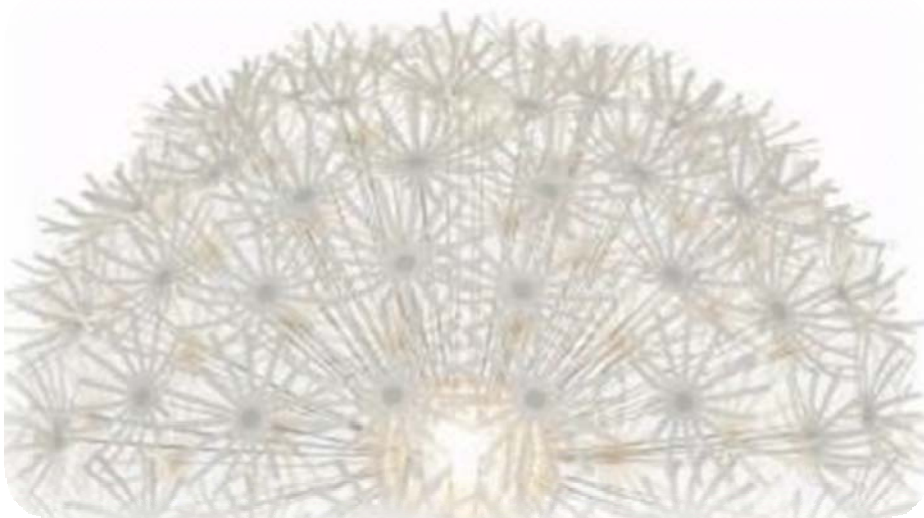


CHALMERS



Changing dynamics for large companies

An interview study of risks, organizations and market dynamics
in relation to the knowledge based economy

*Master of Science Thesis in the Master Degree Programme,
Business Design*

JACK PERCIVAL
LINDA ÅLGÅRDH

Department of Technology Management and Economics
Division of Management of Organizational Renewal and Entrepreneurship – MORE
CHALMERS UNIVERSITY OF TECHNOLOGY
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Abstract

Our world is increasingly developing from an industrial economy to a global knowledge-based economy wherein the use of knowledge as a tool and as a product is increasingly important. It has been obvious that some industries have increasing risks and issues in regards to this development, mutual hold-up issues and that patent trolls play an increasingly large role. The question the thesis has tried to answer is thus what the risks are of the rise of the knowledge-based economy for large companies in more mature industries and in that case how these risks are minimized and perhaps pre-empted in the future. The thesis is initiated by IKEA Components, which has partly defined the perspective of the study. The study has been based on interviews with several medium-sized to large companies in different industries, as well as several patent bureaus. The ambition has been to investigate not only risks and how they are perceived, but also how the organizations are formed to handle the issues. The study shows that several risks exist and that they to a large extent are related to KBE factors. Especially three risks have been identified that are applicable to the larger companies and particularly for those with large supply chains and much collaboration of different kinds. The first risk is related to an increased technological overlap, relating to that products increasingly need to incorporate technology from several fields. Another risk is that the awareness and the will to own patents in different types of collaborations, which gives an increased power to choose supplier or use multi-sourcing, have grown. This is related to the third risk, the increasing importance of keeping knowledge in the company.

More companies are trying to make sure that the money spent on R&D and the following development is actually usable for the company. This can be done with patenting, but it also relates to increasing control of how information and human capital leaves the company, either to competitors, to supplier to customer or to a new start-up. The organizations are responding to this by several means, such as making sure to use patents more strategically and to try to increasingly use patent information. There is an increased awareness inside the organization relating to the patent issues, as for example relating to increased focus on education of developers. Some organizations have been found to increasingly be heading towards more centralized synchronization of the patent issues as to utilize patents more strategically as well as in a few cases, to enable income-generating licensing. Some companies have already created new ways or structures that are more ready to handle the issues of more departments being dependent on understanding the patent issues. We conclude that future structures should have organizations that are more prepared to handle the increasing complexity of patenting and the increased number of touch-points in the organization with a centrally coordinated IP-network that permeates the organization. Responsible not only for securing that IP is not a main risk, but to aid in the strategic planning of R&D and to proactively create freedom of action for the company. This is very dependent on having an organization aware of potential issues and who knows where and when to search for support within the organization or department. An intellectual asset management perspective and the implementation of a MELT model are two ways the interviews have shown that could theoretically aid in these issues.

Keywords: Cooperation, Freedom To Operate, IP organization, Knowledge Based Economy, Large Organizations, Market dynamics, Product Development, Risks

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1. Introduction

The introduction aims to present the foundation for the remainder of the study, including the purpose and background to why the study has been executed, as well as a breakdown of the problems and a discussion about the limitations of the study.

1.1. Background

Since the start in 1986 the company known as Modul Service, within the IKEA-group, has been serving the major suppliers of the IKEA supply chain. IKEA, which at this time already had been sourcing internationally for a number of years, understood the need of creating cost savings via securing the sub-suppliers costs. The value of this control also aided in securing the quality and availability of products to the suppliers and in the end, to the customer. In 2007 IKEA Modul Service changed its name to IKEA Components (ICOMP) while at the same time taking the first steps towards a new role. This role involved the previous tasks appointed, but also the development of new and innovative solutions to fit the needs of the continuously developing range of IKEA.

During this time, the growth of licensing and sales of intellectual property have been increasing. From 1990-1999, the US Patent office issued more than 1 million patents, nearly triple the overall historical issuance.¹ Other signs of a coming knowledge economy were showing such as increasing focus on operations management of intellectual property rights and following competitor monitoring to guard against the risk of litigations that could cost the company both competitive advantage and actual funds via litigation and licenses.² This new economy focuses on knowledge, intellectual capital and innovation rather than resources for production and scale as in the industrial economy, even though industry and production oriented companies are still a major part of this “new” paradigm of economy. Thus the dynamics for large companies can be changing, referring to the forces or properties that stimulate growth, development, or change within a system or process.

The growth of a knowledge economy and greater occurrence of patents both in multinational companies and in smaller ventures over several industries can put pressure on industrial companies previously not focused on Intellectual Property Rights (IPR) to apply new management practices to cope with the risks that can arise. Possibly more so for companies active in industries where knowledge economy dynamics were not previously important or that have not needed to focus on creating competitive advantage from their innovations via an intellectual property portfolio. The actions needed to create value out of product development and research, might therefore grow and increase in complexity. It is especially so since different actors might simultaneously compete and cooperate (coopetition)³ in the Knowledge Based Economy (KBE), which can cause the need for intellectual capital management practices to grow.

¹ Davis & Harrison, 2001

² Petrusson, 2004

³ Granstrand, 1999

It is clear that understanding these potential risks for companies outside the scope of what is considered the typical core of knowledge intense industries, as e.g. Communication Technology (ICT) and pharmaceuticals, and finding ways to handle the potential risks, is critical for better understanding of a large part of the new economy. This is especially critical for industrial economy companies where these risks, if left uninvestigated, might reach a stage where they hinder future innovation and entrepreneurship⁴. As ICOMP's role to develop new technologies and solutions grow, the awareness of, and need to, understand these issues has risen and is the basis for the thesis.

1.2. Purpose of the thesis

Based on the described background, a need can be identified about investigating the potential risks, from mainly a business perspective, that ICOMP and other companies in a similar situation is facing in the course of their transformation to a company more aware of the environment of the KBE, as well how this context can be handled.

The purpose of the thesis is therefore to:

Investigate how the transition towards a more knowledge based society is affecting the dynamics for large companies, focusing on which risks that are present and which IP activities and organizational structures that are relevant to handle the changing business context.

It is thus the ambition of the thesis to identify ways that ICOMP can counter and minimize the impact of KBE related risks. The aim is not to find ways to create income-generating opportunities or new business models in itself, rather how one can avoid the impact of other actors being more KBE oriented on the business arena.

1.3. Motives to the study

This study is of general interest since few studies in the past has focused on the relation between the KBE in more mature industries for large companies and their corresponding IP-departments, R&D departments and internal or external activities.

Many scientific studies have had its starting point in how small and entrepreneurial companies can use their IPR when building up new business models and utilize patents in order to create a niche in the market, as well as how the KBE environment is affecting their business context. However, there is a lack of literature when it comes to if, and in that case how, the changing dynamics at the market affects the large companies and which activities they in that case perform in order to minimize the impact. This study will connect the macro level of the KBE criteria with the micro level, i.e. the organizational structure and IP activities performed by large companies in different industries. The ambition is thus to extend the current literature in the field, currently focused on the effect on mainly smaller companies, through complementing the literature with a study of how the large companies are affected, if at all, and see if the macro level of KBE discussed in the literature has affected the internal structures of large companies.

⁴ Granstrand, 1999

1.4. Problem analysis

The problem of the thesis is specified in the main research question: ***How should product development and intellectual property processes be organized and managed in an industrial company with technically advanced products in order to deal with the new risks of acting within a knowledge-based economy?*** This question is split into three sub-questions, that should together aid in answering the main question, by dealing with separable issues with the goal that they interconnect and aid in creating a holistic understanding of the main research question. The problem at hand is complex and answers can potentially be limited by the access to available information, mainly due to confidentiality, as this can be a give-away to actual strategy for firms on a market. This means that the problem is focused to finding different ways of managing the risks and to understand how and why certain methods are used compared to in-depth process analysis. The problem may thus include the use of for example external patenting attorneys or special tools or mindsets used to combat risks.

The sub-questions that will aid in answering this main problem is thus:

What are the risks for a company similar to ICOMP when acting in a more knowledge-based economy? The question aims to find the actual risks that could be encountered. Both to see if there exists any unforeseen or specific issues for the investigated type of companies and to investigate what general knowledge-based economy issues that the industry finds applicable. This will require both study of literature and interviews with relevant companies to understand the KBE, as well as the actual risks that companies see with this transition.

What, if any, categories of organizing the product development/IP processes can be distinguished and what are the deciding factors for the choice of how companies similar to ICOMP are organized, relating to how, when, why and who?

The question is related to understanding how firms today actually have designed their organization and the connections between different departments. The area can be especially sensitive, since it could relate strongly to how the organization aims to execute their strategy. This also requires to understand models of R&D and IP organizations and to explore the links between them that exist in companies today. The actual deciding factors for the choice of having an organization shall be investigated, but can also suffer from the sensitivity of data. To answer this requires understanding of the needs of companies and the, possibly changing, market and market dynamics where they act.

How do companies similar to ICOMP that have made a transition to knowledge-based economy thinking manage the risks? The question relates to finding solutions that aid in minimizing risks, taking into account both the organization and eventual deciding factors for how the firms takes risks into account. This also means that companies that have made a transition to more focus on knowledge based management practices can aid in understanding of what ways that exist to manage the issues.

1.5. Focus and delimitations of the study

The thesis is taking a standpoint in the three structural arenas described by Petrusson. The judicial and administrative arenas are based on integration into national legal systems, whilst the business arena is a structural collection of markets, innovation systems and firms with relations to the markets on a global scale. The perspective in the thesis will be on creating

results on the business arena, taking into account the firm's organizations and department's actions. The actions on the judicial or administrative arena will be perceived as influencing the actions on the business arena for these companies and departments, but be treated as "black boxes".⁵ Since the focus is on mainly companies that are in more mature areas and have their risks as a basis, the organization of income-focused licensing and income-based sales/acquisition of intellectual property, as well as pure human capital management is not prioritized, although they can be included if affecting the behavior of the interviewed companies.

Companies that the thesis should focus on are limited to those that have behavior or dynamics that can be applicable and/or comparable with ICOMP, i.e. semi-large to large, in the modern industrial economy and whose activities are related to technical innovation and/or design of new physical products with in-house or outsourced manufacturing. This means that their products should have some aspects that can potentially be protected via IP.

1.5.1. Reading Directions

Executive persons reading this reports should focus on reading chapter five, where our findings in the empirical data is analyzed and discussed and chapter six where the results are concluded. If a more in depth explanation of any of the findings is interesting, the relevant section in chapter four, the compiled empirical data, should be consulted and examined.

Persons in the academia that want to gain a holistic picture of the executed study, the applied methodology and the concluded result should find the entire thesis of interest. The first chapter identifies the need for the study and sets the objectives while the second chapter explains the choice behind the methodology. The third chapter investigates studies made in the field in the past and introduces the concepts used in the study, this chapter might however be less relevant for a person familiar with the field that is aware of the research done and the commonly used language. Since the study has its main basis in an interview study, the fourth chapter is critical to examine and get an understanding of the new material added to the research field and the final chapters discusses and analyzes the collected material. Extra focus should also be given to chapter six, where our conclusions are stated.

If a student chooses to read this thesis in order to learn research methodology and potential construction of a scientific report, chapter one and two, as well as four, five, six and Appendix C can be of interest. The initial chapters could be examined in order to see how a problem analysis can be derived and structured, as well as how an interview methodology can be presented and motivated. Chapter four and Appendix C can together be seen as an example of a thorough way to present an extensive empirical data and chapter six and seven can be read as a suggestion for how a thesis can be analyzed, discussed and concluded.

⁵ Petrusson, 2004

2. Methodology

This chapter aims to purpose not only the general methodology of the thesis, but also how the literature will be utilized and the interview study will be designed. The interviews are a central part of the empirical material and the choice of the interviewees is crucial for the end-results.

2.1. General methodology

The purpose of the thesis is based on investigating the potential effects of a transition to a KBE, in the thesis the understanding of the changing dynamics must thus take into account the different perspectives of change in different areas or markets. This is due to that they could provide different issues and maturity relating to the KBE and that several potential research methods could be applicable.

Literature, especially relating to IP-organizations of more mature industries and their specific risks in a more knowledge-intense world, does seem to suffer from a lack of known studies, which also will be shown in the theoretical framework in Chapter three. The use of purely literary studies to answer the research questions was therefore limited and a collection of primary empirical data is needed.

The research strategy, as Bryman⁶ defines it, is simply a general orientation to the conduct of the research, which basically can be split into qualitative and quantitative methods. The quantitative approach takes a deductive perspective on the role of theory in the form of a hypothesis as a starting point, wherein creating ways of collecting data to prove or disprove this hypothesis via empirical scrutiny is a goal. Since the field seems relatively unexplored the qualitative strategy with an inductive methodology has been more appropriate. This methodology should have the goal of using the theory as outcome of the actual research, which means to draw generalizable inferences out of observations from collected empirical material.

The cross-section design, as proposed by Ruane,⁷ focuses on the collection and use of information and opinions from a cross-section of a population at a given point in time, is seen as especially good for descriptive and explanatory studies. Bryman's perspective on the cross-sectional design is also taking this perspective, but it adds that the goals is to detect patterns via associations and that the qualitative cross-sectional design can be compared with a comparative multiple-case study. The main advantage of the multiple-case approach is that it improves theory building by enabling greater comparison among cases and the comparison itself may aid in finding concepts relevant for theory generation⁸ while the cross-section focuses on a single point in time. The multiple-case design was thus chosen although for example Dyer and Wilkins⁹ perceive this method as potentially focusing more on the perceived contrast rather than the actual context.

⁶ Bryman, 2004

⁷ Ruane, 2005

⁸ Yin, 1984

⁹ Dyer & Wilkins, 1991

To choose the interview instead of the survey as the way to collect information was thus logical. The qualitative approach taken and the relatively unknown area of study could mean that the interviews flexibility and providing rich and detailed answers, as proposed by Bryman, would be encouraged to explore and identify different opinions in the area. This was also considering the fact that the information sought, might be secret or sensitive and thus to be flexible to surpass sensitive areas and create a better level of secrecy and still receive extensive answers was a goal. This was chosen even though for example McClelland suggests that surveys have less bias from interviewers, are less intrusive and easier to compile and execute time-efficiently due to the reasons mentioned.¹⁰

However, the quantitative approach could be used to complement the study and aid in proving reliability and validity of the results, as part of an external and more objective truth. The choice to keep a primarily qualitative approach was however taken, mainly to focus on understanding the inner mechanics of the studied area, which would not be easily understood with the use of a quantitative approach.¹¹

2.2. Theoretical framework

The use of literature in the study has several purposes and the main one is to introduce concepts from which the analysis can be better understood while presenting the factors that are possibly affecting the interviewed companies. It is thus a goal to present a wide range of basic concepts, rather than specific Intellectual Capital Management (ICM) concepts in order to be able to find and suggest a common base for discussion when putting forth a more general business and organizational perspective on IP, without focusing on conflicting definitions and priorities of interviewees. The use of literature is thus also very important for the construction of a well balanced and objective interview guide that is still to the point.

A main issue in this area is to find material that relates to the organization of an IP-department and studies of the strategies that mature, large firms and less technology-focused sectors use to handle issues relating to a KBE and competition.

2.3. The interviews and their design

Since the focus has been to collect empirical data via interviews, the design and execution of the interview study has been a major issue in the process of creating the thesis. The choice of using semi-structured and open-ended, interviews were chosen as the best to fit the needs of the thesis. These allowed a number of fields to be investigated while at the same time leave room for interviewees to go off on a tangent of thought that could be of in-direct interest for the study as proposed by Bryman¹². Especially maintaining enough flexibility to delve deeper into the areas that seem more relevant for the company in relation to its specific organizational or market dynamics, has been important for this choice, but also to minimize the chance to seek biased verification to preconceived beliefs via only allowing certain categories of answers. Due to secrecy issues for the partaking interviewees, it also seemed the reasonably easiest way of

¹⁰ McClelland, 1994

¹¹ Bryman, 2004

¹² Bryman, 2004

getting as correct and open answers as possible, while still being able to have a structure that did not force to disclose the full interview as one flowing discussion.¹³

2.3.1. Choice of interviews

Since the goal of the study has been to understand the behavior of firms depending on their external situation and strategic policies, the choice of interview objects have been difficult, especially in relation to the fact that the companies need to face similar issues or have had them in the past, while still varied enough to provide insights in driving factors. The goal was to fulfill a number of criteria:

- The majority should be non-competing companies in relation to ICOMP, even though some ICOMP relevant companies are desired in order gain specific market understanding.
- They should be established and mature, meaning that they should have over 100 employees.
- They should have some sort of product development, although the company has no need to actually produce these in-house.
- The company should be largely focused on physical products.
- The company should have a global market, or market potential

Aside from these industry interviews, a number of patent bureaus active in either designing and filing patents and/or more strategy oriented activities where interviewed. The meaning of this was twofold, partly because these firms can act as the extended patent organization of a firm, large as small and partly because they can provide valuable insights on how to best design organizations and channels of information relating to IP. They most often also work for a number of different companies making them more aware of industry and IP activity related issues on a more general level. The validity of the industry interviews as a basis for a generalizable truth is of course problematic by themselves, thus the use of patent bureaus should aid in creating a better validity as they should have a wider experience with more markets and their insight is thus intended to aid in creating further external validity to the industry companies, either in support of or as a contrast to the industry interviews.

2.3.2. Interviewed companies

Thirteen companies were interviewed during the spring, in the three different categories non-competing industry companies, ICOMP relevant companies and patent agencies. The following companies were included in the study:

¹³ Bryman, 2004

Industry companies

- Ascom
- Autoliv
- Camfil
- Ericsson
- SAAB cars
- SKF
- Volvo AB

Patent consultants

- Awapatent
- Bergensträhle & Lindvall
- CIP PS
- Ström & Gulliksson

ICOMP relevant

- Blum AG
- Titus Lama

2.3.3. Designing the interview template

The design of the interview templates has been a challenging project. The reliability of the answers in the study can be a problem. Ruane¹⁴ discusses ways that the reliability can be increased, including the use of multiple approaches to the same question. This is based on creating reliability by asking the same question, but in different ways. This is said to be relatively simple in single items but in complex issues, especially with qualitative answers, this is much harder. The design of the interview template took this in consideration and was designed to have many angles to a question with similar, but altered, sub-questions to the proposed general questions that could trigger several similar answers regarding the same main question. This should increase the reliability of the answers in the study.

The guidelines of McNamara¹⁵ and Bryman¹⁶ have been the base for the creation of the interview guide relating to language use, leading questions and the order of questions. The language design is especially important since literature often uses several different definitions for the same words and the fact that interviewees would have very varying backgrounds, roles and industry specific buzz-words, the language design in each question has been taken into account, trying to avoid, if possible, jargon or words that can carry different meaning for different persons.

Since it is the nature of studies of this type to give a certain degree of guidance in the answers of the interviewees with the formulation and focus of the questions asked, it has been a specific point not to ask unnecessarily leading questions and formulating objectively put questions. This to minimize the effect of normative or “socially desirable answers”, answering not what is true for the person or company, rather giving the answers that the interviewer seems to be communicating should be the “correct” or most socially accepted answers, as Ruane¹⁷ notes, this is especially important in sensitive areas. The issue of how far the questions were able to delve into the structure and activities of the company was a problematic issue, especially since several areas could be sensitive to different companies depending on the dynamics of their specific market. The information that could be sensitive could thus vary from case to case.

