in cross-licensing negotiations” (2000, p. 24). This confirms the motive to use patents for negotiations, and is also relative to company size, which will be discussed further in the next section.

5.4 Importance of patents grows with company size

It seems that importance of patents, and thus the number of patents increase with size of companies. One aspect of this proposition could be that it is a natural course when a company grows in size and can afford to have increased focus on patents. The financial aspect of the patenting system is a significant barrier for smaller companies, naturally leading to the fact that bigger companies can hire help for the difficult parts of patent applications at a greater degree. This makes the whole patent process simpler and more manageable, enabling increased focus on patent protection, thus the patents become more important as suggested by Blind et. al (2006, p. 661). Patents serve different purposes according to company size, and one could say that they become more important, but I believe it is crucial to point out that they serve different functions. This is probably because the patent system is an old system not adjusted properly to the type of industry that software is. A representative at The Confederation of Norwegian Enterprise
(NHO) tells me that “What is characteristic in the software business is that it’s such a low threshold for doing things in different ways, the financial threshold is so low”. He further says that “There are other ways to make money in the software market than to patent a method that solves a technical problem. Because that’s what it is – the actual software is protected by the copyright act, and it is the technical solution that can be patented”. What the respondent says point out a basic challenge with the whole patent system in the software sector, and can to an extent explain why patents are used for different purposes than what it is intended for. With regards to the fact that patents are used in different ways the respondent points out that “To understand the logic within why [software] companies do different things, it is crucial to observe where in the market they are placed and where in the chain of value they operate”. Companies that compete in the top range of software producers do not seem to have a choice when it comes to whether to patent or not. If they want to stand a chance in this business it is crucial that they have a patent portfolio to protect themselves with if they are subject to a law suit.

When it comes to the big companies like Microsoft, the empirical evidence clearly shows that patents are more important for them than when FAST was a smaller company not part of Microsoft. Back then the focus was to patent the core elements which was sufficient. A FAST interviewee explains that “When it comes to the really big companies in general, I think they create numerous incredibly narrow patents because the number of patents is more important than a patent’s actual value. The lawyers measure the height of the patent stack. It’s a shame because the value of a single patent becomes totally disintegrated”. This is a mechanism to put a value on the patent portfolio which is an asset for the company. A patent in Microsoft obviously has a different purpose than for a smaller company.

Opera is in a different market position than Microsoft and uses patents for a defensive purpose. In contrast to Microsoft, they do not view their patent portfolio as a financial asset, and does not put a value on it. An Opera representative tells me that “If you had knowledge of what our patent portfolio contains, and compare it to our reputation and prestige as an innovative
company, there is not necessarily a link between the two”. It seems that patents does not promote innovation in the traditional way, and in the landscape Opera finds themselves in, it is still important for them to have a patent portfolio. The interviewee further says that “We don't necessarily patent every single interesting idea we come up with”. This displays a picture of a company that use patents because of their size and market position, but it has little to do with successful innovations.

Cohen et al. also find in their study that the larger firms have a greater possibility to distribute the costs of patenting (2000, p. 15). When these firms are able to distribute the costs over several levels, they are thereby able to justify increased use of patents to ensure their market position. In addition Cohen et al. find significant positive correlations between number of applied patents and the motive to strengthen the negotiating position towards competitors (2000, p. 24). This confirms the connection with larger companies using patents more and uses them for negotiation rather than protection. The bigger a company is the more management is involved when deciding strategic usage of patents. The empirical evidence suggests further that top management is an important factor when it comes to innovation and the use of patents.

5.5 Top management commitment

This is an interesting proposition when it comes to the practice of using patents as an indicator of innovative capabilities in the software sector as discussed in section 4.4. It seems that in both cases management commitment and initiative is not only a key factor as suggested by Tidd & Bessant(2009), but a prerequisite when it comes to patent protection of software. When the management of a software company is committed to patents as a protection mechanism it is evident that the system has a significant influence on the company’s IP protection strategy.

Currently the initiative to patent technology within FAST comes from the management. An employee informs that “A lot of the things around patents originate from the CTO, who functions as an idea generator. In teamwork with him something patentable emerges”. The
middle leaders and the team leaders are responsible for identification of patentable ideas which is further evaluated and prioritised. The CTO of the company is the initiative taker, and has the final decision regarding a process or element worth patenting or not. The interviewee further says that “The initiative comes from above, that is very obvious”. He claims that the reason probably is because many of the developers originate from an open source tradition where patents are frowned upon. Still it seems to me that an acceptance towards the patent system and its purpose of protecting the company product exists – but the developers rarely take initiative for something to be patented.