Too specific question early in the interview might mean to intimidate interviewees and make them vary of information that could be crucial to a successful interview. On the other hand, to not delve deeper into the structure of the company could leave the research questions un-

¹⁴ Ruane, 2005

¹⁵ McNamara, 2011

¹⁶ Bryman, 2004

¹⁷ Ruane, 2005

answered. This meant that a balance had to be struck with a fair amount of depth and specificity sought after in the questions and to rely on that where companies seemed more open have interviewers ready with follow up questions that could aid in getting into more specific information where possible.

Four main areas of questions were proposed, to create a better flow and in regard to the sensitivity of the issues. Three of the areas are aimed to create the basis for the structure of the analysis, while the fourth should create a quick comparison between companies allowing to be used together with other data from the companies to put interviewed companies in relation with each other. The three areas were focused on risk, organization and the market development of the company. These areas are based on the hope that they together will aid in understanding the main question of the thesis. A number of high-tier questions followed by lower tier questions were constructed, the latter one were used either if the first answer did not cover the area fully, if the sensitivity of the information in the general question was large or if the details of the answer were not clear.

Two separate interview guides were created, but both with the same set of structure, one for industry interviews and one for the patent bureau interviews. After the first few pilot interviews with the industry interview guide, it was modified to delve deeper in certain areas and less in some, reformulating questions to minimize “buzz-words” further, but still with the same basic structure. Also the order of the questions were changed in order to create a better flow of interviews in accordance with the answers received from the first interviews, as well as to balance the amount of time taken for each part more evenly

2.3.4. Performing interviews

All except one interview have been executed at the offices of the interviewee, both to make it easier to arrange a meeting, but also to get a feel of the culture at the company and to minimize the stress on the interviewee. One interview could not be performed in person due to unexpected events, and where instead executed via a questionnaire based on the interview guide. Before the interviews all interviewees received an e-mail with information regarding the nature of the study to make it easier for interviewees to understand the area of study. In some cases, when specifically asked for, questions were mailed out beforehand to interviewees.

All interviews were made with both interviewers present to minimize the amount of personal influence on the questions asked and to ascertain that comments were followed up correctly while keeping a relatively strict time plan. The interviews were recorded with two separate recording units per interview, with the interviewee's permission. This was done not only to allow greater focus on the actual interview, instead of writing comments, but also to minimize missing important comments made during the interview. All interviews have been executed in Swedish where possible; the goal was to use the language that interviewees work in as to allow them to communicate nuances without the barrier of language and to give more detailed answers. Interviews started with presenting the background and goal of the study, along with the levels of anonymity that were chosen. Also the interviewee was urged to separate personal opinions from the companies' as to make it easier for both parties to distinguish the background of the opinions.

After the interview was finished, the writers have been listening on the recorded material and written transcripts of all answers from the interviewee individually. After this, the writers

discussed their perception of what was said during the interview in order to minimize personal bias. This was followed by summarizing the answers for each question, in order to make the material more comprehensible. These extensive compilations of the interviews were translated to English and sent to the interviewees who had the opportunity to correct eventual faults and to remove information that could be sensitive for the company. This was done to create greater certainty in the answers received and to maximize participation of interviewees.

2.4. Presentation of empirical data

A summary of the empirical data is presented in chapter four, with the aim of finding the general opinion received as answer to the questions put forth, as well as of highlighting areas where the interviewees agree or have divided opinions. The summary aims to present the broad scope of the collected empirical data. The chapter is focused on presenting the material that has been considered to be relevant for the understanding of the analysis of the thesis, without excluding any material that can alter the general picture or reflect any personal opinions.

The full compilation of the interviews can be found in appendix C for eleven of the companies. These compilation are structured according to the questions asked and the answers are presented where they were given, even though it might not be answering the current question. The answers have been written so that it should not be possible to track which interviewee that gave what answers. The answers are thus jumbled and organized under each question. The answers from companies and patent agencies are presented separately. The material from the two ICOMP relevant companies is however not presented due to secrecy issues. These discussions were delving deeper into areas that can be of sensitive nature for the involved parties and are therefore not presented in full length, even though they are included in the compiled version.

2.5. Quality of the study

Bryman¹⁸ notes that the reliability and validity are important criteria in establishing and assessing the quality of a study, although in qualitative studies these concepts can have a different meaning than in purely quantitative research. For example relating to the problem of replicating a qualitative study and in particular in the case of secrecy on the answers from interviewees, where the aim has been to actively minimize the possibility to identify individual companies. Thus the criteria put up by Guba and Lincoln¹⁹ can be more applicable to evaluate the quality of the study, in which the search for a single social reality is not the goal, rather the stress is on multiple accounts of social reality. Guba and Lincoln refer to the trustworthiness and authenticity of the study as to secure quality. In this perspective trustworthiness is made up of four criteria discussed below.

Credibility which parallels the internal validity should be high by the use of respondent validation of the interviews and answers, also triangulation via the use of both industry and patent bureaus interviews should aid in a high credibility in the study, although the issue of secrecy of respondents makes this hard to present to the reader. Transferability, which parallels the external validity, has been created by the use of thick description, which is a rich account of the details found in the interviews to answer the questions fully and to understand if the study

¹⁸ Bryman, 2004

¹⁹ Guba & Lincoln, 1994

holds in other contexts. In the study this has been done by communicating the contextual uniqueness via many and varied questions that should be interconnected. Primarily, the actual number of relevant sources and interviewees with common definitions can have an impact on the validity of the study. This since different roles, within the companies as well as in academia, has different perspectives on the issues and how definitions are used in their daily work. This could have been countered somewhat via selecting a group of interviewees' with more similar responsibilities, but the choice was made to capture many perspectives rather than have perfectly matching definitions with the comparative multi-case methodology. The interview material still provides in depth understanding of many issues and views in relatively high detail, this should aid to make a correct judgment of the transferability to other contexts.

Dependability, which parallels reliability of the answers of respondents, is problematic in an interview study of this size. Although no pure research audit from peers of the gathered material has been performed to aid in creating dependability has been used, the dependability of the study should be relatively high. It has been proven very valuable to let the interview respondents check and correct eventual statements from the interviews and to utilize the multiple approaches in the interview guide. Thus the use of this multiple approach has been aiding in increasing the dependability of the answers and captures the depth of complexity in some of the issues. Conformability, which parallels the objectivity, has been created by for example reformulating certain questions that could be seen as biased and tries to minimize the use of leading questions. Since the empirical data is based not on notes from interviews, but on the actual spoken and transcribed conversation, a greater level of objectivity should be reached. The compilation of the interviews can however be more biased than the raw data, although the analysis is performed on the source material and not the compilation of data. The objectivity of some interviewees can be questioned since they have the opportunity to use the interview as a communicative tool, rather trying to push for a certain view than the actual social reality. But taking this into account, the conformability should still be relatively high.

The authenticity criteria for quality as set up by Guba and Lincoln are primarily concerned with the wider political impact of research. The fairness of varied viewpoints has been very important for the study and part of the study has been to identify varying issues thus this should be incorporated. The ontological authenticity, educative authenticity, catalytic authenticity and tactical authenticity have also strongly influenced the study, aiming not only to increase the understanding of the area, but also to show possible future actions and how one can act to come to terms with the proposed issues.

3. Theoretical framework of the thesis

The chapter aims to create the basic understanding of the KBE and what factors that lie behind, as well as concepts regarding common strategies, R&D structures and IP organizations. This should aid the reader in understanding both the empirical data and the subsequent analysis.

3.1. What is the Knowledge Based Economy?

The Knowledge-based Economy (KBE) is not an altogether easily understood concept, mainly because there exist many definitions of what it is and many disciplines of study regarding everything from human capital studies to pure macroeconomic or management concepts that cover the area. This is made more difficult due to that the term knowledge based economy and knowledge economy is sometimes used interchangeably. Generally when referring to a knowledge economy, knowledge is perceived as a product, while in a knowledge based economy, knowledge is perceived as a tool.

Foray sees the KBE as essentially economies where society is shifting to more and more knowledge-intensive activities and where the term KBE refers to a development scenario in the economies, in which rapid knowledge creation and easy access to knowledge bases generate greater efficiency, quality, and equity.²⁰ A definition of the knowledge economy by Powell and Snellman's also focuses on an accelerated pace of knowledge activities, that contribute to increased innovation, and therefore relates strongly to the Schumpeterian concept of creative destruction and increased speed of innovation as more prominent in KBE.²¹ This view seems to be shared by the Organization for Economic Co-operation and Development (OECD), which see the KBE as a structural change from scale-based manufacturing, to new innovation-oriented activities.²² Although OECD still defines KBE's as directly based on production, distribution and use of knowledge, and therefore as both a product and a tool, they stresses that knowledge is strongly interrelated with the "human capital" and that the technology of companies has always been central to economic growth. They propose that these factors importance has increased at the same time as the focus on their relative importance has been growing.²³

Knowledge-based activities rely on said human capital and knowledge making the KBE an economy of intangible assets.²⁴ Kavida and Sivakoumar also share and expand this perception. They propose that the rise of the KBE has intensified the need to reassess key economic drivers and sources of economic growth and development and that the new economy includes not only industries that are knowledge-based but also knowledge-driven. They, along with Powell and Snellman, propose that intellectual capabilities, in the form of intellectual capital, surpass the traditional factors of production such as land, labor and capital in the KBE. Thus new logics need to be incorporated in business in regard to intellectual capital. This is partly because of the

²⁰ Foray, 2004

²¹ Walter W. Powell & Kaisa Snellman, 2004

²² Foray, 2004

²³ The knowledge-based economy, OECD, 1996

²⁴ Creating Value From Intellectual Assets, OECD 2006

nature of knowledge itself, such as that knowledge is non-destructible, infinitely reproducible and inherently hard to value before consumption of the knowledge. That means that several agents can use the same knowledge in parallel, which allows for endless scalability of a knowledge asset. This in turn leads to that growth in the KBE is dependent on adopting new technologies, techniques and processes.²⁵

Powell and Snellman's study proposes that the patenting data shows that novel ideas are occurring more frequently in new fields, rather than in established ones, and finds support for that the new sectors of the economy has been driving patenting. They found an especially large focus in molecular biology, the foundation for the new biotechnology industry, and in the semiconductor area, which is the basis for the computer, electronics, and telecommunications fields. They also found a decline of patenting in what they call traditional sectors, and see the new areas as more fertile in regards to new products and ideas.²⁶ Eliasson, according to Foray, proposes that knowledge production and information processing are located and increasing in all economic activities, not only in high-tech sectors, and shows via spending on knowledge-activities that the knowledge intensity in all sectors of industry is growing, thus including low technology-intensive sectors as a part of the KBE, even though patenting has not increased in these areas.²⁷

3.1.1. What factors lie behind the rise of KBE?

Several factors lie behind the rise of the KBE with knowledge, innovation and human capital as increasingly important factors. A large focus is on the globalization and the increasing area of ICT, as well as the growth of the service industry²⁸. Foray discusses several factors that direct the evolution towards the KBE. The main factors include the increase in knowledge related investments, new ICT and the growth of knowledge and knowledge flows. Other factors such as increased competition (driven by globalization), growing organizational and technological interdependencies and some sort of hysteresis effect are stated to be other major factors driving the development towards KBE.²⁹

The increased competition factor of Foray in turn arises from an increased use of ICT as a tool, deregulation of national markets and especially globalization. Globalization and deregulation is a main cause in itself of the rise of KBE, according to others such as Houghton and Sheehan³⁰ and the OECD. What they have in common is that the change to a global and deregulated world enables better market efficiency, global sourcing, comparative gains of localization, interdependence of trade and globalization of technology.³¹ Emerging countries focus on manufacturing operations has forced the OECD countries to rely more on their comparative advantage, which according to OECD reports lie mainly in the production and use of human capital and knowledge.³²

The growing interdependencies in organization and technical connections relate to the growing effect of introduction of new innovations, especially in relation to closely linked entities either

²⁵ Kavida & Sivakoumar N, 2009

²⁶ Powell & Snellman, 2004

²⁷ Eliasson, 1990

²⁸ Creating Value From Intellectual Assets, OECD, 2006

²⁹ Foray, 2004

³⁰ Houghton & Sheehan, 2000

³¹ Houghton & Sheehan, 2000

³² Creating Value From Intellectual Assets, OECD, 2006

on horizontal or vertical levels. This is important as this breeds further innovation and implementation to balance the relation in order to incorporate the innovation. This has even greater effect since R&D collaborations among seemingly competing organizations have grown much more substantial in high-technology fields, where knowledge is developing rapidly and the sources of knowledge are widely dispersed.³³ A form of hysteresis is also seen as a reason for the growth of the KBE, where the continuing demand for change and subsequent hiring of personnel creates a change that induces further change and innovation, which in turn creates a hard to break spiral. Snellman and Powell describes this feedback process in terms of patenting, where greater patenting raises awareness and odds that inventors think in terms of proprietary terms and makes further patent claims.³⁴

3.1.2. Intellectual capital and intellectual assets

The increasing role of knowledge and innovations have pushed for a taxonomy of the factors that lie behind the growth of a company's knowledge as to increase its potential to compete in a global knowledge-based economy. Therefore a new approach to this area has been created, called ICM that utilizes the concept of Intellectual Capital (IC) that deals partly with the intangible assets of an organization. IC refers to the collective "stock" of intellectual assets of a company. In this sense it can be defined as a firm's employees', knowledge, brainpower, know-how, and processes, as well as their ability to continuously improve those processes. Paolo Magrassi categorizes intellectual capital in three groups:³⁵

- Human Capital - including know-how, culture, experience, working knowledge and many other attributes that correspond to human competence and abilities. This capital cannot be owned by organizations; rather they are locked in the persons with the knowledge, although it can be codified.
- Organizational Capital – IP such as patents, copyrights and trademarks are included here, but also the infrastructure, or internal relationship, capital of a company. This is referring to the processes, strategies, culture, values and tools such as IT systems of an organization.
- External Relationship Capital – This includes customer and supplier relations but also the trademarks actual reputation, such as in the form of brands. Therefore the customer penetration, orders, distribution channels and joint ventures as well as the licenses and franchising agreements are in this category.

The collective stock of assets called the intellectual capital can be split into several discrete parts, the intellectual assets. Although intellectual assets lack a well-established common definition some seem to agree that they have three core characteristics:

- They are sources of probable future economic profits.
- They lack physical substance.
- To some extent, they can be controlled and traded by a firm, such as in the form of an IPR.

Because intellectual assets are not always separately identifiable as a single asset, but rather tend to be complementary or overlap significantly, they are difficult to measure.³⁶ To find useful

³³ Powell & Snellman, 2004

³⁴ Powell & Snellman, 2004

³⁵ Magrassi, 2002

³⁶ Creating Value From Intellectual Assets, OECD, 2006

metrics that aid in tracking how society has become more dependent on knowledge production, use of intellectual assets and the development of the KBE is therefore a challenge, even though the importance of knowledge and intangible assets has been growing. One focus has been to look at the stocks of knowledge such as the actual human and organizational capital while another focus has been on activities such as R&D efforts, investment in ICT, education and training and reforms in organization due to an increased importance of knowledge. One of the most developed lines of research in this field focuses on patent-based measures to quantify both these focus areas.³⁷

The existence of IPRs creates a legal protection of the interests of creators of knowledge-based activities by giving them proprietary rights over their creation, and therefore, enjoys a unique status in the portfolio of corporate capital. This is since IPR can be seen as a collection of claims that reify the existence and the value of intellectual assets resulting from knowledge-based activities and transforms them to tradable objects that can be controlled opposed to knowledge in general³⁸. Therefore, intellectual property can be seen as one of the most valuable assets, when compared to tangible assets in the increasing area of knowledge-based industries. Intellectual capital and assets are seen as the manifestation of the collective knowledge, ideas, innovation and wisdom of a company's employees, but IPRs are a manifestation of this capital.³⁹

3.1.3. The role of patents in the KBE

Since knowledge is a product of abundance, rather than of scarcity as compared to traditional means of production, imitation of knowledge intensive products has grown in importance as this knowledge more and more relates to competitive advantage for companies and possible ROI for investment in knowledge and innovation. This in turn relates to the importance of IPR within the KBE. Intellectual property is not the product itself, but the special idea behind it; the way the idea is expressed and the distinctive way it is named and described.⁴⁰ The patent, one important form of IPR, and the system related to it, is created to ensure that new knowledge and technology is codified and made public in return for a temporary monopoly on commercializing said idea in a geographic space. The patent can be said to be a defined set of claims that concretize the application of an idea.⁴¹ Via this temporary monopoly it also creates further incentive to undertake R&D and inventive activities.

Foray proposes that the mechanism of patenting is infrequently used, especially in Europe, and not preferred in most industries. Foray finds that firms tend to prefer to keep knowledge secret, rely on lead-time or the use of complementary assets to protect innovation. This is proposed to be due to the nature of the patent giving uniform rights to all sectors, the cost of creating and protecting patent rights and the lacking effectiveness of the legal environment to protect these rights. In relation to this, actual patent filings grew by 94% in the United States and by 76% in Europe between 1992 and 2002, with ICT driving most of the growth along with biotechnology, that has had quick growth in the period.⁴² Also from 1990-1999, the US Patent office issued more than one million patents, nearly triple the overall historical issuance.⁴³ Patenting before

³⁷ Powell & Snellman, 2004

³⁸ Petrusson Ulf, 1999

³⁹ Kavida & Sivakoumar, 2009

⁴⁰ Kavida & Sivakoumar, 2009

⁴¹ Foray, 2004

⁴² Creating Value From Intellectual Assets, OECD, 2006

⁴³ Davis & Harrison, 2001

this period show no strong rising trend, but around 1983, the volume of patenting picks up and increases steadily until the late 1990s. Thereafter the pace takes off even more sharply and this patent trend suggests a recent acceleration in the production of new knowledge⁴⁴. In addition, the patent licensing activities of some firms have become significant profit centers. IBM receives over \$1,5 billion in revenue only from their licensing of IP, totally unrelated to products or manufacturing and Merck and DuPont earned 2% respectively 8% of their net income, from licensing revenues in 2004.

3.2. R&D organizations

In literature several models exists for how R&D and especially New Product Development (NPD) can be carried out and organized. This section will briefly navigate the most common forms of organizational structures for R&D in industry along with some processes related to NPD and concepts: this to create a better understanding of the IP-departments and R&Ds possible connections and working procedures.

Some aspects in organizations as discussed by Trott are the factors of formalization, complexity and centralization, wherein formalization of procedures, rules, etc. is said to inhibit innovation in organizations. Complexity refers to the organizational diversity of disciplines in the company while the centralization refers to the decision-making and location of power in the company where decentralization of power is said to lead to increased responsiveness in decision-making.⁴⁵

Functional, or basic structure organizations in product development are based on the notion that separate departments handle issues in a sequence with clearly defined responsibilities. In traditional functions such as manufacturing, the departmentalization is powerful for developing specialization and expertise in departments. Other types of organizational categorizations, such as by product, are common in more manufacturing oriented companies, although certain centralized functions persist across the organization, which support efficiency and is especially well-equipped for handling product platforms. This is also one key argument for centralization as dissemination of knowledge is faster and easier if they are more closely connected via central administration. This makes functional structure a good way to handle new, but not so innovative products. The problem is of priority as short-term projects conflict with long-term planning and more innovative freedom, as well as the integration between departments. The independent project organization consists of self-contained groups with full-time members from various functions with a leading project manager. This is appropriate for large, highly innovative projects or specifically dynamic markets but is lacking in the ability to re-integrate and keep group members from not being isolated from the organization and carry the knowledge created back to the larger organization.⁴⁶

The matrix organization is an organization that employs a multiple-command system including not only a multiple-command management structure, but also related support mechanisms, which use both project managers and functional departments. In this organization staff is assigned to projects as needed across functional authority at part or full-time, often with leaders being dependent on the type of project that is undertaken rather than seniority. This results in

⁴⁴ Powell & Snellman, 2004

⁴⁵ Trott, 2005

⁴⁶ Trott, 2005

conflicts of loyalty and high competition on resources, but also tedious decision making processes and coordination are common problems of this type of organization. The pros are the ability to handle both large and complex efforts from several disciplines, as needed, with the ability to simultaneously process independent tasks and in the larger picture, projects. They also tend to create informal communication channels and create more information dissemination back to their function.

3.2.1. Product development models

The idea of stage-gates in complex product development is relatively old, being established by NASA in the 1960's. The use of phased project planning with a sequential approach with various amounts of phases with several types of checkpoints, or gateways, between them have since been developed. In a new product development process, the use of a stage gate model can be essentially split into three areas according Cooper, but many other stage-gate models exist that have added steps to divide the activities in this basic definition into further areas.⁴⁷

1. Pre-development activities – such as generating ideas, screening and develop product strategies
2. Product development and testing – such as further development and business analysis
3. Commercialization – marketing and feedback from consumers

Since the early versions of the stage-gate model, new demands have arisen that affect the process. Due to factors such as increasing demands for speed and increased flexibility, the sequential model have problem accommodating the needs of downstream departments. This has called for several paradigm shifts and among them the use of cross-functional teams. The use of teams in organizations is nothing new, in manufacturing the use of cross-functional teams has occurred in parallel with the introduction of concurrent engineering. Concurrent engineering is a systematic method to concurrently designing both product and downstream production and support. The teams can include external consultants or key component suppliers. The shifts can be divided into several generations, see Figure 1, as presented by Von Stamm⁴⁸ and Trott⁴⁹.

⁴⁷ Cooper, 1988

⁴⁸ Von Stamm, 2008

⁴⁹ Trott, 2005

| Generation | Type | Characteristics |
|---------------|--|--|
| First | Technology push model | Simple linear process with focus on developing new ideas which where up to manufacturing to produce and marketing to sell, based on an assumption of a market accepting new products and R&D. Typical in pharmaceutical industry |
| Second | Market pull model | Simple linear process with focus on market and customer interaction as the source of R&D direction. Reactive R&D processes in response to market needs. Influential for fast-moving consumer goods. |
| Third | Coupling model | Sequential feedback loop process. Larger focus on the R&D/Marketing interface where innovation can come from any area, including manufacturing |
| Fourth | Interactive model | Sequential but non-continuous model with parallel development with integrated teams. Closer coupling with several functions. Focus on integrating manufacturing and design. Technology push and market pull is linked |
| Fifth | Systems integrating and networking model | Fully integrated parallel development with expert systems with customers, suppliers integrated. More collaborations and focus on flexibility and speed of development |

Figure 1, Presentation of the five generations of product development

These generations represents not only a shift from the classical technology push or market pull, but an increasing focus on integration off capabilities and feedback to the process itself. The product development funnel is another interesting and much used tool in product development. This tool developed in the early 1990's encourages a company-wide perspective to management and coordination of product development with a start in the business strategy. The funnel is not primarily concerned with quick generation and evaluation of ideas to be taken to a next "phase" of some linear product development model, as sometimes used in literature. The funnel starts in the perspective of the internal capabilities and the external market to identify what the company can do and need to do, now and in the near future. The feedback loop from previous experiences makes this a holistic model covering the whole company and not just development in itself.⁵⁰

3.3. IP-Organizations

This chapter will shortly discuss the general options regarding the organization of IP, different set-ups of possible organizational and functional layouts and outline what activities that typically fall under these departments in literature.

Activities concerning IP have many possible layouts. The IP activities of a company can be found in several different parts of the company simultaneously. From the centralized corporate function to the fully externalized IP activity supplier such as patent attorneys, bureaus and law firms.

⁵⁰ Von Stamm, 2008

These activities are also found in separate IP business units. Most often they are cost-centers with certain cost sharing. They can also be arranged as to sell services internally, providing patent clearance, competitor intelligence functions etc. Sometimes these are arranged as external income generating licensing offices, in comparison to the universities' technology license office or technology transfer office, they fill the relatively same function. IP departments can also be arranged as local or subsidiary offices with separate responsibilities. Functionally they may be organized as organizationally separate IPR functions, such as patenting departments, trademark departments or as a fully integrated IP department. They can also be found as an integrated part of other departments such as R&D or the legal department. There is a lack of studies made in the subject of IP-organizations, noted by both Granstrand and by Petr Hanel⁵¹. Hanel claims that the size, organization and dedication of resources to the protection of intellectual property are less often the subject of inquiries than the use and effectiveness of the intellectual property rights.

The Taylor and Silberston study⁵² which outlined the "classical" patenting departments, primarily by classifying them on size, is one of the in-depth studies made in the subject of IP-organization. In the study four successive stages of intellectual property organization were identified. The first class, with no distinct arrangement at all, uses primarily external agents. It is in the study by no means limited to the small company to have this type of minimal patenting organization; it was quite common also for larger companies. The second and most common industrial patent department category has some full-time staff, including a dedicated patent specialist, but still relies heavily on external agents for handling the finer details of patenting. The third kind, considered the typical industrial patent department in the study, had more staff, typically with a centralized corporate department and a number of associated patent staff placed individually or grouped throughout production and R&D. The fourth kind was in the Silberston study called the 'super patent department'. In these departments in which up to 35-50 patent employees were included, almost all activities excluding those needing foreign agents were handled.

In relation to these classical types, Granstrand describes the typical Western IP department as found attached to the R&D or legal department as a relatively centralized function with a number of decentralized engineers linked to the department. Granstrand also describes several aspects in Japanese technology firms that separate them in terms of the activities and organization compared to the classical Western firms. Via this argument he proposes a fifth and also a hypothetical sixth category of patent departments, based on the Silberston study and system that expands the view of the patenting department, which is shortly discussed below.

The fifth type of patenting organization are representing the Japanese corporations organizational function, where the patent department is developed into a comprehensive IP-department that contain 50-500 staff and with the whole firm incorporating a form of patent culture.

The most important aspects identified for these level five organizations concerned a greater power in the IP departments, that combined the patent and other IPR in one department, that generally had a higher level of centralization and more focus on patent clearing providing not

⁵¹ Hanel, 2004

⁵² Silberston, 1973

only the organization with relevant technical dissemination, but actively mapping patents and pro-active scanning for inventions internally. These information activities were deemed more extensive and integrated than those of the classical companies. The Japanese companies also had a higher degree of integration between the patent and R&D department and a clearer patent-culture with clear goals, incentives and via visible organizational means. This shows that these companies have actively tried to organize not only to strengthen the role of IP, they are also organizing the company to better accommodate the patent-strategy and patent goals.

The sixth type of organization that is discussed by Granstrand is the extended IP department in which technology intelligence, information management and technology planning are included, as well as that acquisition and exploitation of technology is added to the activities and subsequently organized to incorporate these capabilities. This type of IP-department is based on a future scenario integrating intellectual capital management capabilities encompassing human capital management, IPR and other intangibles as these assets increase in value for companies. This can lead to that the IP management in certain firms can be subordinate to various forms of intellectual capital managers which as Granstrand argues symbolizes a reorientation of the organization to further prioritize intangible assets as increasingly important.

Granstrand continues to argue that although the IC concept will have effects, the IP-department of traditional manufacturing firms will not change in its organization to some form of pure IC-department with some executive corporate IC-manager. Although he argues that the integration of licensing and R&D function with IP is a possible future step, as more central coordination is needed due to continued cooperation with external partners. The continued integration of patenting and technology scanning to aid in the development of technology planning, evaluating future competitors using integration of patent and business intelligence, achieved via analyzing patents using databases, new methods, software-tools and communication networks, could definitely be part of these next generation patent departments according to the author.⁵³

To conclude, the organization of the patent or IP departments and their categorization is not elementary, one way to do this is based on size as Taylor and Silbertson, while Granstrands seems to separate the next levels rather on the perspective on IP and the activities that are followed by this, see Figure 2.

⁵³ Granstrand, 1999

| Level | Type of activity within IP department |
|-------|---|
| 1-4 | Obtaining and maintaining patents |
| 1-4 | Identifying patentable inventions |
| 1-4 | Deciding if to patent or not to patent inventions |
| 1-4 | Opposing patenting by others |
| 1-4 | Handling infringement issues |
| 1-4 | Joining forces with licensing and litigation functions when needed (not typically seen as part of the IP department in Taylor, Silberston 1973) |
| 1-4 | Aid in foreign patenting |
| 1-4 | Acting as a patent clearing-house for technical information in the firm, including patent monitoring of other firms |
| 5 | Mapping of technology |
| 5 | Pro-active internal invention scanning |
| 5 | Maintaining patent culture |
| 6 | Technology planning |
| 6 | Acquisition and exploitation of technology |
| 6 | Human capital and intellectual capital management activities |

Figure 2, Presentation of the six different organization levels.

Davis and Harrison created a “value hierarchy” based on their experience. This hierarchy is based on the activities of companies and is shaped like a pyramid with five levels, each a basis for the next level where each higher level represent increasing demands upon the IP function. The levels also represent the best practices in the management of intellectual assets and especially intellectual property. In the first and most fundamental level of the hierarchy, called the Defensive level, the staking of claims on intellectual assets via IPR companies build a base from which they can create value. At this first level the IP-function provides a shield to protect from litigation and stockpiling patents helps companies to negotiate cross-licenses.

The level one company is trying to accomplish five things, generating patents, protecting core business, initiate basic processes that enable patent generation/maintenance and enforcement and ensure that the technical staff has design freedom. Design freedom relates to that a technical team can invent in a given area without the threat to infringe other companies’ rights, but also to be immune from litigation on a company level (which strongly relates to the concept of Freedom to Operate (FTO) strategies).

A large focus is to find ways to increase the number of patents in the portfolio in general, seeing this in the same way as currency in general, the more the better. Although the importance lies in having a high number of high-quality patents, even though there is no further definition of this. This is motivated via a case from Hitachi, where their “mountain” of patents where of no use, it could not create leverage in crunch situations.

Another important step in the defensive level is related to respecting the IP rights of others via product clearance techniques. Defensively oriented companies have continuous product clearance processes that work to minimize sunk investment in R&D and product development, that may be deemed protected by third party patents in later stages. The use of software tools

to aid in patent clearance can be very effective, especially connecting the patent clearance with the own internal patenting processes is deemed as positive. Willingness to enforce patents are also among the best practices of defensive companies. The authors claim that patents are only worth what a company is willing to spend to enforce it. Which should not be interpreted to enforce every patent, the risk is rather that counter suing ends up costing more in attorney costs than the litigation was worth. The goal is rather to create a reputation of *willingness to litigate* balanced with the cost awareness that this brings.

The second level called the Cost control level focuses on the reduction of filing and maintenance costs for patents, mainly it focuses on taking proactive action in relation to the first level of the authors value hierarchy. The most important practices of the second level value hierarchy are to relate the patent portfolio to the actual business use, to establish IP committee's with cross-functional members, to establish screening processes for patent evaluation, set guidelines for filing and renewal of patents and a regular review of patent portfolio to motivate further maintenance of patents.

The third level focuses primarily on extracting value directly from IP and to focus on nonstrategic IP that has tactical use. On this level the focus of IP management activities shift from IP as a legal asset to a business asset. During this level more management support, as well as more proactive licensing organizations become important. This means to take certain authority/activity decisions, aiding in the creation of an organization with effective handling of IP value extraction.

The fourth level, called the Integrated level, focuses on the companies that look beyond defense, costs and profits. They look at IP as an integrated business asset usable in a number of ways. This is also where the IP department starts helping the other parts of the organization to reach their strategic goals. This means that the best practice in this level is relating to aligning IP strategy with corporate strategy and includes intellectual asset management over multiple functions.

The fifth or visionary level focuses on staking future claims, being more focused on gap-analysis of IP for strategic use, but also encouraging new disruptive technology and embedding intellectual assets and IA management into the company culture. This translates into the best practice activities of future opportunity scanning and performance measurement systems to follow up the organizations and the assets performance for the company.

3.4. IP activities

In literature several strategies to create value and especially operational freedom is accounted for, although the reasoning behind the actions vary. Therefore to briefly discuss activities directly related to creating operational freedom – a basis for strategy execution on the business arena for companies, is important. Krattiger takes a perspective on FTO as a strategic tool, combining legal, scientific and business expertise coupled with strategic planning, even though the concept of FTO usually is discussed as a legal concept used as input for strategic risk management decisions in the product development and R&D processes.⁵⁴

⁵⁴ Krattiger, 2007

The legal concept of FTO in this case exists in relation to a broader perspective on FTO, as an indicator of the business constraints imposed on the organization. Krattiger makes an important note in that risk cannot be avoided completely; rather every choice carries its own risk. Krattiger expresses that FTO should be considered very early in product development processes, partly because the developed product, with potentially large sunk cost, is much more troublesome to seek licenses for later in the process, since the bargaining position is weak. The risk with not obtaining licenses early, is that at a later stage a license might not be acquirable at all. This can in turn lead to patent infringement cases.

Krattiger discusses ten main options when creating FTO in three strategic categories, legal/IP, R&D strategies and business strategies, which means she defines the categories on the functional level rather than on the purpose of the action as compared to Bader. According to Bader there are three main motivations why companies use patents, wherein one is to create Freedom of action (FOA), which uses three levels of so called interaction; prophylactic, defensive and offensive which will be the structure for the following chapter.⁵⁵

The prophylactic or preventive measures of Bader can be achieved by having a large patent portfolio to deter other companies from entering the technology areas or to go into infringement lawsuits, which in turn will protect the company's products. This relates to actions regarding competitor monitoring, which aims to observe and analyze patenting behaviors of competitors, and the product- or patent clearing of the products in the internal product development processes before they are put on the market, more related to the classical legal FTO investigations and opinions. Krattiger describes modifying the product and inventing around the invention as the two applicable R&D strategies, modifying the product by removing the patented solution fully or to replace it with another solution can be applied especially if FTO analysis is performed early. Invent around the patent would according to Krattiger require the company to put considerable resources in the development of alternative solutions. This could delay product development, but lead to other inventions and possibly new forms of IPR for the company. In parallel with licensing attempts, attempts to invent around are often pursued in industry.⁵⁶

The Krattiger perspectives of defensive actions are related to the situation when a product seems to be infringing others rights. These actions are called Business Strategies, they include "to wait and see", which is the choice of leaving it up to the rights-holder to find and contact the company, which might cause demand for a license or some other action. The risk is that at least in the US triple damages can be given if the infringement was willful, i.e. the company had knowledge about the possible infringement but acted without a license anyway. Abandoning the project might be the most reasonable strategy considering the risk in some cases. Krattiger notes that this should be done as early as possible and regular meetings with developers, IP-personnel and managers should be held to ensure that this is done. Merging and/or acquiring either the whole IP right (not the license of use) or the company that owns it in order to create FTO is also a viable option in some situations. The defensive measures are according to Bader initiated when an infringement accusation occurs from another company. These actions have four basic pillars including attacking the validity of the allegedly infringed patents. Thus trying to find ways that the administrative proceedings were wrongfully made, or the claims to the

⁵⁵ Bader, 2006

⁵⁶ Krattiger, 2007

patent is based on inventions that already were discovered, i.e. to prove prior art in the area exists. Another way is to create influence of the actual infringement proceedings outside earlier mentioned ways, including political steps.

Offensive actions

Offensive actions relating to FTO, or “designing access” as Bader refers to this process, relate to the company’s actions toward pro-actively securing their FTO, such as pursuing in-licensing or cross licensing as well as engage in oppositions of filed patents by competitors and interference proceedings to ensure the FTO of the company’s own products remains clear. Licensing in the right to a possibly infringed patent is a process that according to Bader is almost mechanical, even though in some cases it can be troublesome to negotiate. It should also be mentioned that in the areas where patent thicket exists, the licensing procedure is more complex due to the need to contact many parties and that royalty stacking can be an issue for the end product.⁵⁷ Cross-licensing, i.e. trading the IP right of the company for others IP right is also fairly common. Some companies have entire teams that try to create stronger cross-licensing positions and especially during mutual hold-up this strategy can be effective, i.e. when companies can block products or other use of technology due to mutually dependent IP rights. Opposing third party patents by attacking their novelty, utility or non-obviousness is also a way to create FTO by annulling whole patents or certain claims in patents, although the cost of driving these litigations are high and the outcome is uncertain. Bader also states that although opposition against patents is fairly uncommon in general, certain sectors such as the consumer goods and furniture component industry still has a culture of opposing applications.

Krattiger mentions that in practice several of these actions will be performed simultaneously and revised depending on the situation and circumstances of the case. The actual feasibility of the different options will vary during the different R&D phases. Many of the activities in this field may vary between different industries. As Merges and Nelson discusses, there are industries where the technological advances are cumulative, they build on each other over each generations. These technologies are dependent on each other, demanding a perspective on technical advances in certain fields as cumulative while in other fields, technology must be viewed as systems, where a useful product is made of several different components. Certain areas have hybrids of the two models of thinking behind products, such as automotive and computer industries. This can be said to be complex systems with own dynamics of the use of IP, for example the need to negotiate licenses will be larger when the dependency on other technology components increases. This in comparison to when the technology allows for “discrete” or more easily confined technologies without as many dependencies that can enable the creation of stand-alone inventions in the technology field.⁵⁸ In these “discrete” fields IP is not as important for creating cross-licensing and negotiation possibilities⁵⁹.

⁵⁷ Shapiro, 2000

⁵⁸ Nelson and Merges, 1994

⁵⁹ Hanel, 2004

3.5. Sum-up of theoretical framework

The theoretical framework that has been presented has the goal of establishing three areas that form the link between the theoretical framework, empiric data and the analysis of the material. Via these three areas, see **Error! Reference source not found.**, the thesis will aim to find the answers to the questions put forth for the thesis. The three areas are related to risks in the KBE, the objective for the IP-organizations and how organizations are constructed in order to deal with objectives and company risks.

The KBE chapter provides a framework aimed to give an understanding for how the general business climate is changing, how this can be seen and what the factors are. In this relation the theoretical framework should provide input to how the risks in the KBE are related to the risk for the interviewed companies, aiding in understanding what the known and unknown risks are in relation to the KBE for the investigated companies. This should be derived from the KBE and FTO related chapters, since it is related to the rise of ICT along with globalization and deregulation, which creates a more intense competition. Marking increasing innovation and thus investment in R&D as a focus for sustained competitive advantage. The concept of intellectual capital and intellectual assets are presented and the role of IP in the KBE is explained to represent the claim to a certain idea.



Figure 3, The three main areas that together build up the fundament for the analysis.

It has been discussed that investment in innovation is increasing, which causes the importance of IPR and patenting to increase as well. An increasing collaboration between actors horizontally and vertically causes then, in turn, growing interdependencies. Five different R&D stage-gate models have been presented with varying amounts of departmentalization. Also different types of stages and corresponding activities of IP-organizations have been discussed as well as possible organizational layouts. The value hierarchy of potential ways to utilize IPR as well as possible actions that companies can use to create freedom to operate where also presented to give an understanding of concepts, terms, and potential actions presented in the empiric data.

4. Compilation of the empirical data

This chapter presents the compiled data from the interviews with the industry companies, as well as with the patent agencies. This is presented in a comprehensive and summarized way and is organized based on the areas of interest for the study, which is the basis for the analysis.

4.1. Market development regarding patents and IP issues

When it comes to the market development around patents, the smaller companies discuss that the pace of patenting is increasing, and that they have a feeling that the patent applications sent to the patent offices are getting more and more similar. The larger companies do however not seem to agree, they are more expressing a feeling that the pace is being constant for the time being. Also the patent agencies are separated in this question, some of them states that no change in the pace have been noticed, while other refers to that more applications are handed in. The technology development rate is so high in some industries that patents are increasingly irrelevant, there is no time to utilize the protection and get ROI on the investment. There has also been discussions about that the business perspective in IP has grown in attention and that the awareness in general has increased.

The traditional markets seem to be dominated by large actors, smaller actors have usually been acquired or are working in very niched fields. New smaller actors are however once again entering the traditional fields, as a result of the introduction of electronic applications in the older technologies and through globalization. The general opinion is also that the smaller actors do not have the same conditions to work on the market when it comes to patents, since some mean that a patent is not worth more than the resources the company are willing to spend in defending it. However, an IPR can be very important for small actors for various reasons.

Telecom discovered already in the 19th century, after an analysis of the US market, that the telecom industry should probably not use their patents in order to block each other. The Bell companies had held on tight to their patents, which had caused that the expansion of the phone net in the US was lagging, compared to Europe, even though it was originally invented there. This was an early revolutionary insight and has led to that the telecom market has almost from the beginning worked for licensing and common standards, in order to reach compatibility, rather than blocking each other with patents.

One company highlighted that the larger companies often have groups working actively with patents and that these groups seem to have incitements focused on delivering many patents, rather than to create high quality patents, in order to reach their bonuses. Also the patent agencies discuss a higher awareness for the IP question among their clients. The higher awareness can e.g. be seen in the creation of IP strategies for more careful evaluation of what and how to patent and in the introduction of the commercial perspective of the related questions. None of the interviewed agencies are of the opinion that licensing is a common phenomenon in their industries, even though all of them also say that it occurs and is used by a handful companies.

The patent agencies also discussed that the shift has focused from the regional market to become global, which is seen in that more companies apply straight to e.g. EPO. They also discuss that the tendency to apply for many patents is following the economical cycles, which might be a consequence of cancelled project or a higher cost awareness. This does also apply for infringement cases, when everything works fine there is no urge to check what anyone else is doing. Patents are also mentioned to be more suitable for some industries, e.g. material technology where it is easy to define the coverage.

Most of the interviewed companies see themselves as defensive in relation to other actors on the market, as one company expressed, “this is a rather defensive corner of the world”. Worth to mention is however that the two companies that aim to be offensive both act in a similar market dynamic perspective and faces about the same challenges from competitors.

Most companies seem to have protection of products as a main purpose for patenting, but purposes as to secure business, blocking competitors and as well as for licensing purposes are commonly expressed in the interviews. Especially companies in intensive industries mentioned that it is very difficult at the moment of application to know for which product or other use the patents will be utilized. Licensing seems to be rather limited to some industries and even though one company expresses that they get large incomes for licensing, they also discuss the importance of finding a balance between having incomes from licenses and from product and service business in order to create a successful business and company.