Before merging with Microsoft, the patent system was also thoroughly anchored in the management. A FAST employee previously involved in managing the process informs that “The objective [with their patent incentive program] was to build a pipeline of patents and to incentivise people, in addition to give guidance with regards to what the management wanted to be patented”. It is clear that both before and after Microsoft; the desire to patent would have to come from the management to be completed. It seems that the process is too complex and time consuming for the developers, to even think about making the effort, when the job is busy enough as it is. The person previously involved in the program says that “I don’t think that people necessarily comprehend how beneficial it is to have a patent with their name on in their resumé. That is the significant value even though they don’t own the patent themselves”.

In Opera as well as in FAST, the initiative to patent comes from the management level. In Opera the Patent Advisory Group discuss potential patents and makes sure that they are aware of relevant patents that others have applied for or own. What is special about Opera is that their basic attitude towards patents have not changed over the years, the company believes that the possibility to patent a software solution is problematic. A respondent at Opera tells me that “At some point we had to acknowledge the landscape of our business. Our competitors do not hesitate when applying for numerous patents and the landscape where we do business forces us to deal with it”. So even though the company finds the whole idea of software patents
problematic, they still have to navigate and decide to accept how their competitors choose to use the patent institution. The company has a tradition for open source, but the core elements of the browser technology are patent protected.

New ideas being developed in Opera are recognised by management and discussed in the OPAG group for further to decide whether to file an application or not. This is similar to the process in FAST, and confirms the proposition that top management commitment is a key factor for innovation. The empirical evidence further suggests that with lack of top management commitment, the patent application for software solutions would be significantly lower, as the developers themselves find the patent system time consuming and complicated enough to let it be. The Opera respondent informs that “Some of the employees find it appealing to have their name on a patent. But it is individual, not everybody comes up with these ideas, and it is often the same people”. Pavitt explains that it can be difficult for management to foresee the possibilities of innovations and therefore the innovation process is seen as uncertain and difficult to decide how deal with. In relation to these two cases the top management is the initiative taker with regards to applying for patents, but it is mostly the middle management that identifies the potential processes or technology. Pavitt states that “In practice, top-down corporate visions can be a poor guide to innovation strategies” (2005, p. 101). He exemplifies this with the success of Ericsson and that the success of mobile telephony came from middle management. In addition to initiative from both top and middle management, the organisational structure also plays a great role when it comes to enabling innovation and encouragement of new ideas as explained in the next section.

5.6 Organisational structure enabling technological change

According to the empirical evidence of interviews conducted within the company, it is apparent that the present organisational structure within FAST is not a significant barrier for innovation taking place. It is a structure based on complex tasks as a result of working in such a high
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technology environment. The complex tasks and the challenge of continuously developing the technology enable innovation, as Tidd & Bessant (2009) suggest. This is particularly the case for the employees working directly with the technology, the developers. They constantly have to address whether a new function or process is valuable and interesting for the clients. When it is decided that a new idea should be patented, the process goes further through a central team within legal and marketing in Microsoft. For FAST this seems as a good solution, to let the experts in the patenting field deal with the actual process – which in other words means that it is not as time and resource consuming for the person that possess the idea. One of the interviewees describes the Microsoft patenting process as “a working machine”. This structure is an important factor that influences the possibilities and strengths of the company enabling innovation and technological change.

When the search provider was an independent company the situation was different. When the company was founded in 1997 and through the following years, a FAST employee points out that “There was an early focus to patent protect core elements within the technology”. Central technology elements such as core technology and core algorithms were then patented. The firm was focused on commercialisation until 2004 when attention to patenting was regained and an incentive program was created. The structure of the program was that the inventor would receive a bonus when filing a patent and an additional bonus when it was granted. This system did not acquire as many patents as the management had hoped for – probably because it consumed too much time for the developers. The inventor was much more involved and had to take initiative to file an application, and the bonus was not incentive enough in itself. This shows that the actual organisational structure and structure of the patent process plays a significant role if one view patents as an indicator of innovation.

Within Opera Software the empirical evidence suggests that the organisational structure is beneficial for innovative capabilities. The different tasks preformed are of a highly technological character, as is also the case at FAST. Opera is known for being a highly innovative
company, regularly presenting new solutions and features before competitors. The patenting process is well integrated as a part of the organisational structure. The structure of the process is of a more adjacent nature then in FAST. Discussions regarding patents are considered in the internal Patent Advisory Group (Opag). The group consists of representatives from the legal department and the development department, as well as an external patent consultant. Similar to FAST, the person that has the idea is not expected to spend too much time and resources filing a patent application. The application is written by a consultant, with help from the inventor that describes the idea in detail. An internal formality for development of new browser technology is that developers check patentability of the technology. A natural consequence is to also check whether it has been patented before, but this is done by external help to make sure the developers work with technology instead of searching for patents. As the Opera respondent said to me; “We have to choose whether we want to produce a product or investigate patents”. The most important criterion though, is whether the new idea is close to core technology. The closer to core technology, the more likely it is that a patent will be prioritised. Equal to former FAST, Opera also has a bonus for the inventor when a patent is granted, but the Opera representative informs that they could just as well discontinue the bonus because it is not incentive enough. It is clear that the organisational structure enable innovation – because of the explorative nature of software development. The patenting institution is well adjusted and controlled as a part of the organisation.