Among the interviewed companies there are examples of companies using technology portfolios, but these are usually more patent oriented companies. The most common method today is still to work with more individual patents that is either mostly ad hoc or focused on protecting a specific product, rather than a technology. However, there are companies with more advanced mindsets, one example can be one of the larger companies working a lot with licenses and cooperation's that has taken the mindset of seeing patents as a form of a currency that allows them to participate in the developments of standardized platforms together with their customers and competitors.

All companies that chose to answer the question about patent litigation answered that they have been in court due to patent questions, but they also stated that most cases are solved outside of court. Another area that was discussed was that companies in patent intensive areas are more prepared for litigation and infringement cases partly due to that these organizations often have shorter decision channels.

All interviewed companies have some kind of product clearing process in their product development and it is most often connected to a stage-gate system in the R&D process. To which extent the clearing is done differs and is referred to the requirement of the specific market dynamics. For companies in too complex industries it is seen as too costly to make a full clearance and the more patent intensive companies state that they only need to clear new product areas, or in suspicious cases, and that they already know the landscape of the traditional markets. Everyone however agrees on the importance of clearing, even though they do not believe all companies have it.

All companies agree on that the clearance should be performed early on in the development cycle, but only a few of the companies discusses that the gate activity should reoccur during the development. An often seen pattern is that companies/departments that have encountered serious trouble due to IP is driving the development of more efficient systems.

4.2. Purposes of patents and patenting

The main argument for patenting is for the companies to be able to use their own developed technologies, with other words, to get a monopoly and be able to block others from copying or making something very similar. A few of the more patent advanced companies also express purposes for the patent as a tool for licensing and a way to control their knowledge. Some actors, both companies and agencies, express that the desire is to patent competitors potential products in order to avert them, which is more dependent on the competitors' business strategy than on their own.

Some of the actors say that a business commercial perspective is crucial when it comes to valuation of potential patents, the cost always have to be compared to the potential value of the patent. One actor does however clearly states that objective valuation only can be performed in theory and that the actual value is set by the context and the desire for the invention at the market.

The IP portfolio should support the brand of the company and one company states that the vision is that the portfolio should be a living asset where about 70% of the portfolio should be considered to be active. One aspect raised is also that the vision even internally varies; the market side is looking for a blocking effect, while the engineers more often think that no one else should copy their baby.

The patent agencies are rather united in the opinion that patent in its nature is a defensive tool, it can be used to prevent others, but it does not give you any direct right. However, several of them also discuss that the tool still can be utilized in an offensive way. Another area highlighted by one agency is that the purpose is not always synced with the application, the claims are often written at a component level and misses the overall purpose. Another opinion is also that companies sometimes prefer to keep pending patents, since there is an uncertainty in where the continued development, which is performed in parallel with the application process, will end up.

All interviewed companies agree on that inventing around patents are according to the rules and most of them uses it as the first method to get hold of patented, but popular and interesting technologies. Technologies without a market or products that are unique for one player and not desired by any other are not in the risk zone for being invented around. If the question of a potentially blocking patent is raised late in the product development process some companies state that a license for the actual patent usually is less costly than to invent around the patent and the patent agencies extended that opinion to the extent that the common method usually in that occasion is to keep a straight face and wait for a reaction from the opponent. Even if the infringement is discovered it will take many years until a decision about seizing production or a forced license is taken in court and the price is more or less the same in Europe as if the license would have been taken from the beginning.

One of the larger companies with less dependent products has seen issues with “not-invented-here” syndromes with invent around solution. Few companies seems to evaluate the possibility of invent around from a quantitative perspective, only one actor discusses a method for calculating the amounts of “man-months” to go around their own patents as a measurement of the quality of the patent. Another company also discusses that it is more difficult to invent around a patent portfolio than individual patents, which is one of the reason to their mindset of how to patent. Other methods to get around patents, as oppositions and belittling, are not commonly used according to all interviewed actors; usually these are more often applied when it comes to arguments in cross-licenses negotiation in order to reach a good deal.

One interesting aspect seen is that the same purpose can take very different shapes. Two actors active in intensive industries with similar conditions and with the same expressed purpose of blocking other and creating licenses deals had very different opinions about how to think. One of them speaks about aiming for essential patents that everyone must use, while the other found essential patents of less importance and rather went for an approach of creating bomb carpets for new areas.

One of the interviewed individuals expressed the feeling that there today is an own drive in the creation of many patents from actors such as PRV, lawyers and more active companies, which according to him affected the inventive step. A comparison with the development of grades in school was presented, if the teachers performance is evaluated based on the grades of their student, the grades are usually going up.

4.3. Risks and their relation to the knowledge based economy

There are several new risk communicated and the three main one are overlapping technologies, control in the supply chain and globalization. These risks seem to be more or less commonly shared by all the interviewed companies, as well as the sighting done by the patent agencies.

In telecom or ICT, the technology has always been dependent on other technology, which has not been the case in e.g. automotive or more traditional markets in the past. This is since no one owns for example only a part of an airplane wing. This is however slowly changing with the introduction of more complex systems when electronic and automated control systems are entering the traditional fields. This brings in “new” patent landscapes and market dynamics to fields that have been without these issues in the past. The overlapping technologies make some sorts of cooperation almost inevitable, which causes new risk with knowledge leaking, contract issues and IPR splits. One of the patent agencies however did not find this risk very imminent, the interviewee argued that the most common method to acquire complex components from another area is to purchase the product in questions from the original developer, which exhausts the IP rights for the buying company.

It should also be remembered that someone always need to take on more risks than the other, as one company explained it. Another perspective expressed is that smaller companies, or even NPE’s, entering the market have affected the original market dynamics. Larger companies have often better negotiation possibilities since they often have an interest in exchanging rights with each other, the small actors are only interested in money.

The owner conditions in the supply chains have altered lately in many industries and the willingness to own IPR has spread to further actors than in the past. Today more and more

companies see owning IP as a competitive advantage that gives them the freedom to choose their suppliers, enable multi sourcing and to hinder the competitors to get hold of the same technology through a supplier, which has not been the case in the past. One of the patent agencies does however argue that there are no increased ownership issues, but an increased awareness that transforms the issue to an internal weapon. The companies that are more prone to patent, are more focused on the risk of leaking knowledge and they work actively with controlling their knowledge. Companies active in standard setting activities discussed that standards are crucial for the compatibility, but they also saw the risk with spreading their knowledge through open standards to all other companies, even those that had not participated in the creation of the standard.

The third main new risk is caused by the globalization, new landscapes in other parts of the world has all of a sudden gotten relevant for companies here, but most of all the risk appears when companies are entering new markets. One often mentioned risk is the rise of China and the rest of Asia, today they still seem to lack full knowledge about how to produce with the same quality as expected in Europe, e.g. one company mentioned that a Chinese company had realized that there should be a hole on the side of the product, but they did not realize it had a function and needed to be precisely made. Many of the companies see Asia as an increasing threat since they are quick learners and adopters, while one company dismissed the risk with stating that Asia will have the same costs as the European companies if they adopt the same production technologies in order to reach better quality, which means their competitive advantage is lost. China has also started to patent more products in the last years, especially in simpler products areas they cannot be ignored.

Most of the companies interviewed see that the IP risks in general are synchronized with the main risks of the company, or at least as a part of them. The company that does not see the IP risk as imminent explains that their industry is rather mature and saturated. Other main risks discussed were e.g. losing human capital and knowledge leakages, where Asia once again was mentioned as an example where one company experienced a 50% employee turnover.

Another discussed specific issue was that one company experiences that NPEs and other offensive companies tend to attack their customers, since the customers tend to earn most money. This has gone so far that the developing company has started to take on a share of the risks for their customers, which adds to their effective risk.

A company utilizing an internal open-innovation system where co-workers can share and discuss innovative ideas mentioned another case. The internal social media carries many opportunities but it does also create risk of uncontrolled information leakage and the risk of employees "stealing" ideas/innovations from other individuals, which can cause a lot of pain for the provider.

One patent agency highlights the risk of not being aware of the claims in the patents; it is not uncommon that the protected function is completely separated from the commercial offer. Complex products also increase the risk in one way since it creates a higher insecurity due to the difficulty of getting a holistic picture over how the area develops and effects on their business. One theory of one interview person is that the value of IP increases when production resources and possibilities for plagiarism goes up, e.g. a medicine is easy to synthesize and the value of IP

on that medicine is thus often considered to be high. The same goes for IP in complex components when the possibility of purchasing advanced production resources is more accessible.

In general it can be seen that IP issues are more and more integrated with the business side today and the issues are handled higher up in the hierarchy and are clearly considered to be more important today than five years ago, this development has been quick.

The risks have changed and increased in different ways and the awareness is today much higher about both risks and opportunities. Questions about FTO are discussed more in the last five years, which one company relates to both the increased risks and the growth of the company. This can also be seen in that one company expresses that it has gotten easier to ask for resources today and that it is a much more favorable situation nowadays to for example hire new personnel. Also the new global competition has forced increased awareness, competition is no longer only regional.

One company had a customer that a few years back demanded them to deposit all their product data and specifications at their location, with the motivation that they need to be in control and able to deliver even though the supplier might disappear. Other issues mentioned is the questions of information loss and leakage when employees are laid off, due to recession, and they move up or down in the value chain but also that the customer today want to have more power and wish to be in a position where they can choose their suppliers, in order to press prices.

When discussing methods to decrease these risks, half of the companies start with mentioning a belief in extensive patenting with different goals, e.g. building up a strong portfolio, patents as much as possible of the technologies or just applying for many patents. One reason expressed for this choice is to transfer know-how into patents, in order to increase the protection and decrease the risk of leakage. Especially companies in patent intensive areas believe that a strong portfolio is a way to reduce their risks. Other methods mentioned are more focused on patent monitoring of competitors as well as to disseminate the issue far down in the organization, which means that the awareness is spread to the individuals working directly with the issue, rather than an expert.

In the automotive industry it seems like stronger patenting and contracting to control know-how and suppliers are increasingly important to deal with risk and it seems like actors all over the value chain has realized this. This is also an industry where the development goes so fast that the ROI is too short for one company to develop an own platform, which increases the potential in utilizing open innovation, collaborations and licenses even further, compared to what other interviews have shown.

Another risk that needs to be considered is the usage of consultants in the R&D processes. No one usually knows where the consultant has been working earlier or where the person will head after the project is finished. This can cause issues if the consultant presents an idea that was previously developed for a competitor. It is the experience of the consultant that makes the individual interesting, so this issue needs to be accepted and what can be done is only to control the results. This needs to be done both through contracting with the consultancy firm and through actively acquiring new inventions and ideas from the consultant. This is craftsmanship,

the person owns the right to their experience, but the relevant results still needs to be acquired by the company.

A more crucial matter is that both several industry companies and almost all the patent agencies states that they do not believe that the actors at the market has full control over the new risk and the way that companies interact with each other. The awareness of that they need help with the questions do however seem to be there. One company even expressed that willingness to participate and be seen in forums such as in open innovations has been faster than the development of methods to handle and decrease the risks with the participation.

When the patent agencies received the questions about how they believe the patent work can minimize the companies' risks, many of them raised the point that the patent system today is not utilized as it was intended to. Patents was from the start aimed to be a source of information and is today an available tool to be used in order to understand the companies environment and collect information to include in the strategic work, e.g. to direct research and development.

Another idea that came up was to utilize the system for more than blocking the market; the capacity of the patent portfolio could for example be used for dynamic purposes and HR incentives. One agency created a two-step method where the company should start with monitoring what competition is doing and then create tradable objects that can be used to get the company out of difficult situations in a financially favorable way. Investing in own IP is clearly cheaper than to pay royalties, protecting technologies is therefore a way to create possibilities.

4.4. Market interaction, competition and the impact on freedom

Cooperation's and interactions between actors are most often occurring in vertical relations and the question of control has increased in importance. One interviewee discusses that it is a lot of talk, rather than an explosion, about cooperation in development on a high technological level. Another kind of collaboration, where the IP question is central, is when e.g. EU-programs or Vinnova gather companies together in so-called open innovation platform/R&D projects. The involved actors then split the cost, but have low chances of getting any exclusivity to the results. This is not an issue if the participating actors are non-competitors, but that is seen as not very likely. During the interview study there has however been a few cases where e.g. technologies used in med-tech have been licensed and used in the component industry or where components developed for an electronic component was introduced in a pacemaker. One of the agencies even argued that this is more or less risk free since it is difficult to attack an infringer using the patented function in another context.

The most often expressed issue regarding interactions is the increased focus on IP in negotiations for cooperation's and this applies for both customers and suppliers. In the past the competitive advantage was to be first to market, not to own patents. Almost all the interview companies had at least one historical case where ideas or rights to the results were lost due to poor contracting or similar reasons. When working closely together, the companies need to share experiences with each other, but the risk of leaking information backwards to supplier must be remembered. Tougher standard agreements and negotiations regarding ownership and IP is a fact, but as one company express it: "The important factor for us is the knowledge itself, IP is just a tool".

The time to a full return on investment is in some areas today longer than the product life cycle, due to the quick development rate. To develop own platforms and systems is very expensive and the development pace is so high that there is not enough time to get the investment back. This is according to one company the main reason to why cooperation's and IPR licensing has increased in their industry.

One patent agency discusses that they believe there are more R&D collaborations and platforms today where companies cooperates and shares the risk, due to that the prerequisites as the competence, the contracts and the technology are more available today. Several of the other agencies also express a personal feeling towards more interactions today, but no one expresses a clear trend or has any research to refer to. Another tendency one agency mentions is that some buyers in cooperation's has the wish that the consultant or developing partner shall guarantee that the products is not infringing any rights. This is something many individuals' finds very uncomfortable and most buyers do not seem to know why they require it or how it should be executed in reality. Larger suppliers do in general not accept these kinds of terms.

All interview actors were urged to define the concept of Freedom To Operate and the core of their answers is a legal definition of the concept where the risk of infringement during the development of a new or modified product is in focus. However, no two companies had the same width to the concept, some definitions includes the actual business perspective where for example the possible interaction with competitors are included, while other kept it to the strictly legal perspective. Some examples of definitions are:

- To make sure that we can utilize everything we develop and pay for, it should not be owned by our customers or by a consultant. We should not sign of any contracts where we sell our rights. We should be able to use the technology for more than one customer if we have paid for it, while if the customer paid they are allowed to block us.
- Partly to make searches on a product or system level and partly to check the different functions that a product performs. One part is also to investigate the relations in the value chain, the choice of supplier might be limiting my freedom, e.g. if a supplier holds a license to an important patent, other suppliers might not be able to supply the same product. This action enables risk adverse operations.
- To have the possibility to develop and launch ideas at the market, without anyone being able stop us. This means that we have protected the idea, that no one else has protected it or that it is not possible to protect.
- Get lost money. FTO is to have a portfolio strong enough for me to be able to negotiate with anyone that tries to stop my business.
- FTO is a remarkable concept in the perspective that you can never know if you have it. FTO gives a hypothesis related to if someone can sue you and make money, but you can never know for sure.

Five out of seven industry companies stated that FTO is a prioritized questions for their company, the other two explained their answer with that the complexity makes FTO too time-

consuming and costly. One of the companies has products that consist of so many components that it is more or less impossible to clear them all. The other actor uses a strategy to wait and see and bury their heads in the sand, which is possible since it is still possible to act in the specific industry without infringing the fundamental technology.

The prioritization of FTO, according to the companies, relates to the ability to develop new factories and products without the risk of being stopped and a desire to have technology leadership, thus owning their own technology becomes very important as it is seen as a receipt on their innovation and gives states. The method for performing FTO searches is crucial; one company reports that they have rebuilt their processes to go from 99 to 99,5% security, to be applied on important areas where a high security and a need to get a better holistic picture is expressed.

When the patent agencies receive the question about prioritization of FTO, they answered more hesitantly than the companies. Most of them found it uncommon that FTO was prioritized due to the complexity. They rather argued that this is very dependent on the industry, that FTO questions are very relevant for e.g. telecom or automotive, but that there are industries that will be better off without reaching an advanced IP level, due to the nature of their technology.

The general expression for how the companies have acted in order to handle the risk with FTO is to increase the awareness of IP questions in the R&D organization. One company discussed that a FTO search won't give the complete truth, it is a quite a lot that needs to be known, but when combined with the answer of other actors' patent mapping can be used as a tool that enables tracking of the competitors' R&D and directing the own development away from too intensive areas.

Some more practical examples for handling FTO questions mentioned by the companies are to create checklists and clear processes for the reactive work, where a high strategic level is not considered to be enough. It is also to create a clear gate structure so that the employees know that they are committing an error if they do not check the patenting issues. One company aims to get the supplier to be responsible for FTO on purchased components, which means that the company only needs to take care of FTO on own products and processes, which can be compared to another company that communicates that they are constantly in different negotiations about patents and licenses, which makes FTO clarity issues business as usual rather than a threat.

The patent agencies were asked to answer if they believe that companies in general are properly informed and aware of the patent landscape and system, so they are able to take informed decisions for FTO questions. None of the four agencies believed this is the case. Reasons that were raised included that the customer often has a great knowledge about competitors' products at the market, but no idea relating to if there is a granted patent behind it, as well as that a company often is locked into their own little sphere, which causes their thoughts and interpretations of the surroundings to become colored.

4.5. Organizations and how they have changed in relation to IP

The development regarding patents has made the largest companies in the study change to a larger IP focus due to market factors, such as changed competitor behavior and the risk of losing business/income. One example is found in the development of the most intensive industries of

today when it comes to patents. The industry was forced to “wake up” when one actor all of a sudden started to patent a lot and then went to all the other actors and demanded royalties for patents that were infringed. Cases like this affect the companies' organizations and the company in question went from a company with a modest patenting to a company with an extensive patent function with more refined processes and strategies.

The development of the patent organization can also be based on internal factors; examples such as internal reorganization or acquisition of other companies have been expressed in the study. Another often mentioned factor is the growth of the company, when a company grows it usually has new needs, where a refined IP structure often has happened to be one. The last discussed internal factor is cases where rights are lost due to poor contracting or situations where infringement litigation has led to costly consequences.

A trend among the interview companies is that the large companies in traditionally non IP-intensive industries have had strategic reprioritization of the IP function lately. It can also be seen that geographically spread out IP organizations are common among these companies, which in some cases are caused by the company growing through acquisitions.

The general opinion is that a good starting point for a company is to be decentralized. This since the company needs to increase the awareness in the R&D department of the importance of owning the results of development and to create some sort of innovation or patent culture. At some point the company reaches a stage where it develops a demand for synchronization of the work as well as a wish to start controlling the costs. Where the breaking point is for when it is relevant to transfer to a more structured organization the companies found uncertain, but agreed on that some kind of structure always is relevant.

One actor discussed that centralized IP units rarely work; the IP unit needs to permeate the organization since the issue can occur anywhere and a central unit cannot discover these situations if centralized. The same actor also discussed that the size of the IP organization needs to be balanced, a too large unit will have difficulties to work efficiently in the large organization.

Most companies see the centralized IP-organization as a service center for expert knowledge in IP-issues and not as a department with their own agenda. Several interviewees express that the central unit should be focused on IP from a holistic perspective, while the local coordinators which exist in most companies, keep track of the specific issues of the separate business units and take part in local projects e.g. tasks as patent landscaping, competitor monitoring and patentability investigations.

The largest and most developed companies when it comes to IP, use a kind of a network approach where several different departments and roles are connected. One example is a company that has built a network where the patent engineers belong to the IP organization, but work closely with the product development process and can go in and support specific projects. Another company of about the same size is creating an IP community that aims to creating a holistic company perspective with clear communication channels, so that all actors, as R&D, IP, business and legal, can interact regarding IP questions. This is motivated by that the individual unit impossibly can know that a deal that possibly generates a large sum of money for the R&D department, at the same time causes a twice as big loss for the marketing department. This model is based in the MELT model, a management model based on combining

management, economics, law and technology in order to create an efficient IP community, where different backgrounds can cooperate instead of pushing ideas from one department to another.

All companies have a gate structure where patenting and infringement is an early checkbox, but thereafter the structure of the companies differs. Some of the companies have a recurring activity between the R&D department and the IP organization regarding patents, while others hand over the IP issue fully. There is no clear pattern for which companies that has chosen which structure.

The responsibility to initiate issues regarding IP is most often mentioned to be in the R&D function. They are responsible for making sure that the tick boxes regarding IP are checked in respective stage-gates in the development. Pure patenting processes can however generally be initiated by anyone in the organization, usually the one that has the best knowledge in the area, either in technology or in understanding the market needs.

The patent coordinators role differs between companies and situations, sometimes it is to aid in identifying potential inventions and sometimes purely as a support mechanism. One company also discusses that the role might differ depending on the level of the experience of the R&D employee in question, an inexperienced developer might need help with searching for patentable inventions, while more experienced developers performs this task on their own. Another perspective mentioned is that patenting within a development project is lead by the project leader, but other projects, such as continuous improvement, is handled by the patent coordinator and the responsible manager. It was also argued under the interviews that R&D employees have a lot of different tasks on their tables already and perhaps they should not be given additional responsibilities. Therefore an interviewed company chose to give the responsibility for identifying patentable inventions to the patent coordinators instead.

One company also expands the discussion further with discussing that technicians and business employees are locked in different value-systems and that only in the best of worlds, they can delve into each other's areas and find potential businesses ideas. The norm for commercially marketable product most often comes from the business side and to illustrate this theory the interviewee told a story from another industry where a business person had came up with the idea of using the battery as a lid to press down the SIM-card, which is a brilliant invention and today commonly used, but it is so simple that no engineer would ever dare to propose it.

The patent questions do according to all companies escalate from the developer/patent engineer to someone higher up in the R&D department, e.g. the R&D director. This person does then in some cases take the decisions regarding patent issues herself, but many IP related questions seems to be discussed in innovation boards. Innovation or patent boards are common; all interviewed companies either have them or express a need for creating them. They are usually consisting of higher management and a mix of R&D and business personnel. Although they are recurring, how often they meet vary from every 2 weeks to once per yearly quarter. The board is often summoned in order to deal with a specific unit or technology area and one of the companies' express that the innovation boards are not enough since they often lack the holistic picture of the company. One of the larger actors has taken the board concept one step further and developed two boards, one operational that executes decision and proposes strategies and one strategic with the highest management that takes the actual

decision. Patent strategy is based in the technology areas and research projects and can differ within the company, e.g. the timing for application.

One company points out, that at least in their company, the IP organization owns the process for patents and not the actual question. The IP organization needs to have clear communication channels with the different involved parties in order to synchronize goals and actions. Another decision structure that was discussed was based on that patent applications is an extended way of making an FTO, which means that the decision for applications is driven by a technology push and taken by the R&D director. The final decision is rather when the patent is on its way to be granted and where the higher management is responsible to decide from a strategic perspective if there is a market need for the technology and if the patent should be taken.

When it comes to the question about centralized or decentralized organization it can first of all be seen that only the larger companies in the study have a centralized unit that handles the IP issues, the smaller companies utilizes patent coordinators or similar set ups. However, the responsibility given to the R&D employees, the patent coordinator and the IP unit, when it exists, differs largely between the companies. The companies that communicated that they intend to work offensively in some way with their patents are the same ones that have a central unit that handles and drives the patent work. The smallest companies communicates that the responsibility is given to the R&D employees, the patent coordinator is only coordinating the work, keeping track of the landscape and in some cases keeps the contact with the external patent agencies. The middle-sized companies work with a mix of a centralized unit and a decentralized responsibility in the different units. Interesting to highlight is that one of the large actors in the last category is communicating that they will go more towards a decentralized organization for the continuous work in order for the centralized unit to focus on high-priority cases as acquisition, while the other actor with similar pre-conditions discussed a willingness of becoming more centralized.

4.6. IP- related activities and responsibilities

All interviewees had a monetary compensation structure for creating invention disclosures that are turned into patents. The reason for this is to motivate the extra work of doing administrative work, even though some companies have lower rewards for employees expected to hand in invention disclosures in their daily work. Other rewards discussed by some of the companies are invitation to local events and dinners, as well as other rewards, e.g. the inventor of the year. One company has taken the incitement structure one step further and introduced a two-fold structure, one payment for applications and one when the patent is granted.

Two out of four patent agencies did uncompelled highlight incitement structures as an important aspect to intensify the patenting at companies and their experience showed that it has a real impact on their clients.

All companies that answered the questions about evaluating patents confirmed that some form of criteria is in use today, or are under development. The commercial value is usually the main factor, but different companies approaches the factors from different angles, criteria's as competitors business strategy, critical areas for patents, cost improvements, quality and competitive advantages are mentioned. A company can rarely know which invention that will get valuable, but prioritization is considered to be necessary.

“We are not aiming for a Nobel Prize; technical value is only valuable if it can create business.” This citation from one of the companies illustrates the difference between technical value and commercial value according to them. The crucial factors are that someone else is willing to pay for using it. That is more dependent on the competitor’s business strategy than his or her own. Another company uses an approach to only patent technologies that are visible in the end product, production technologies and similar processes are therefore kept as trade secrets. This is however getting more and more difficult due the dissemination of information due to that customers visit many different suppliers and spread what they see in order to increase the competition.

Many actors have a proactive and continuous monitoring of competitors published patents in order to see what they invent, so they can avoid infringing patents. Most often the infringement search is included in the product development stage-gates. On the other hand is the opposite, to reactively await the reception of C&D letters and not actively searching under every stone for potential infringement in less important areas, discussed by some of the larger actors in less IP-intensive areas. This is a question of practicality and resources; important areas should be prioritized. One actor more or less disregard the infringement clearance process, this due to the fact that they are in constant cross-license negotiation with competitors and that the relevant patent is in all likelihood already covered in some way. Large actors are mostly aware of and respect each others IP, which means that sidesteps are most often accidental, at least according to interviewed companies.

One company argues for that infringement clearance searches only are done on important techniques that many people are in need of, e.g. compare the probability for infringements between a new engine that has 800 horsepower and consumes 0,2l/10 km versus a new way to attach a sticker. In important areas the clearance is done continuously and its importance is, for this company, defined based on both commercial and techno-economical aspects. A pen that can draw a line that is 30 km long instead of 10 km is a great technical invention, but if the commercial norm is that a pen is lost or broken before the ink runs out, the techno-economical perspective would show that the pen is not fulfilling the customer needs. The value norms are changing over time and the challenge is to determine when which one is applicable.

To find infringement on the companies own patent is often made by the sales force via spotting new products when meeting customers or going to fairs and trade shows. This is according to all companies most often an unconscious process with no clear channels. One of the interviewed companies has a counterfeiting team focused on shutting down factories that replicates the original product. This team is however not focused on patent infringements; IP has not been an issue in any of the identified cases due to the specific patented solutions of the products.

All interviewed companies utilize patent bureaus to write and pursue patent applications, as well as for some patent clearance questions. In general it can be seen that the relatively smaller firms, without a centralized unit, have more patent clearance and other IP related work outsourced, than the others that perform quite a lot of work themselves. These companies utilize patent bureaus to different extent and how they share information with the agencies differs, when it comes to communication about purposes and goals with the patent application or FTO investigation. Some actors also mention that it is important to remember that different agencies are specialized in different areas and several of the companies discuss the importance of making an active choice.

One of the most intensive companies discusses the importance of sharing enough information and says from experience that the end-result usually gets better in those cases. This is especially important if a specific claim is the core for us, a modification of that claim might cause that the patent does not fulfill our purpose anymore and the agency needs to be aware of that, the company do not want to pay money for a patent no one will use. Another large actor discusses that they utilize different agencies for complementing patents, which requires a strict control of information and the final claims, so that they do not cross over each other. Another large actor has divided their external agencies into two different categories, bulk supplier and niched specialists, where the specialist are hired to solve questions the company lack expertise in. The same company also discusses that it is much faster to make FTO internally since 80% of all hits can be filtered out when a person skilled in the area views it, which also causes that the persons learns about the latest technologies at the same time.

If the questions instead was altered and directed to how the patent agencies sees the most optimal exchange with the companies, almost all of them says that more information about purposes and goals would be desirable. Some of them even express a wish to be present at the customer site and to follow the development closely more or less from start, in order to be able to perform as efficient work as possible.

All interviewed actors, companies as well as patent agencies, discuss the importance of continuous education for the R&D employees and all the companies do offer some sort of basic training for their personnel. The course does usually include the basic ABCs of what patents are and how they work. Basic level is to know the three patentability requirements and to have a basic understanding for what they mean. Basic knowledge for a researcher is e.g. to be aware of that the inventive step can be fairly low and that everything should be reported. The in detail work is to be taught when the need occurs, while education should focus on processes and practical issues. One company states that is not optimal if the technician knows everything, the level of desired knowledge should be chosen in advance, or else it cost too much in both time and resources. The patent process is important, but not full education for the developers. On actor discusses that most important is to get the engineers to understand the difference between technical and commercial values.

One of the interviewees discusses a vision about creating a course related to IP management for management. This course would focus on opening the eyes for the potential with IP and teach the higher management that patents can create business and not only protect products. This does however not need to be licensing. One example mentioned was how a company can create a completely new market through IP and at the same time keep the role as the high-end supplier. A company with a new business idea, without an existing market, could publish the basic parts of the solution in order to create a functioning market and then only patent the edges that gives the company the competitive advantage in the high-end area. This would give a market where many actors can participate, which gives credibility to the solution in the eyes of the customers, but at the same time protect the premium utility of the invention.

Most actors discusses that they utilize patent information in some way, although there are different opinions regarding how well it can be used for inspiration. One company highlights that patents in themselves create incentives and that it is an extra spur to receive a paper with golden banners and that it is more worth within the building than in a press release. Discussions

about that both own and competitors patent information could be used in order to identify gaps and potential developing areas are also raised by several actors.

One medium sized actor collects information about competitor's patents and disseminates it internally. Everything that is published by the competitors is spread with the goal to be used as a source of inspiration. It should however be pointed out, as another actor discusses, that competitor's patent information is useless if not the correct person utilizes it.

The challenge with the patent system is, according to one of the larger companies that a patent application is signaling that you are not allowed to utilize this until the technique is obsolete. Due to that fact, it is difficult to use the patent information as a source of inspiration. On the other hand, as another company discusses, it is easy to inspire and motivate the researcher internally through sending out information about how many patents the other groups internally have delivered. One actor does however state that his opinion is that it is only lawyers and large companies that can penetrate and understand the patent system today. The patent agencies opinion about the same issue is that the potential for utilizing the freely available information is huge, especially for developing countries that is interested in the basic technology that is no longer protected, but also for companies searching to direct their development.

Most actors utilize different forms of vertical collaborations as a part of the product development. Several companies express a more active IP and contract handling today in these relations, due to that previous cases have generated loss of potentially valuable assets. The companies have taken different approaches to this matter. To have a full investigation with background, foreground and side ground, as a base for negotiations is a great opportunity, but the counterpart will most probably leave before the papers even touches the table. The discussion gets too complex and the benefits are lost in the suddenly visible risks. The same logic applies for companies utilizing an IA-approach, with the creations of documents listing all kinds of assets that are taken to the negotiation table. To have the list is great and the result have in the past been brilliant, but the extra work needed to construct information in advance makes the method only suitable for very high-profile cases. Another concept launched by an actor is to have a "resident engineer" that is fulltime at the customer sites. The concept has given win-win situation where the customers received great solutions and the company a great business deal.

All interviewed companies have some form of patent information system, the smaller companies tend to use official databases of information rather than the commercial databases that large companies tend to use, although some of the large actors express doubt regarding the use of automatic analysis tools. Most internal systems for patents and disclosures are kept within the IP-organization and are not accessible for R&D employees. Informal channels and personal networks seem to some actors to be as important as the processes and authorities themselves. Several actors communicate a need for a good patent database and communication tools.

Some more company specific tools that were discussed under the interviews have somehow the same core and purpose. The tools are aimed to visualize and map the content it is applied for and to form a basis for further discussion. One tool discussed is a feature template used for visualization, mapping and to get a starting point for discussions when it comes to patentable inventions and communication internally. Another discussed tool is a claim chart that is more or less seen as the product of the patent organization and is a kind of receipt of the value of the

patent. The claim charts exist for many different purposes, where one is to visualize that anyone that uses a specific standard will infringe the patent.

It is valuable to communicate to the employees which kinds of mindsets that are utilized by the centralized units, it is easier to deliver when you understand the purpose. Another important aspect mentioned is that there are many different tools that do different things in a company. The analysis tools for patents are processes that will never be dominant in the product development, but that notch in to the processes where they are applicable and needed. One company uses patent application as an extended tool for FTO searches. Searches for prior art often comes back from the agencies with a security of 70-80% and the next step in securing the idea is therefore to send in a patent application. Neither a patent application has full security, but at least no one else can patent the idea if you have a pending patent.

Both companies and patent agencies discuss the matter of developing an organization able to handle, and to create income, via licensing. The organization needs to be in place the day it gets relevant, many companies today does not have any structures in place, which means that no one knows how to handle a potential request for a cross-license.

Another commonly discussed area, where the opinions diverge, is technicians that use patent databases as Espacenet in order to make a first patent clearance during the product development and then sends the results to the IP-organization. Some interviewees praise these initiatives and states that this would be the optimal technician, while other organizations discourage the work and would rather see that the focus is the creation of invention disclosures that truly presents the idea. The later group tends to consist of more advanced companies with own patents units, whereas the smaller companies to a larger extent encourages own investigation. Several actors also discusses that there is a lot to be learned from reading patents and that even a person without knowledge of the technology can get up to speed, to such an extent that the invention can be discussed. Some critique is however raised about the applications that are written in a way that more or less only lawyers can understand the information.

A tool that the patent agencies offer is services where they rewrite and visualizes the patent claims, in order for the employees to be able to understand what is actually protected. People are often overconfident in patents and are not aware that the idea they might believe is patented could very different from the actual patent claim.

One patent agency state that companies in general rarely utilize the fact that they have a patent, they are not offensive when it comes to defending their rights. It is also mentioned that it is difficult to change a mindset in a company and that patents are a great communication tool that has a high value. Patents can be compared with a burglar alarm for a house; it creates an uncertainty for the potential burglar or infringer.

4.7. Key statements

When interviewees where urged to discuss how they personally believe that companies today should act to create FTO and how the connection to the IP organization should be, the following key statements were made:

- It's more important to have an innovative culture than innovation or patent departments. Even more important that this exists in the management and in the organization. It has to be a part of daily activities, it is a slowly-progressing work
- Compare the issue with a teenager that does not want to do their homework, the argument that knowledge and higher grades leads to the possibility for themselves to control their future is usually raising the motivation. Same goes for a company, you need to know what you are doing and how to manage the resources in order to earn money and to keep the control.
- Costly FTO searches are not always necessary, it is more important to be part of the control/project groups with the sponsors and to get the information about what is actually needed.
- Insecurity can lead to a halt in potential licensing questions, even though the IP and business department are positive to licenses. Individuals working with the question once a year might perceive licensing as dangerous and the best would be if these people were not involved in the decisions.
- Crucial to realize ones own limitations, if Sahlgrenska ask me to perform brain surgery I realizes that I lack competence for this task, which unfortunately is not the case with IP issues. Insecurity very often leads to a "no", independently of the context. The question is if it is increasing the competence or improving insight about the required competence that is needed.
- All new products with a commercial basis shall be protected. Project form where expert functions for e.g. patent, environmental issues and law are engaged in order to create a knowledge basis for the project. No one has the full competence today as an individual.
- The link is to have clear input, clear output and clear processes regarding the activities in between. In reality that means that a dangerous patent can't only be sent out, it needs to be clearly communicated to the people with rights to handle what can be done about it.
- Strategic decisions about how many patents or essential patents that should be taken and form the organization based on that. Many patents require perhaps an own department, while an organization handling a core of essential patent might be designed differently.
- IP needs to start and end in the business with a process that has three steps: strategic planning, R&D & the creation of rights and extracting value
- Important not to exaggerate the risks, rather look at the possibilities and the constructive parts of the patent work.
- More and more open innovation. Our customers are driving this development and they seem to intend to own the platform and to get the suppliers to develop it. The platform gives an opportunity to build on each other's solutions.

- Hypes come and go faster and I believe most actors in the industry are aware of the importance of IP today. Requires cooperation higher up, a single individual does not have the complete knowledge to take a substantiated business decision today, but the competence is available within the organization.
- There might be a lack of awareness about the required knowledge at smaller less mature companies and the risk is that the IP rights are lost. It is important to realize when expert competence is necessary, ether it is internal or purchased.

5. Analysis and discussion

This chapter is analyzing and discussing the results of the empirical data, in the perspective of the theoretical framework, in relation to the three main areas, the KBE related risks, IP activates and their purpose as well as the structure and possible improvements of the IP organization.

5.1. General discussion

The interviews that have been performed show numerous interesting issues, not only regarding the actual risks, use of patents and organizational schemes to deal with the issues, but it also illustrates the difference between the smaller and larger companies and over different industries. The first part of the analysis will cover what the KBE means for the interviewed product developing companies, especially relating to current and future challenges. The second part of the analysis will focus on the actual factors behind the companies behavior regarding patents and how this is turned into patents, focusing on the how and why's of the IP-organizations. The third area will cover the organizational set-ups and concrete ways to minimize the risks for these companies today.

It is important to remember that the perspective of the thesis is mainly from a point of view of relatively large actors that have product development. Although the comparative size of the companies in the study varies, it is important to note that a company with hundreds of developers and a multitude of different product categories usually has a wider financial base with more secure income than smaller or niche companies dependent on the success on one product category. The large companies naturally have a bigger chance to utilize all the tools and opportunities with IP since they can build a long-term investment in the organization with internal competencies and organizational capital and can take on eventual patenting costs. Companies producing only one patented product do not need as large patent resources, but it is unclear how a smaller producing company can handle the potential effects of being accused of infringement. The amount of money being available to be put in defensive, or offensive actions in and out of court is the reason why smaller actors and large actors still seem to have different starting-points when operating in a more knowledge based economy. Thus a healthy business climate, where small and large actors compete on the same terms, does not appear to be easy to create in a product development focused areas of KBE. However, the perspective will be on activities and organizations of the larger actors that have been investigated and not on how large the actual effects that risks have if realized.

The varying definitions of certain terms have been seen in the study, and especially regarding the concept of FTO. The interviews show severely different perceptions regarding the term. The core that most companies discuss is that FTO is a legal perspective on the risk of infringement during the development of a new or modified product and most agree that it is important to have FTO. However, no two companies had the same width to the concept, and some definitions include the actual business perspective where for example the possible interaction with competitors is included. This perspective is not a purely legal one, it is instead that of a full

company freedom evaluation than on a specific product or part of product. The inclusion of the relationships in value chains to analyze FTO is severely different from the very well defined and purely legal definition that some actors consider as an FTO analysis. The result of the interviews proposes that more defined terms are needed in regards to describing for example FTO from different perspectives, such perspectives being a business and a legal one. The perspectives of FTO as a legal freedom of a product seem to be more established, while a full supply chain and competitor freedom analysis seem also known to be related to concepts of Freedom of action or Design freedom.

5.2. KBE related risks and what this could mean for companies

The risks of the interviewed companies are related to several areas, where some actors are naturally more focused on certain areas of risk than others. This is depending on their varying roles, industries and current activities of the company. Several areas where companies see risk related to IP have been identified and especially the risk related to the growth of a more knowledge-based economy. Even though several of the interviewed companies do not think in the terms of a KBE, most express issues related to factors and the development found in literature regarding the KBE. Certain factors have been influencing the external analysis, relating especially to the perception of risks, which will first be discussed briefly.

Many companies discuss the globalization issue from several perspectives, e.g. as a general business risk, due to the rise of new companies establishing on the market, or as technological challenges, e.g. as new companies especially in China that do not respect the IP of other companies. The question is if the globalization issue is a risk in itself in relation to KBE risks or if it should be seen as a separate field of risks that not directly relates to changed behaviors. On one hand, globalization is an issue that has to be taken into account in almost all fields of industry and competition and where IP is a factor. On the other hand it can be better to separate the two fields from each other, discussing globalization phenomena as a separate issue from changed behavior due to how companies protect knowledge and use patents for different strategic purposes. The analysis will not take a standpoint in this question, but it will however focus on KBE related risks rather than focusing especially on globalization effects per-se.

It is also interesting to note, in the beginning of the analysis, that several cases have been shown where the behavior of an entire industry or industry niche has severely changed due to a single actor becoming more IP focused, gaining some sort of first movers advantage in regards to the other actors on the market. The question then is how easy it is to change a whole industry's IP dynamics if a single person is replaced, who might decide to increase IP focus in the organization.

5.2.1. Risks of companies in KBE

The dynamics and use of IP within the different industry sectors that the interviews have covered, such as automotive, ICT, mechanical engineering, provide interesting insight into the dynamics of IP in those industries. It is clear that the automotive industry has some more complex areas of IP than the mechanical production oriented companies, but often less so than the ICT industry. This means that the possible risks are very different depending on the industry dynamics and thus the need to handle them varies.

One of the main risks that have been identified in the interviews is the increasing overlap between technological fields. This is mentioned in relation to many of the industries that have

been part of the interviews. The overlap means that products and product development increasingly use technology from other areas than those that the industry has at its core and have used in the past. This translates into, for example, increased use of electronic systems and semiconductor technology in previously more mechanical engineering focused areas. This does not mean that e.g. mechanical engineering is less important; it means that the overlap makes both areas important for the development of new more complex products. The interviewed companies do not always have the internal competence to handle the technology fields needed to develop these new products. This can mean that previously discrete technical fields have to handle the IP dynamics of more complex products, with for example patent-thickets and mutual blocking issues. As a consequence, more niche actors can play a role in the markets currently dominated by larger companies. This is due to that they might have the expert knowledge, solutions or IPR that enables the large companies to create products with combined technology areas. This encourages further recognition of the importance of these niched companies from larger actors in the future.

That is not all; this also leads to that companies with a Non-Practicing Entity (NPE) business model have more possible targets for litigation. This is due to that in this increasingly complex IP climate, IP is increasingly dependent on others rights due to that technology can be more based on “complex” technology dynamics than the “discrete”. If companies are not used to, or prepared to handle these situations NPE:s can be an increasing risk. NPE’s are also seen as especially troublesome due to that they are only interested in money, not in a potential cross-license, which could mean that an increased number of expensive licenses or litigations arise in the areas where this overlap is increasing.