The patent system is clearly an integrated part of the organisational structure that is necessary for both companies. The two companies are quite similarly structured and the employees are educated and experienced in the same landscape in Norway. It seems that the structure in both companies provide sufficient room for the employees to encourage and explore possibilities for technological change. This concludes the empirical evidence chapter and the conclusion presents the important points derived from the evidence.
6 CONCLUSION

The purpose of this thesis has been to identify which factors moderate a company’s decision to patent software, and what the patents are used for. The results have been presented in chapter five, and it is clear that the patent system serves different functions for different purposes. Patents are a mechanism that protects something from being copied, but can be difficult considering knowledge which is incremental and intangible. On a general level one can say that within the knowledge economy incremental ideas and innovations have become a hallmark of growth in the society. It is challenging to defend and preserve knowledge that can be distributed through the internet and other technologies. The patent institution is an established example of a worldwide system created to protect inventions and secure investments. Based on Malerba’s system of sectoral innovation this case study confirms that an institution shape how actors within a sector communicate and thus how business is conducted. Malerba also points out how institutions can be better adjusted to some sectors than others, which is clearly stated in this study. To look at the software sector and its relation to the patent system has enabled me to clarify which factors lead to how two software companies choose their IP strategy.

The framework of sectoral innovation system has been beneficial to see the important role institutions play in business. The patent system and its rules and regulations are an example of an institution that shapes how the companies do their business leading to successful innovations. There are other protection mechanisms used in the software sector, but the patent system is an institution that provides a legal document, as suppose to copyright and the open source alternative copyleft. It is clear that the original purpose of the patent system – to promote innovation – is not what it is used for in the two companies investigated. From the book
Managing Innovation by Tidd & Bessant and the study done by Blind et al. and I have drawn out six propositions that I could expect to find in the two companies FAST and Opera.

The overall conclusion regarding these six propositions is that software patents and the patent system as a whole, is in these two companies primarily used for other purposes than to protect the patented elements. In the study by Blind et al., they suggest that protection from imitation is the most important motivation for companies to patent, regardless of sector. In this thesis it is established that companies in the software sector have different priorities. The most important factor that motivates the use of patents is in both investigated companies to be able to negotiate with competitors. Their patent portfolios first and foremost serve as a tool to uphold a power balance with competitors of the same size. A respondent at Opera describes the power balance in this way “It’s like when USA and Soviet never attacked each other with nuclear weapons because they knew that the other could retaliate”.

The second most important factor to patent is suggested by Blind et al. to be competition blocking. This is proved to the contrary in my study – the companies regard this factor as insignificant. An important reason for this is that the developers of software technology are able to produce multiple different processes that serve the same function or solution, eliminating the need for patents to protect an exact process or solution. Further my thesis confirm as suggested by Blind et al., that importance of patents grows with company size. Big companies like Microsoft use patents more than smaller companies, e.g. when FAST was a small independent search provider. It is important to point out that in addition to patent importance growing with size; the functions that the companies ascribe to the patents also differ with size. For example, for small companies the purpose can be to protect core technology, while big companies use patents as an asset and power tool towards competitors.

When it comes to the propositions suggested by Tidd & Bessant, they are both confirmed in the two companies. With regards to top management commitment it seems that it is not only a key factor, but a prerequisite for software patents being used as a protective
mechanism, or for other purposes. If the management in the two companies were not to initiate patent applications, the interview respondents in the two companies are sure that a significantly lower number of patents would be applied for. For a software company to innovate and thus might have the need for patents, this thesis also confirms that it is important that the organisational structure enables technological change. The tasks preformed by software developers are recognised as complex and require complex decisions. This leads to the developers being able to be creative despite the work being repetitive, but not routine based.

The aspect of company size and different priorities that moderate a company’s patent strategy could be caused by a number of aspects, but it seems to me that there are a couple of underlying reasons for the way the patent institution is established in the software sector. The culture within the two companies is similar and there are some underlying ideals that could be the reason why the top management initiative is so important to use patents at all. The ideals seem to be that the software business would be better without this system, and that sharing of technology has a positive effect on development of new technology. These ideals could be partly based on which themes are incorporated in teaching within technology education of various forms. It thus could indicate that the patent system should be incorporated as a more significant part of ICT education to clarify for what purposes a software patent can be used. The reluctant attitude towards patenting is evident among the developers working close with the technology in the two companies. The empirical evidence indicates that this is probably caused by the fact that patenting is seen as a mechanism incorporated in the business strategy as a whole and is thereby almost exclusively a concern for the management.