The risk of increased overlap of technology is strongly connected with the increasing speed of innovation that some companies express. This increased innovation pace means that new technology and products turn “old” quicker, which together creates increasingly large problems to get return on investment from the companies R&D. This can be especially so in regards to large projects or projects with uncertain future application.

The increased speed of innovation creates several issues; one of them is related to the value of patents in this setting. Some interviewees make the notion that when the time to a next generation product using certain technology turns shorter and shorter; the value of the patent application is decreasing. This is due to that the application might not be granted until the product is replaced on the market. Thus the value of a patent in this setting can decrease in favor for other types of protection such as trade-secrets, or having no protection at all. Innovation speed is also related to the increasing availability of production technology, which certain interviewees see as a large future threat. In the case of e.g. generic versions of medicine, the value of a patent is high if it can hinder the use of certain production technology. An effective hinder in this sense is a patent that is not easily invented around by the fast-follower or for that matter, a large competitor.

Smaller actors have reported an increased pace in the patenting behavior and a feeling of a lower inventive step. A reason for this that a few interviewees mentioned could be seen as in relation to potential strategies of building carpet of patents, instead of applying for essential patents. This could be to avoid that competitors invent around the single patent. This could possibly be as a response to the increasing threat of fast followers and competitors with the potential to invent around a single patent. This can be seen in regard to Foray’s reasons for why

patents have rarely been used by European companies and would mean that companies are willing to take larger patent costs if they receive a better protection against competitors. At the same time it is important to note that most actors report that the pace of patenting is steady, which could mean that this development can be limited to certain industries or technical areas.

The increased speed of innovation also makes the use of open innovation more lucrative, which interviews especially with actors from automotive industry shows. As costs are shared and the co-developed technology will have larger chance to get commercially applied, the risks with innovation are lowered. This also seems to fit well in with the presented literature regarding the KBE although also for large actors in more mature industries. This focus on open innovation brings other potential problems related to knowledge control issues. Companies in the interviews are very aware of the risks with open-innovation, especially of not owning the actual result and potentially giving away important know-how.

The awareness of the issues regarding knowledge management seem to have grown, especially in companies that have seen more collaborations and/or has many developers. Here the risk is not only focused on the protection of markets and technologies when using IP, it is also to protect and keep the actual knowledge of the company. This is related to several more knowledge related risks that the interviews have uncovered, i.e. that knowledge that is not properly protected can leave the company and potentially be used by others. Employee's using their gained knowledge to start a competing business is one of these identified risks, another is the use of different kind of consultants. The consultants are over time assigned to many and often competing actors, and the gained knowledge is often brought from one company to the next. The company thus needs to control how the knowledge can be used as to not leak e.g. possible inventions, techniques and trade-secrets, which can be elemental to sustaining the competitive advantage created by investing in innovation.

A larger focus on knowledge leakage and knowledge control has also been recognized in the whole value chain in the interviews. This relates to that more actors want to control the IP resulting from collaborations. Interviewees even propose that there has been a quick shift during the last five years in some industries relating to owning IP. An interesting aspect is that literature regarding KBE suggests that horizontal collaborations should increase, while the empiric material however indicates that a general increase is only noticed in situations when actors are entering new areas and for example lack test equipment.

This shift towards more focus on ownership of IP relates to both the customer- and supplier-organizations according to the interviews. This risk is related to that a greater awareness of the possibility to generate income and secure that one is not "replaced" with competing actors. The goal seems to be to generate a return on the investment from either the internal innovation or the actual collaboration. That means that suppliers in a value chain are to a greater extent trying to guarantee a dependency on their IP for all competing suppliers, while customers want to be able to have multiple sources and be as independent and flexible as possible in choosing suppliers.

The interviews also recognized risks regarding patenting that can be seen as Foray's 'hysteresis effect' as a risk in itself. Due to that certain actors are pushing for increased patenting, other actors do the same thing in fear of lagging behind, thereby feeding the loop of increased patenting.

The increasing strategic use of IP does not only aim to cut cost in different ways, but also to create licensing or divestment opportunities. This increased interest in utilizing IP to create direct value in turn creates new risks for other actors. If a competitor or supplier is more prone to infringement litigation, to sell rights to NPE's or other offensive actions, this can lead to increased complexity in the management of IP. This could however also mean that increased use of cross-licensing is made, which makes the IP-climate more open and possibly less prone to litigation among competitors and suppliers.

All the above risks relate to a general issue that could be seen as a separate risk, the increase in complexity. The more collaborations, licenses and patents that are created, the more resources have to be put into understanding the risk exposure of the company, in order minimize the risks. For large actors involved in many geographic and technical applications this can demand new sorts of tools to cut through or manage the complexity. Another aspect of this risk is that the ability to predict the market has become more challenging and complex, in both the perspective of predicting the behavior of the competitors, as in predicting the need from the customers when it comes to setting long and short term R&D strategies. The main areas of risk are summarized in Figure 4.

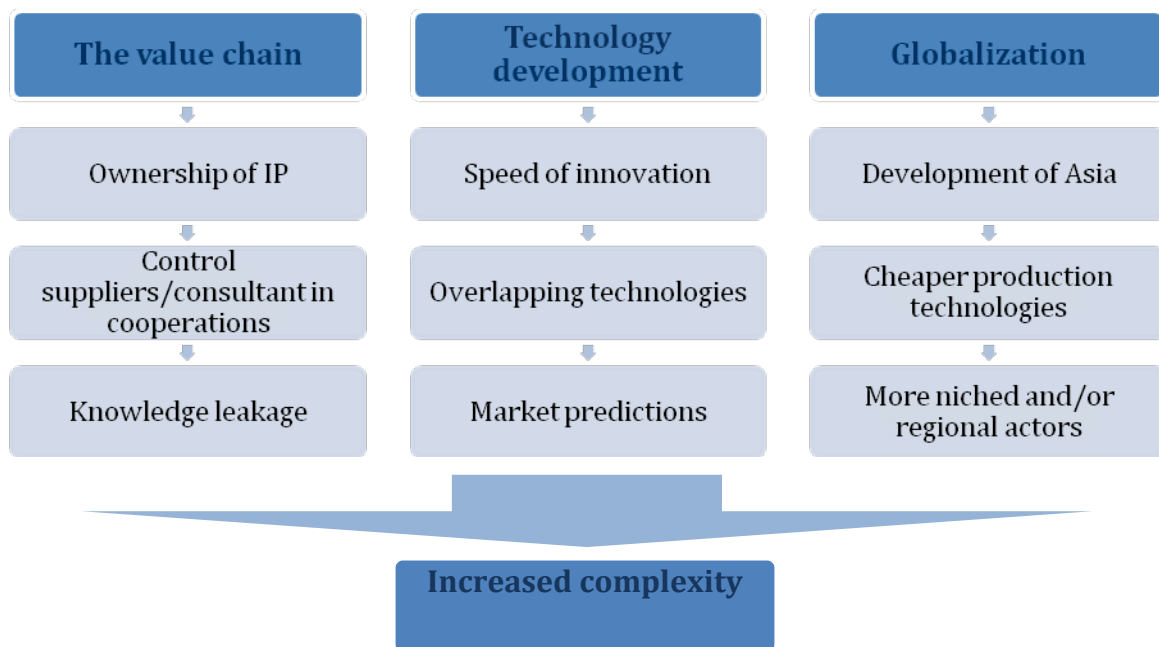


Figure 4, Visualization of the three main areas of risk.

5.2.2. What do the identified risks imply?

The identified risks that are especially related to the IP control and knowledge control, as the risks within the value chain and the effects of overlapping technology, seem to be more related to the KBE related risks of larger companies. What this can mean for a company in a complex value chain is that the supply chain management function has to take into account more factors than that have been relevant in the past. It is especially so in relation to how collaborations with other actors in the value chain, and the outcome of ownership relating to patenting, affect the future possibilities to act. Not only to utilize or control the application of the developed knowledge, but also how it affects the options for selling to, or buying from, multiple sources. This in itself implies that companies with complex supply chains and vertical collaborations over R&D projects, must take particular consideration on how to continuously handle licensing and patent clearance issues in order to secure that the value chain is well-functioning and without major risks, while at the same time supporting the sourcing strategy.

This suggests that in the near future the largest risk of infringement might not come from competitors, but from the companies own value chain. This can happen if suppliers become more prone to demand licenses in order to regain their investment in innovation, or if suppliers aim to be less dependent on a single customer due to access to global markets and control of their IP. This is especially true if the development toward more collaboration with various actors is needed to develop products containing overlapping technology fields.

What is interesting is that these risks are not only found in areas which have a more “complex” patenting dynamics with high dependency on others patents where KBE issues can traditionally be found, but also in the “discrete” areas where innovation and patenting have been more independent. It seems that many of these risks, makes the companies perceive IP as a sometimes vague and an unnecessarily menacing threat, rather than seeing IP as opportunities to aid in creating clear ownership structures with economically tradable goods that enable actual business value for all involved parties. This also shows that even companies in more mature industries have KBE related issues and could be increasingly seen as part of the KBE. The ability to handle an increasing complexity in these issues and to create a well functioning and efficient supply chain that still takes complex IP issues into account seem to be an important future capability in relation to above risks.

5.3. The purpose and activities regarding patenting

Apart from trying to manage the risks encountered in the previous chapter, the interviewed companies have different purposes of the patent organization. The dynamics of the market play a large part in setting the purpose of how and why patents are used. Partly, but not only, relating to the technical dynamics as discrete or complex. Interviews provide that some industries are more or less in constant negotiation with competitors, while other industries, with other technical dynamics, are more independent and focus more on blocking each other. The purpose and use of patents thus also relate to the competitor situation, which is related to the dynamic of the specific industry. In order to be a large and central player in industries with high dependency on cross-licensing, the patent organization will thus have to be able to aid in negotiating and creating patents that are usable for cross licensing with relevant actors to avoid litigation or hold-up. It is costly to have services or internal personnel that for example monitor and compile patent data, the available resources limit the potential use of patents, and thus a balance of what is needed and afforded should be created to maximize the value of resources.

This can be observed in that some of the interviewed companies are focusing resources on certain technology or product areas, or in areas or situations that are new to them, for activities such as external clearance searches, patent monitoring and patenting.

Companies do not generally have the purpose to create Nobel-prize winning research. They should give value to their shareholders, relating to creating business value rather than scientific value. In the interviews this is related to a larger focus on creating business value from patents, rather than technical innovation for the sake of technological development. It is observable that companies trying to be more strategic in their use of patents try to think more in terms of patenting in portfolios of patents that complement each other, rather than individual patents. A certain number of patents can although be needed to utilize a patent portfolio in both business units and for corporate purposes, and these activities can be resource intense. Thus a larger organization probably has more use of activities that aim to create corporate synergies than smaller companies or companies less prone to patenting.

The interviews show several ways on how companies utilize patent information. There are examples of companies trying to utilize it more and more as a source of business information, aiding product category managers to take informed decisions and to track where competitors are heading. This can aid the company to avoid sensitive areas and is the basis for work regarding use of other FTO strategies that aim to minimize the problems related to FTO. This view of patents as a source of information to be used by the company, relates strongly to the view of the patent system as documenting the progress of technology and identifying possible future areas. At least in larger companies where the resources exist to internally translate the patent information to useful business intelligence. Some actors also report the not-invented-here syndrome in development as a factor that contributes to not use patent information as “inspiration”, even though examples of developers that use patent information for their own development also exist, for example via Espacenet. The interviews also show that this information can be too complex to be used as raw data. This means that some companies utilize external data treatment such as information services, or that the company is in the process of trying to package the information better.

The patent organizations purposes are thus at least to some extent as “intended” by the patent system, although the business application of these intentions adds layers of complexity to possible activities and strategic use. For example if an actor plans to use patents to create a new markets for products, this can be done by designing patents that allow for other actors to enter the same product area, however without the possibility to utilize the most efficient solution, see Figure 5. This means that a legal monopoly is created on what the owner sees as the most valuable market, the premium products, while at the same time creating market adoption of the product category by allowing actors to sell the “new product”. These actors can find useful technical information and be inspired by the patent. This uses the patent system to create value for all who utilize the system as intended, as a monopoly and as a source of knowledge and is a scenario that has been discussed by one of the interviewees.

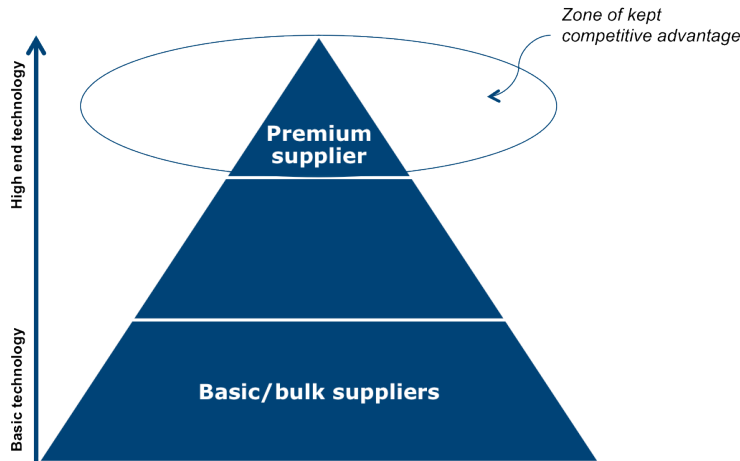


Figure 5, A strategic use of patenting

5.3.1. Do the activities correspond to the purposes?

The increasing complexity and risks of KBE can require, as previously mentioned, new activities related to the IP organizations. This is because more areas seem to have a need to be dealing with the IP question if the development to more ownership issues, increased complexity of technological fields and larger risks to leak knowledge is getting more intense in the KBE. Several of the interviewed companies are in a change process regarding patent organization and their use of patents to a more strategic use, which can mean that they will properly handle the risks and the other purposes of the patent function in a more structured way in a near future.

One thing seems to be clear, all interviewed companies try to minimize the risk of infringing, more or less utilizing the patent function to combat the effect of IP of other actors on the company. This means that the patenting function of a company should partly be a process related to maximizing the value of R&D, i.e. via better protection and utilization of investment in innovation. At the same time the patent function could direct another process, the process to create what has been described as FOA. This suggests that large companies should have a proactive process to constantly scan for potential hindrances to the freedom of the company and identify how the IP-activities best can battle this risk; via licenses, opposition, patent-monitoring or other means as proposed by the literature regarding FTO strategies. This is a more pro-active and strategic use of patents where the IP-organization contributes to the overall business strategy, relating to the integrated or visionary level of Harisson and Davis, without necessarily having a need to apply income-generating licensing.

This does not mean that they have to have the responsibility, rather the capability, to aid or educate other relevant parts of the company on how to handle the issues. This to make sure that e.g. contracting with collaboration partners are done without risk and that patents that have strategic value in other parts of a company or at a corporate level are not divested or dropped due to cost reasons. Although the awareness of the IP-related issues seem to have higher prioritization today, the monitoring of competitors and future relevant patent fields with technology planning has not been frequently mentioned in the study. To pro-actively identify the possible future competitors via patent-mapping and finding what paths and hinders on the path to future valuable areas should then be prioritized to aid R&D decisions to minimize the potential dependency on other actors in the future. To include more of the higher level

organization activities of the Granstrand/Silberston scale to a greater extent would thus probably aid in realizing the creation of Freedom of action.

5.3.2. Perspectives on patents

To utilize the patents as a way to create a legal monopoly by hindering others from using the technical innovation is the most mentioned view of patents seen in the interviews and it can be seen as the most basic purpose and relates to protecting business, this basic utility however is used to achieve other purposes. The FTO is a purpose following this, i.e. to guarantee that the invention that one has developed can be used internally and with some sort of guarantee that the patented invention can be used with as little dependence on others as possible. Another purpose of patenting is to handle the risks, especially relating to the risks more related to large companies in complex supply chains. The use of patents is to create some form of negotiation power and control of knowledge. This means that patents are used to hinder that knowledge can be used when outside the company, but this also relates to the use of patents to control the outcomes of collaborations with other actors. This means that the codification of knowledge from the human capital to the organizational capital is an increasingly important role of patents in these large companies. This is also implied in the interviews where the standard contracts regarding patent ownership and the focus on contracting seems to have increased. The use of patents to package and sell knowledge in products is also a view on the purpose of having patents. Interviews also show that some companies think in terms of protecting products or markets, taking a clearer business perspective relating to create income from producing products and hinder copies on those products on the market.

Some companies have a clearer purpose to patent to create objects to trade, either for other assets or resources. One company sees patenting as the creation of a tradable currency, especially seeing the patent as an object to trade as any other resource, the purpose of the patent is thus to enable the company to participate in other competitive advantage- and income generating activities, but also as a tradable object in the case of infringement. It is also interesting that the actors that see themselves as “offensive” relative other actors on the market, are the companies that have a larger tendency to want to generate income from patents. Patents are therefore also seen as a separate source of income. A pragmatic use of a patent as a delayer also exists, making it more costly and inefficient in time to invent around. This is since competitors are prone to “invent-around” a patent given enough time and if the invention is valuable, thus a patent that prolongs how long an invent-around is kept away is valuable for minimizing the risk of copying. Another use of patents is to willingly create insecurity for other competing actors, not only by having more patents, which leads to an insecurity to copy an idea due to increased risk of making infringements on the patent. There are also examples where companies create patents that are more complex to “decipher”, regarding to what they cover as to create even more insecurity in competitors or potential infringers.

5.3.3. How perspectives on patents relate to the value hierarchy

When these purposes are related to the purposes of patents in Davis and Harrison’s value hierarchy, it is relatively simple to categorize the actors that primarily utilize the patents to provide core business with protection in a defensive category or a cost-cutting category. The companies that have a larger market pull perspective on their patenting, rather than a technology push, seem to relate more to the cost-cutting level where what patent that are applied for are more carefully chosen from a market need perspective. The companies in this

level tend to be the actors with fewer applied patents and smaller IP-organizations. This while the more offensive companies also relate stronger to the higher levels. It is however not clear from the interviews that companies that do not use income-generating licensing cannot perceive patents as from a higher value hierarchy level, such as the visionary or strategic levels. This can be companies that have clear objectives to use patenting to protect the knowledge of the company. This because the purpose of patents then supports other departments goals and the corporate strategy to better codify knowledge and sustain competitive advantage.

However, very few firms that have been interviewed use an intellectual asset perspective in relation to the patents as proposed to companies that are in the integrated level. The known users do not utilize it over the whole company, only in important or sensitive areas, and especially during negotiations. If the adoption of an IA approach is not increasing even for companies with large resources and relatively complex technologies and market dynamics, this can mean that the value hierarchy and the IA perspective to patents is not as applicable for larger companies as for smaller ones, or at least that it might not be applicable in the same way. This can be due to slow adoption and transformation speed in large companies rather than the actual effectiveness of use of IA management practices. Utilizing the value hierarchy to categorize the companies by the purpose of patents is however not an ideal way, as activities performed in relation to the levels vary in the companies, but it creates a comparatively easy way to categorize companies by their perspective on how to utilize the patent.

What is interesting is to try to understand what is the hen and what is the egg in the area: Did the purpose of patenting start with or end with the current risks? This is difficult to analyze from the available data, however most interviews with industry show that some adoption has been made due to changing risk with both the growth of patent monitoring practices and increasing the awareness internally as consequences of changing risks. It is however not clear if all these relate to recent changes. Most companies also state that the handling of patents has become more strategic, focusing more on business perspectives and dynamic usage today. The previous purpose of patents seems to have been less connected to the potential business- and knowledge risks and more focused on issues regarding creating technical protection and monopolies. This suggest that the awareness of risk and increased strategic use of patents have lead to that the purpose of the patenting organization is today more defined from the risks of the company than previously, at least for the industries covered by the interviews.

5.4. IP-Organizations and why they look like they do

Some companies see the IP organization in relation to the R&D process in different ways. Most interviews indicate that they see the patent organization is in its most basic form as a central service organization, which owns the patenting process. Most often this is in relation to a matrix organization, where the patenting organization is involved in the different projects. Several more complex organizations have however been identified, both in relation to the IP related work and in relation to how the patent organization is split into smaller units, such as licensing and business intelligence groups.

5.4.1. R&D organizations and connection to IP

The patent departments of the interviewed companies are organized from a decentralized or a centralized perspective. The centralized department refers to if the company has a strong central unit that directs the work, as compared to if the different tasks are disseminated in the organization without centralized guidance. During the interview study it has however been visible that this is not the only parameter. Another factor that is varying between the companies, independent of the organizational set up, is how the responsibility is divided in the organization. In Figure 6, the two axes represents these two factors and the companies have, based on our interpretation of their own descriptions, been plotted, independent of each others positions. The different sizes represent the amount of patent families the companies apply for in an average year, where the smaller dots represent less than 40 patents a year.⁶⁰

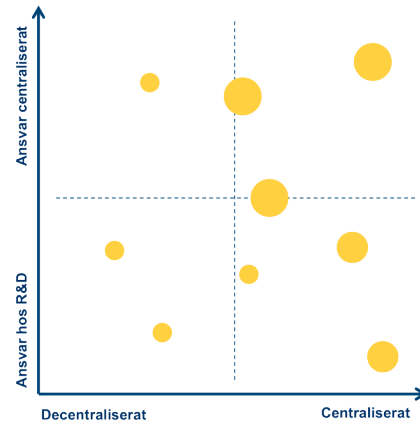


Figure 6, the choice of a decentralized or centralized organization

Based on Figure 6 it can be noticed that the patent activity is probably not enough in order to describe the complete picture of the reason behind how companies are organized. The most logical would be if the less active companies, due to their need for resources, were found to have a decentralized organization and therefore are located in the lower left corner. This seems to be valid for many of them, but Figure 6 does also indicate that there are less intensive companies that has both synchronized and centralized organizations. The same applies for the other end of the scale, not all of the intensive companies work with a centralized unit that directs and manages the work. Several of the largest actors have some kind of centralized unit, but the responsibility directed to that unit, versus the R&D departments, differs a lot.

In Figure 7 the colors have been changed to represent the complexity of the industries that the companies have described as their reality. The blue dots consist of companies working in complex field where there is either a patent thicket or many overlapping technology fields included in the same products. This dimension shows that all the companies in more complex areas seems to have found a reason to develop a structure where some kind of centralized function, e.g. a IP unit or some appointed coordinators, that manages the patenting function. One reason for this could be that these areas are more difficult to navigate and that a holistic picture and some more extensive knowledge about the field is required in order to maximize the results of the patent function. One interesting aspect is the small dot that is found in the higher segment, thus a company has been identified that applies for less than 40 patents/year and still finds

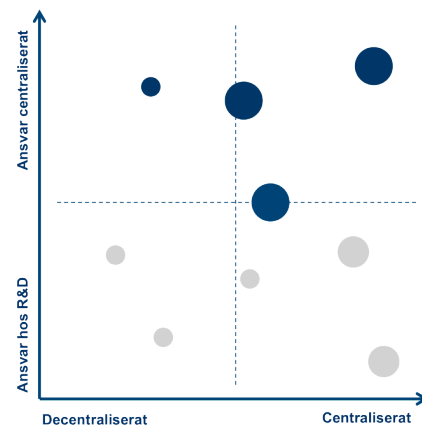


Figure 7, The choice of dissemination of responsibility in the organization.

⁶⁰ Based on the companies supplied information

a need to have the responsibility centralized. This is a company in an intensive field and even if they do not apply for a lot of patents, they are probably forced to make quite extensive work in order to keep track of the competition and secure FTO for their new products.

5.4.2. Development of the IP organizations

When the issues of decentralization versus centralizations were discussed with the different companies, many different pros and cons with both choices were identified. The one argument most companies seem to agree about was that when a company grows or increases their patenting, some kind of demand for synchronization and prioritizations is most often raised. The arguments raised in the interviews are that it is very difficult in more patent intensive companies to keep a holistic picture and keep track and get a continuity of the patent activities, documents and clearance searches. The possibility for building up the internal know-how is neither efficiently utilized, the experiences are in several cases witnessed to be lost. The decentralized organization works fine for less active industries that has few patent cases, there is less need to build up more structured organizations due to that the continuity is low. However, several of the companies are describing a willingness to transfer into a more synchronized organization, the pros of this setup is that in a growing organization the pros start to outweigh the cons of the costs at some point. Synchronization leads to higher possibilities to build up internal knowledge in the area, as well as that a higher control can be kept, which can lead to a more cost efficient organization.

As discussed, it is rather complex to explain why the IP-organizations seem to be organized as they are and why they head in the current directions. Many factors seem to play a combined role. Resources and size of the IP organization of course have to fit in comparison to the rest of the company and be balanced with the actual need of activities to be performed. The parameter of industry dynamics play an important role as this seems to be setting a “least level of activity”, meaning for example that it is more or less impossible to be a large player within telecom without engaging in some sort of licensing activity, if products are to be developed. The maximum level does however seem to be more dependent on the strategy and willingness of the organization.

If the reason to the location of the companies represented by the dots in the middle of the figures are investigated, it can be seen that even two larger companies, with more or less matching pre-conditions in patent activity and market dynamics, have chosen to take on different organizational structures. One of the companies has chosen to delegate the responsibility to the business units, while the other is taking on more responsibility in the centralized unit. One factor that always seems to remain constant when it comes to the transformation of organizations seems to be the influence of the human factor. The preferences and beliefs of the person or persons leading the change, as well as getting support or awareness of issues from the management, seems to be crucial for the way that the organization develops. The organizational inertia could also be a reason why many companies are organized as they are, which would indicate that a new company should have an easier time designing functioning processes and spread awareness of the issues in the organization, than the mature companies with old habits.

The questions about the future, regarding where the organization should be tomorrow, is not easy to answer. It could be that a third dimension of the matrix in Figure 6 should be added, an axis showing the awareness and permeation of IP issues and the maturity of the company. The insights about where in the matrix a company should be located in order to create the best

balance between costs and benefits is one factor that should be considered. Another is how well the IP organization is connected to the other departments in the organization that is dependent on IP issues, as e.g. the supply chain management or the strategy.

The example of the MELT model, which aims to be a more holistic model with the goal to permeate the organization and take a more dynamic approach to the IP-function along with other central functions, stands in relatively stark contrast to the centralized model and might be an example of how an expanded organizational structure could be like. The MELT model can according to one interviewee better synchronize the needs of various business units and fulfill the patent organizations purpose on a corporate and a business unit level. The goal with this model is to rely on an IP-network that creates an awareness and closeness to the necessary touch points rather than having the departments push tasks to each other. This model could therefore aid a company in creating a more strategic use of patents on a company level.

The connection between the patent organizations and the R&D department has been found to have very similar characteristics in the interviews. All interviewed companies have similar gate-structures in the product development, where patentability and FTO searches are included relatively early. The developer or the product manager most often have the responsibility to secure that the work at respective gate is done, possibly via some sort of patent coordinator. This is needed due to that the R&D developers do not always understand the role of potential patenting from a strategic perspective. Neither do developers always realize that their innovation can be of a great business value and be patentable, even though their innovation does not carry a great technical height.

5.4.3. Internal awareness and knowledge

Education for R&D personnel is an often raised subject in the interviews and discussed as a great tool to create a more efficient work process and a more resource efficient organization. Several actors discuss that less resources in the patent organization will be needed if the developer can identify new potential inventions herself. Many of the companies also discuss the benefits of having developers that for example can recognize and diversify between technical and commercial value and be skilled enough to be able to communicate properly with patent bureaus and participate in patent negotiations with other actors. The developer knows the technical innovation best and his skills can be crucial in these occasions. A word of caution was however raised, the educations should probably not be focused on teaching the developer everything about patents, as this is considered to be too costly and time consuming compared to the gains. The developer should, according to most of the companies, be taught the internal process from invention disclosure to a granted patent as well as the patent ABC:s, e.g. to know what the inventive step requirements actually mean.

Another very interesting aspect is that all companies see a need for education in these questions, but when the area is discussed more in details, the conversation is often moving over to discuss awareness, rather than extensive IP knowledge. No single individual in an organization today can know everything and single-handedly take informed decisions, but almost all organizations have access to the relevant knowledge in their network. The view has been expressed that it might be more important to educate the developers, as well as management, to be aware and realize when they need to search for help from another person or unit. A person that is insecure about questions does often give a negative reply, instead of asking for an advice. This can be illustrated by a theoretical case where Sahlgrenska would call a manager and

ask her to perform heart surgery, the person would immediately realize that this is out of her area and say no. The same persons might later get a question about strategic use of patents, as e.g. a licensing deal or a complex FTO questions. This time the person might not realize that expert knowledge is needed and instead of asking for an advice, the person might answer even though she has a lack of knowledge. With other words, it might be more important to teach the employees to realize and be aware of when they need expertise advices, than to teach them the actual knowledge to take the decisions themselves, this is illustrated in Figure 8.

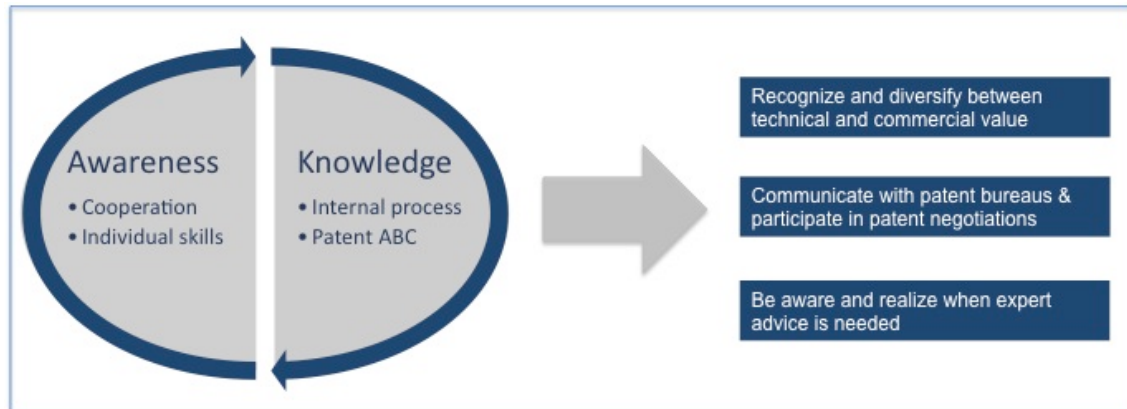


Figure 8, The role of education and awareness

5.4.4. Use of external agents

All interviewed companies have some work outsourced to external patent bureaus. All companies use them for writing and applying for patents while the majority also utilizes them for doing patent clearance searches and other work at least occasionally. Some large actors utilize a mix of “bulk” suppliers and more specialized or strategic bureaus. Bulk suppliers perform important, but non-core works, such as designing patents or perform patentability searches in new areas. The choice of supplier seems to be more related to cost efficiency, but also the notion that certain patent bureaus are better in certain fields than others has been raised. What can be noticed is that these bureaus are usually handling the work related to the administrative arena, while being supplied only limited amounts of business arena information, which seems to be more typically related to the internal patent organizations domains. This information seems often to relate to what the actual business value is of the potential patent. Certain patent bureaus claim that access to this information would aid in designing better patents, made visible in Figure 9. This could be a reason to why one large actor moves toward greater integration with one supplier. More strategy-oriented patent firms are given more responsibility in regards to patenting and the business arena, supporting the patent or R&D organization with relevant information and advice. These seem to sometimes be more integrated in the R&D projects and are early on aiding in patentability and FTO searches. Examples have been seen where they take over the role of the patent organization with internal coordinators managing the contact, especially in firms with less amount of applications per year.



Figure 9, Quality of work factors with external agents

An interesting aspect is that this set-up with using patent bureaus to a large extent to perform administrative work differs from the classical perspective of the activities of IP-organizations as established by Silberston. Especially when taking the comparative sizes in regard to the patent organizations, which should put the larger companies on a relatively high level. The smaller actors in the study had a more typical set-up in relation to their number of patent related personnel, where coordinators managed the relation to external patent bureaus who performed more of the work. When analyzing the type of activities and organizational layouts of the studied patent organizations it is possible to notice an indication that could represent a shift in the organizations. This shift is generally regarding the large actors towards organizations more like the type five organizations of the Japanese companies in Granstrand's study, but the growth in personnel does not seem to be close to the number that should be found in that category. This could be due to that the large companies utilize external bureaus to perform many of the more standardized tasks externally and thus the personnel is outsourced to a large extent. Only one company in the study seems to currently indicate a tendency to move beyond the level five organizations and in the direction of a level six organization, represented by the emergence of an Intellectual capital management group which supports other units across the company and aids in managing both intellectual capital such as IPR and human capital, although this is in no way implemented throughout the entire organization.

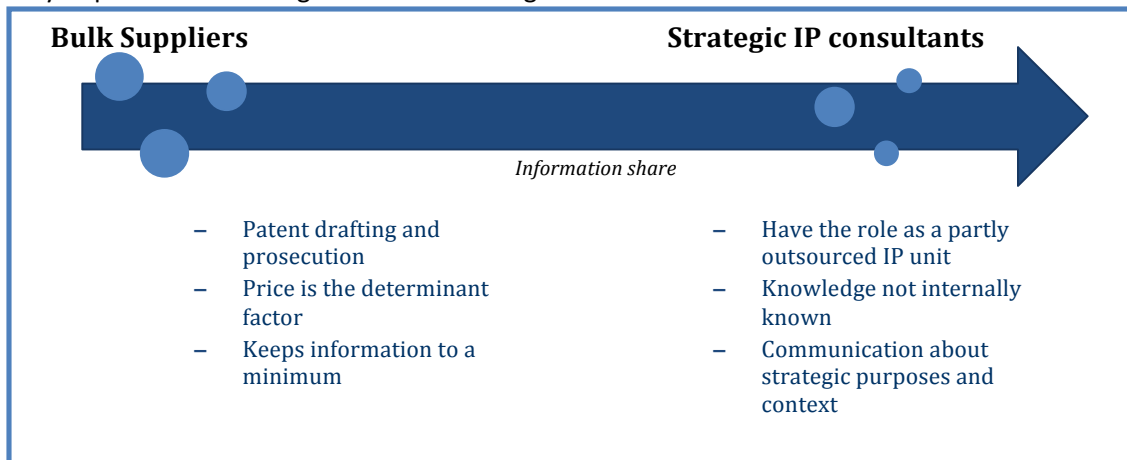


Figure 10, The difference between "bulk" and "strategic" external agents

5.4.5. Management, authority and the future

There are most often either implemented, or currently being implemented, different types of innovation or patent boards in the interviewed companies. They have the goal of finding the potential technical or business value for patents and most often have the final say in if patents are to be applied for. This use of a patent/innovation board should make it easier to have a more strategic work regarding patents, since more persons with different roles are involved in the decision and different functions can therefore identify the potential use of the discussed patent. The use of an operational and a strategic board, as one example shows, can be a way to maximize efficiency in day to day management and creating management support for decisions in a more decentralized organization, allowing for more regular meetings and continuity while still coupling the strategic use of innovation to many parts of the organization.

The value of a large informal network, that complements the formal one, has also been seen as an important factor, through which communication and awareness seems to be spread outside

the formal IT- and communication channels. This can relate to the increased strategic use of patents, where formal channels are not yet available.

Where the patent organizations are heading is, as discussed, a complex question dependent on many factors. One thing that seems to be shared by all the companies, independently of size and market dynamics, is that the IP questions is getting more and more complex, which in the future probably should be reflected in the organizational structure. The larger companies does not only have the issue of creating a well functioning IP unit, the IP question is today an issue that has many touch-points and needs to be handled by many different department, as e.g. sourcing or sales. The awareness of the importance of IP issues thus needs to permeate the whole organization. One angle that has been raised in the interview study is the fact that a decision taken by one department might give far-reaching complications for another, which the first department by themselves could not have been able to foresee.

One visionary organizational structure for companies with this kind of complex set up could be to incorporate all touch-points into some type of widespread IP-network or community. The network would then include roles that represent the different perspective of the different departments and they can together create a holistic picture and better information to be utilized for important decisions. The network should handle not only questions usually connected to IP activities, as patentability and FTO, it should probably also be driving the IP questions when it comes to as separate subjects as purchasing, sales and contracting. If the network reaches far out in the organization it is easier to capture new issues, but it is also easier to spread the awareness of the questions to all employees. This in turn would enable the network to battle the question of knowledge leakage and other supply chain risks, as discussed earlier, but also contribute to the process of building up a more holistic and proactive FOA process and create shorter, more efficient decision channels.

6. Conclusions and future papers

The chapter aims to conclude the finding of the discussion and the analysis in relation to the questions put forth for the thesis, followed by a short discussion of potential future papers.

6.1. Conclusions

The risks in the knowledge-based economy seem to be equally valid for the larger product developing companies, but three increasingly important risk areas are identified that are especially valid for the companies with large supply-chain networks. The increasingly overlapping technology fields, increased will to control IP within the supply chain and the knowledge control. These risks seem to apply for all the interviewed companies and should therefore also be applicable for a company with similar conditions as ICOMP. Due to the increasing importance of the KBE, the large players seem to see a greater need to collaborate. This development has caused a higher awareness for IP and patent issues and more actors in the value chain have realized the value of controlling IP and knowledge. The increased focus on knowledge and how it can be controlled affects the competitive advantage of companies because it relates to maximizing the value of increasingly costly investment in R&D, increased power in the relations with collaborators or suppliers and the potential value loss of leaking knowledge, inventions or trade-secrets. The introduction of niche players in the overlapping fields and increased complexity and IP-dependence can thus change the role of the large companies and the industry dynamics. These risks can affect large producing companies in a wider extent than the smaller or non-producing actors due to large supply chain networks with increasing complexity and demand for IP-control.

The increased dynamic and strategic use of patents seems to be a central concept when it comes to handle risks of the transition towards KBE. Companies have started to realize that patent and IP decisions need to increasingly have multiple business applications and be used in more ways than to create monopolies to use a technology. A product is increasingly seen as nothing more than developed and packaged knowledge. The increased awareness regarding the risks also seem to be an important factor to better manage them, especially to create higher awareness in the whole organization has been an often mentioned way to battle potential problems. Based on the interviews it can be concluded that the patent information rarely is used as much as it potentially can, although it is occasionally distributed in organizations with the purpose to inspire the developers. Few companies utilize it in order to e.g. make strategic decision about how to direct the R&D, even though some companies are increasingly interested in using patent and competitor intelligence related activities as a way to decrease the risks.

It can be seen that a lowest level of activities and organizational structure for IP seems to be set by the market dynamics. This relates to the complexity of the technological field but also related to competitor behavior. The market does however not set the highest potential level and actors in the same market have varying purposes for patents. The two factors that seem to play the largest role for which organizational structure that is used have been identified to be the

amount of available resources and the market complexity. Resources, which could be correlated with the needs, can be seen as a crucial factor for if the patent organization is decentralized or centralized. The complexity of the market is on the other hand correlated with the dissemination of responsibility. A complex area requires a more holistic view, and thus central management. The role of the patent bureaus seems to be important, most companies use them in some way, but mainly performing work on the administrative side for the larger companies, without access to business information. This can be a problem although it hinders knowledge leakage. The study has not been able to identify other categories of structuring IP processes in relation to R&D, however the companies can be categorized based on their purpose of patenting and how they utilize their IPR.

In order to handle the new complexity with IP issues that has touch-points in different parts in the organization, the study indicates that there is a need for new organizational models that better connects the different departments, roles and responsibilities and creates larger awareness of IP-issues. One of the most crucial factors for a network, or any patent function that work in complex setting, is concluded to be to have a high awareness throughout the organization. Patent related education of the employees can thus be a great tool in creating an efficient business, but based on the analysis, it is important to keep it to a relevant level, with focus on understanding when and how to find support from other patent department. This is not only for R&D personnel, but also managers and personnel at the different touch-points for IP.

The MELT model is one observed example of dealing with the issues and an IA management group is another. Both models aim to create a more holistic picture of inventions, but from different perspectives. What can be concluded is that some type of IP-network might be a future solution, a network where all types of roles and responsibilities are represented and both patent issues and opportunities can be discussed from a holistic perspective. This type of IP-network can aid in continuously and pro-actively monitoring new actors and patents but also to actively create freedom of action, which aid in managing the increased complexity. The IP-organization should thus permeate the whole organization and support both corporate management and the different departments with relevant decision support material and knowledge that can affect their development, minimize the companies overall IP-related risk and create competitive advantage. At the same time they should aid in the management and prioritization of internal activities and use of external patent bureaus in a way that is resource efficient while providing quick support to R&D developers, but also the other functions increasingly dependent on the capability of handling IP issues effectively and strategically.

6.2. Future papers

A need to further investigate the link between supply chain management and potential IP-related risks can be recognized, this is especially true for companies that have a large focus on collecting several different type of technologies and co-developing a complex product. Especially the effect of more niche actors that have a high focus on IP-ownership and licensing models that establish in the different industries suggest an interesting area of study. Also the effect on human capital and organizational capital of a company by utilizing product development consultants in large organizations would be important for future studies.