6.1 Limitations

This case study has certain limitations as to whether it can be generalised. There are three interviews done in FAST and one interview in Opera. The reason for only doing one interview in Opera is because the relation to the topic of this thesis is very clear throughout the company.
They have a very outspoken attitude and a clear definite strategy towards patenting software. The interviewee was a person with experience and firsthand knowledge to the whole patenting process and IP strategy in the company. The respondent was interviewed on behalf of the Chief Technology Officer and Opera Software as a whole.

The empirical evidence goes through six selected propositions of why companies patent software, but there can of course be several other reasons not accounted for in this study. Marketing purposes can be one general aspect that could be looked into more thoroughly. This thesis does not seek to be generalized for the whole sector, but holds a more analytical standpoint towards the sectoral innovation system theory, and how institutions at a macro level affect companies at micro level. This does not provide sufficient information to adapt to a general level, but provides valid information about how the patent system affects two software companies. The empirical evidence clarifies the challenges that the companies within the software sector experience when dealing with the institution.

6.2 Suggestions for further research

This thesis scratches the surface of challenges ahead with regards to software patents. It is clear that the patenting system does not promote innovation within the software industry, and software patents are used for different purposes. Some companies use them as assets, others use them to block competitors, and others again use it for other purposes not mentioned in this study.

It depends on which level further research would be conducted on, but specific topics could be to look more thorough at how patenting affects innovation, or how values and attitudes of employees in the software sector affect a company’s IP strategy. A more statistical approach to motivations for patenting would probably give an interesting result; one could use a survey in several software companies to see which factors are weighted as most important. On a more general level it would be very interesting to see some research on which alternatives could be
relevant as a substitute in the software sector for the present patenting system. It would also be an interesting topic to investigate how the institution could be better adapted to the software industry. Research on how the patent system capture knowledge in software patents and in general, would also be a beneficial study. Finally I would like to add a quotation from an interview respondent from FAST as a striking point and for possible further reflection on the topic: “Patents doesn’t have an actual significant value beyond the value that the surroundings assign to it”.

6.3 Policy recommendations

The empirical evidence suggests that an alternative for software patents should be considered, as the system is not fulfilling its purpose within the software sector. It seems that it does not necessarily inhibit innovation, but does at least not contribute significantly to successful innovations within the two companies. It looks like the system is redundant when it comes to protect investment in the patented objects, as the profit is more or less independent of patents. It should further also be considered whether a system to protect specific solutions or processes is actually needed, or whether the sector could function just as well without it. In that case alternative solutions would be beneficial to identify. In addition, the demands for a process or a solution to be patentable should be to a greater extent be applied in practice, as the system today enables patent applications to be granted without fulfilling the formal requirements. The patent process in USA is specifically mentioned in this thesis as problematic. This is a comment made in a general level, and the requirements are of course different in various regions.

When it comes to patents as indicators of innovation, the respondents emphasize that the companies are much more innovative than what is communicated through patents. It would be beneficial to explore which alternative indicators could give a more accurate and nuanced picture of innovative capabilities within the software sector.
BIBLIOGRAPHY


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APPENDIX

Interview guide

1. Tell me about how strategy towards IP protection has developed over the last 20 years in this company.
2. What is your strategy today?
   a. How do you assess what should and should not be protected?
   b. What other types of protection are important besides copyright and patents?
3. How do you work with the legal aspects of protection?
   a. How do you make use of other companies’ experiences in the same field?
4. For what overall main purpose do you protect your products?
   a. What are other important aspects?
   b. In which way do the values and norms in this company influence the IP strategy?
   c. How important is economic aspects of protection?
   d. How important is competitors in the market in relation to protection?
   e. How important is it to be conceived as something specific outwards with regards to IP strategy?
5. Who is included in the decision to decide whether something should be protected or not?
   a. Who has the final call?
6. In which degree does the patent and copyright rules and regulations affect the company as a whole?
   a. In what way(s) do they affect the IP strategy?
   b. How do you work with international aspects?
7. How good are the patent laws and regulations adapted to the software industry?
8. Do you believe that the rules and regulations should be changed?
   a. In what way?
9. Where does the company stand in relation towards the open source debate?
10. Do you believe it is possible to have an entire software industry based on open source?
    a. Why/why not?
11. How does the company work with innovation?
    a. Do the patenting issues prohibit innovation from happening?
    b. How do you incorporate aspects of innovation when developing/changing the IP strategy?