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Awapatent – Associate – patents - 18/3 2011

Bergenstråhle & Lindvall – Partner / Consultant - 30/3 2011

Blum – Vice President – 6/4 2011

Camfil – Innovation Manager - 30/3 2011

CIP Professional Services – Consultant - 21/3 2011

Ericsson – Director patent strategy and portfolio management - 31/3 2011

Saab – Intellectual Property council – questionnaire

SKF – Manager Intellectual Assets - 29/3 2011

Ström & Gullikson – Partner / Consultant - 29/4 2011

Titus – Patent chief & Marketing Director - 5/5 2011

Volvo – Global Director of Intellectual Property - 21/3 2011

8. Appendix A – Interview guide, Patent agency

15 sekunders frågor

Organisation

| | |
|--|---|
| | Fungerar ni som patentombud? |
| | Kan ni ge en fingervisning om hur många ansökningar ni är involverade under ett genomsnittså? (antal) |
| | Skulle du anse att era klients patentarbete ligger mestadels centraliserat eller decentraliserat i organisationerna |
| | Ungefär hur många jobbar idag aktivt med IP-frågor? |
| | Vilken bakgrund är vanligast hos de individer som jobbar aktivt med patent? |
| | Använder era klienter er aktivt för: |
| | - att undvika intrång? |
| | - undersöka patenterbarhet? |
| | - integrerat strategiarbete? |
| | Vet ni om era klienter, har eller har övervägt, att ta en försäkring mot intrång? |

Marknadsbeetende

| | |
|--|--|
| | Vad anser du, har ni sett någon generell utveckling av patentklimatet i stort? |
| | Är licensering vanligt bland era klienter? |
| | Använder era klienter licensering som en del av sin inkomstström? |

Nuvarande situation

Överblick för patentutveckling

| | |
|--|---|
| | Har ni märkt en ändring i klients sätt att arbeta med patent? |
| | Större omorganisationer eller ändringar i affärsplanen som påverkat utvecklingen? |
| | Har några speciella händelser påverkat utvecklingen som ni kan berätta om? |
| | Har det varit en strategisk omprioritering som ni kan berätta som påverkat? |

Hotbilder

| | |
|--|---|
| | Kortfattat, vilka är de högst prioriterade hotbilderna som era klienter kommunicerar? |
| | Är detta samma hotbilder som du anser är de största riskerna för företagen? |
| | Annars, vilka är detta? |
| | Vilka faktorer gör dessa prioriterade? |
| | Har dessa hotbilderna förändrats över tid? |
| | Isåfall, hur visar sig dessa förändringar? |
| | Hur anser du att patentarbetet bör stötta/bidra till att minimera företagens övergripande hotbilder? |
| | Hur anser du att detta bör ske? |

FTO som hotbild

| | |
|--|--|
| | Kan du berätta om er definition av FTO (FOA) |
| | Anser ni att det har blivit svårare för era klienter att behålla FTO idag jämfört med tidigare? |
| | Är FTO en prioriterad fråga för era klient företag? |
| | Har era klienter kommunicerat att FTO varit den avgörande faktorn för deras sätt att agera? |

| | |
|--|---|
| | Finns det konkreta exempel du kan berätta om? |
|--|---|

Marknadsbeteende

Branschens utveckling

| | |
|--|---|
| | Berätta kort för oss hur du ser på marknadsutvecklingen runt patent? Har klimatet förändrats? Finns det likheter / skillnader mellan olika branscher? |
| | Mer branchspecifikt, är det några speciella marknader som sticker ut? |
| | Förhållandet stora företag vs små – samma förutsättningar och metoder? |
| | Håller patentering samma takt som tidigare? |
| | Vad anser du har varit de drivande faktorerna som påverkat förändringen? |
| | Är faktorerna olika inom olika branscher? |
| | Kan ni se en beteendeförändring bland hur aktörerna agerar på marknaden? |
| | Hur ser ni på interaktionen mellan aktörer på marknaden och dess inverkan på FTO? |
| | Konkurreras det på ett annorlunda sätt idag? |
| | Anser ni att patentarbetet framför allt är ett offensivt eller defensivt verktyg? |
| | Vad är oftast syftet med era klients patentering? |
| | Portfölj, individuellt beslut per patent eller familjer? |
| | Anser du att era klienter idag är så informerade och medvetna om patentlandskapet och utvecklingen av denna att de kan ta underbyggda beslut för FTO frågor? |
| | Varför? Varför inte? |

Organisation

Organisationsdesign

| | |
|--|---|
| | Vad är den vanligaste profilen på en typ-klient för er? |
| | Vilken avdelning/avdelningar hos era klienter jobbar ni oftast mot? |
| | Vilken roll/titel har individerna på avdelningen i allmänhet? |
| | Hur ser det optimala organisationsupplägget ut enligt er för ett effektivt patentarbete och utbyte med er? |
| | Vilken roll och bakgrund hos individerna ni möter är den optimala ur er synvinkel? |
| | Hur sköter era klienter i allmänhet intrångsfrågan? |
| | Kontinuerligt eller sporadiskt? |
| | Hur identifierar man intrång från andra? |
| | Är det vanligt att ni är involverade i utbildning av era klients personal? |
| | I vilken omfattning sker detta isåfall och på vilket sätt? |
| | Hur anser du att patentorganisationen kan stödja arbetet med FTO? |
| | Hur anser du att man gå framåt och utvecklas? |

Verktyg/system

| | |
|--|---|
| | Vilka verktyg anser ni skulle kunna hjälpa era klienter vid patentfrågor? |
|--|---|

Avslutning

| | |
|--|--|
| | Hur anser du personligen att företag i dag optimalt ska/bör bete sig för att skapa FTO? |
| | Övriga frågor? |

9. Appendix B – Interview guide, Industry companies

15 sekunders frågor

Organisation

| | |
|--|---|
| | Har företaget beviljade patent? |
| | Kan ni ge en fingervisning om hur många patentfamiljer ni ansöker om ett genomsnittså? |
| | Skulle du anse att patentarbetet ligger mestadels centraliserat eller decentraliserat i organisationen? |
| | Ungefär hur många jobbar idag aktivt med IP-frågor hos er? |
| | Vilken bakgrunder är vanligast hos de individer som jobbar aktivt med patent? |
| | Använder ni er aktivt av patentbyråer för: |
| | - att göra intrångsundersökningar? |
| | - undersöka patenterbarhet? |
| | - integrerat strategiarbete? |
| | Har ni, eller har ni övervägt, att ta en försäkring mot intrång? |
| | Arbetar ni aktivt med competitive intelligence inom er avd.? |

Marknadsbeetende

| | |
|--|--|
| | Vad anser du, hur är patentklimatet i er branch? (1-5) |
| | Vilka IPR används? |
| | Är licensering vanligt i er bransch? |
| | Använder ni licensering som en del av er inkomstström? |
| | Använder ni korslicenser? |

Marknadsbeteende

Branschens utveckling

| | |
|--|---|
| | Berätta kort för oss hur du ser på marknadsutvecklingen runt patent? Har klimatet förändrats? |
| | Förhållandet stora företag vs små – samma förutsättningar och metoder? |
| | Håller patentering samma takt som tidigare? |
| | Med avseende på patent, var skulle ni positionera er själva i förhållande till de andra aktörerna på ett offensivt/defensivt plan? Varför? |
| | Anser ni att patentarbetet framför allt är ett offensivt eller defensivt verktyg? |
| | Vad är syftet för er med patentering? |
| | Portfölj, individuellt beslut per patent eller familjer? |
| | Har ni hamnat i domstol någongång för patentfrågor? |
| | Har ni varit i andra tvister som lösts utanför domstol? |
| | Hur ser ni på "product/patent clearing" i produkt utvecklingsprocessen? Verkar alla aktörer agera likadant? |
| | Vad är huvudsakliga syftet för er att ta patent? Vilka mål och förväntningar har ett patent att uppfylla ur ett tekniskt och affärsmässigt perspektiv? |
| | Hur kvantifierar och utvärderar man ett patent? Finns system? |
| | Finns det strategiska mål och/eller visioner om patenportföljer bakom besluten eller är det snarare viktiga specifika tekniska lösningar som patenteras? Isåfall, kan du berätta för oss i generella termer om dessa? |

| | |
|--|---|
| | Hur ser ni på invent arounds, modifiering av produkten och andra metoder för att komma runt patent? |
| | Andra sätt att gå runt patent? Ex opposition? |
| | När är det värt att gå runt? |
| | Hur undviker man att andra gör det? |
| | Externt / internt perspektiv |

Risker & strategier för att skapa handlingsfrihet

Risker

| | |
|--|---|
| | Generellt, har övergången mot ett mer kunskapsinriktat samhälle skapat nya risker i förhållande till affären och teknikutvecklingen? (ej företagsspecifik fråga) |
| | Beroende av teknik från andra brancher, globalisering med asiatiska och nya aktörer, kostnadsökning, råvarubrist, kunskapsbrist/avsaknad kompetens |
| | Kortfattat, vilka är ert företags största risker? |
| | Är detta samma risker som du i din roll som ansvarig i patentfrågor ser som de mest prioriterade? |
| | Annars, vilka är detta? |
| | Kan du göra en grov prioritering över dess viktighet? |
| | Vilka faktorer gör dessa prioriterade? |
| | Har dessa risker förändrats över tid? |
| | Hur visar sig dessa förändringar? |
| | Hur har ni valt att hantera riskerna? Stöttar/bidrar patentarbetet till att minimera företagets övergripande risker idag? Hur tycker du personligen att riskerna bör hanteras? |
| | Hur anser du att detta bör ske? |
| | Hur ser ni på interaktionen mellan andra aktörer på marknaden och dess inverkan på ens handlingsfrihet? Konkurreras det på ett annolunda sätt idag och betydelsen av interaktion ändrats? |
| | Partnerskap, licenser, leverantörer etc |

FTO som hotbild

| | |
|--|---|
| | Vad är din definition av "FTO"? (FTO/FOA) |
| | Är FTO en prioriterad fråga för ert företag? |
| | Har företaget agerat för att hantera hotbilden med FTO? |
| | Finns det konkreta exempel du kan berätta om? |

Organisation

Överblick för patentutveckling

| | |
|--|---|
| | Berätta kort om utvecklingen kring er patent organisation |
| | Större omorganisationer eller ändringar i affärsplanen som påverkat utvecklingen? |
| | Har några speciella händelser/case påverkat utvecklingen som ni kan berätta om? |
| | Har det varit en strategisk omprioritering som ni kan berätta som påverkat? |

Organisationsdesign

| | |
|--|---|
| | Kan du med en grov skiss rita upp er organisation och markera ev. kopplingar mellan produktutveckling och patentorganisationen? |
| | Vilka faktorer har påverkat er patentorganisations design? |
| | Hur är de kopplade? |
| | Finns det bestämda beslutspunkter för produktutvecklingen där patenteringsfrågorna är inkluderade och vilken roll är isåfall ansvarig? |
| | Vem initierar oftast frågan om potentiell patentering? |
| | Har ni en incitamentsstruktur gällande patent? |
| | Finns det en urvalsprocess för vad som skall patenteras? Finns det kriterier och måtvärden? Vem är ansvarig? |
| | Har ni en incitamentstruktur gällande patent? |
| | Hur undviker ni att göra intrång på andras patent och hur identifierar ni oftast att andra gör intrång på er? Sköter ni detta kontinuerligt eller från fall till fall? |
| | Var sker detta i organisationen och finns det definierade steg? |
| | Används externa ombud och isåfall hur? |
| | Vilket ansvar har de? |
| | Hur integrerade är de i patenteringsprocessen? |
| | Hur mycket information ges till dem? |
| | Utbildar ni er personal i patentfrågor? |
| | I vilken omfattning sker detta isåfall och på vilket sätt? |

Metod & System

| | |
|--|---|
| | Arbetar ni med konkurrenters patentinformation och isåfall hur? Vem använder informationen? |
| | Utför ni analyserna/datainsamlandet själva eller med extern hjälp? |
| | Hur används information och av vem? |
| | Används patent som inspiration för egen utveckling? |
| | Ser man andras patent som möjligheter eller som hot? |
| | Använder ni er av samarbeten med andra aktörer i er produktutveckling? |
| | Vilka risker ser ni med samarbeten? |
| | Använder ni några speciella hjälpmedel/verktyg för att underlätta arbetet runt patent? |
| | Har ni några speciella metoder/synsätt som ni anser hjälper er framåt vid patentering alt FTO-frågor? |

Avslutning

| | |
|--|---|
| | Hur anser du personligen att företag i dag optimalt ska/bör bete sig för att skapa handlingsfrihet både ur ett juridiskt och ett affärsmässigt perspektiv? |
| | När anser du att det är värt för företag att ta patent och hur ska processen utformas, vem ska driva frågan och vilka ska vara ansvariga för de olika delarna? Hur skulle du personligen tänka i beslutsprocessen? |
| | Ser du en koppling mellan att aktivt jobba för att skapa handlingsfrihet och en organisations uppbyggnad och arbetssätt? |
| | Övriga frågor? |

10. Appendix C – Empiric data

Industry Companies

Briefly, how do you consider the market development around patents? Would you say that the climate has changed? Are the circumstances the same for smaller and larger companies? Is the patent rate constant?

- More applications are sent to the patent offices, there are higher goals today in the industry to apply for many patents.
- Many applications are similar to each other and it is not always a proper clearance seems to have been done.
- The conditions differs dependent on size of the company, it is not common in our industry to find small actors with a crucial patent.
- Patenting is moving to Asia and therefore also some resources.
- Few actors are active at the market. The old small ones have merged or have been acquired but the larger companies. New smaller actors are however developing in China and Korea.
- Established companies in China respects patents, they do often not do so under the period of establishment.
- No niche companies within the traditional products, but exists in the new areas of applications within electronics.
- EU and US has reduced their patenting in our area, while the Toyota-group is increasing.
- More patents with lower inventive step.
- Create a core with smaller and less relevant patent around as protection.
- Large companies are often more intense and have groups working actively with patents and these groups seem to have incitements about delivering many patents, rather than to create high quality patents, in order to reach their bonus.
- Mixture of “crazy” inventors and large companies that patents
- Telecom has not seen a specific transfer regarding the market development for IP.
- LM Ericsson stated already late 19th century after an analysis of the US market, where the Bell company hold tight in their patent, that the expansion of the telecommunication infrastructure was hindered by the blocking patents.
- The fundamental fact is that as many as possible should be able to communicate, therefore the industry works for open standards and licensing in order for the technology to be able to work with each other. The companies exhaust their rights to block each other on FRAND terms, which mean that they still use their right to earn money on their patents.
- The market for telecom products grows with the size of the network it functions in, which is fairly different to other industries as medicine or watches that competes on uniqueness
- Difficult to distinguish what a patent in reality gives the rights to stop, since this is to be decided upon in litigations. The terms is therefore not equal for small and large companies, the resources are limiting the possibilities
- Before the GSM technique was launched, very little was patented in the area. All of a sudden an actor started to patent a lot and then walks around and requires royalties from all the other

companies. This caused the industry to wake up and since then has the patenting continued to increase.

- The overall IP activity has increased in our industry.
- Our customers have started to patent in our areas. We believe this is rather ad hoc and based on their own ideas, than a result of a department working fulltime with development, but we know some customers that have more dedicated projects and sub departments focusing on bearings.
- Our interest increases over time to become more proactive and less ad hoc and is focused to cover areas rather than single patents.
- A few large actors are driving the industry; the smaller actors are very focused on a single application. Patenting between the large actors is like a cold war

- Increasingly important with IP, awareness of the business perspective and how to extract value out of IP
- Main difference between small and large actors is that large actors have resources to go to court, if the business analysis shows that it is of value.
- The technical domain has handled the IP in the past, but the business domain has now started to show interest and they work with a different agenda.
- Some person can say: "I heard about what you are doing, I don't understand it at all, but we have to be a part, we also have an interest and we need to direct the IP management to become more commercial"
- IP has reached a global phase; the patent rate increased 10-15 years ago but has then decreased again. It is easy to apply for many patents, but expensive to maintain them.
- Three phases exist to IP-management: plan, create and extract value.
- Regarding IP value creation: "To make it grow is one thing, to make it work is something else"

- A strong development towards more licensing of IP-rights has occurred in our industry. Competitors cooperate in creating technical platforms.

In relation to patents, where would you consider your company's position to be, relative the other actors at the market, when it comes to offensive/defensive behavior? Why? What is your purpose with patenting? Do you take individual decision or do you have a portfolio strategy? Have you ever been in court or in other disputes?

- Rather defensive due to our size, type of product and place in the supply chain compared to larger actors.
- Difficult to foresee at the application time if the patent will be used as a sword or a shield, it is more to distinguish if it is useful for something.
- Patterns for research and development are visible for smaller companies with around 200-300 patents, then you can distinguish linked products.
-
- Intends to be offensive, have rather large incomes from patents.
- Patents are used to get a return on the development investment and cannot be used for blocking in our industry. We use patents to create licensing opportunities, which is due to our type of clients, where sourcing from multiple actors simultaneously is a requirement.
- Patents can be used to block and hinder the market.

- We work with portfolios.
- Have been in court, but 75% is solved through negotiation.

- Defensive, we do not sue people left and right, which is also dependent on the staffing. If you do not have a group that has as interest to push the issue, more focus is put on checking infringements and freedom to make new innovations.
- The purpose is to protect own products and to make sure they are possible to realize without the problematic situation with being sued.
- Larger focus lately, the company is growing which create a larger interest for IP.
- Initiated the thinking of creating different patent families depending on the category for the product, but mostly still individual decisions.
- Has been in court, but also solved disputes through negotiations.

- In the middle, we get large income from licensing but also from our product and service business. The balance is very important.
- Our view is to see patents as a currency that allows us to participate in the development of open standards together with customers and competitors.
- Our purpose is to create essential patents that work as a currency for standards and that we are committed to license. We complete our portfolio with patents that can give us a competitive edge or be used for cross licensing.
- We use technical portfolios; it is often unclear which specific products that will utilize the technique when the patent decision is taken.
- We have been in court; it is neither common nor uncommon. Most disputes are solved through negotiation, as the American expression states, "To sue someone is an extended way of saying hello".

- The whole industry is very defensive; the actors mostly protect their own solutions and apply for patents in order to secure their business.
- Patents are in general not an active business tool is used in order to create new business or cooperation's, even though I believe a change is on its way.
- A license deal takes 6-12 months to secure, the administration is not the issue, rather the prioritization done by the counterpart, a license document can lay at a desk for months before being sent back.
- Ad hoc patenting from projects and other R&D activities quite common so far. Some more proactive units, and units in very competitive fields have IP strategies defined (of different scope and quality...). A main focus for my strategic unit this year is to define and implement IP strategies in more of our units.
- Rarely in court, even though cases exist

- Industry specific questions, but generally this is a rather defensive corner of the world.
- Electronic application has started to enter our traditional markets, which has given us new competitors and a new importance of IP.
- Companies in industries used to IP has shorter decision channels, they are prepared for handling questions as litigations.
- Traditional engineering have clear transaction paths and the technologies are not dependent on each other, e.g. an aircraft wing is an invention in itself, it is not dependent on other technologies. Could give a competitive advantage to be more open and develop each other's technology further.

- Mostly to block or delay competitors, but we have some portfolios with more advanced purposes than to block others.
- Have been in court and are prepared for doing it again, however there is a lot happening behind the scenes.
- According to us we are working offensively with our IP portfolio. The goal is to protect the technology we are selling or licensing.

What is your opinion about "product/patent clearing" in the product development process? Do all actors seem to perceive this in the same way or have you noticed any specific differences?

- More or less all companies that has a need for it should have a patent clearance process, how extensive the analysis is, is a question of resources.
- There are go/no go clearly defined in the gates even though it is difficult to give exact answers, patents should be cleared early
- Patent clearing is included early, already in the very first gate are hindering patents investigated.
- Tasks regarding mapping the patent landscape with the purpose of creating and identifying blocking patents are included in both the pre-study and the product development.
- Deep analysis is done on new areas, the traditional patent landscape is known by us.
- All patent clearance is done internally.
- Some actors do not seem to investigate the patent landscape, up to us to make sure we get paid.
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- All patent clearance is done internally
- Some actors do not seem to investigate the patent landscape, up to us to make sure we get paid.
- I do not think everyone does it, only the smart companies. We have the clearing integrated in the development process.
- Our products require many patents, which everyone knows. Our industry works with cross-licensing programs and a license for a single patent is never critical for the end product, the industry is built upon contracts between the actors.
- Occurs both sporadically and continuously in the development phase, one process aims to keep control over the development and to see if an FTO should be done, and the other is for special cases, such as new products.
- Subscription on Derwent patent profiles, newly published applications from chosen areas is distributed to the relevant person every second week. The person determines which applications that can be a potential threat and these are put under surveillance. The profile works very well at departments that have had patent issues in the past. This work will in the future be prepared internally, due to the cost.

- The responsibility to initiate the patent work is always on the project leader, which is the same person that ensures that the project has a business case.
- Our patent clearing process is being discussed and will be updated.
- A company that has encountered serious trouble due to IP is driving the development of more efficient systems.
- Large differences, I know for example some larger groups that have given the full responsibility for patent clearance to their supplier. We aim to work closely with our suppliers but no general searches are performed unless we are suspecting a conflicting patent.

What is the main purpose for your company to apply for a patent? Which goal and expectations should a patent fulfill from a technical and business perspective? How is patents quantified and evaluated?

- Main purpose for patenting is freedom to use, to be able to use our own technology.
- Technology push rather than customer pull, the technology is steering our development. Still everything we do has a business and commercial perspective and to take a patent is a strategic decision that is taken on a high level and where the market potential is a crucial factor.
- Applies for patents in order to protect our technology and to block others.
-
- Technology push or customer pull in the company is dependent on who you ask, but for me the commercial side is crucial for the ability to make business in this industry
- To objectively measure the patent value is only theoretically possible, the value of IP is decided by its context and the desire for the invention at the market
- Ensure that no one copies the products or makes something very similar.
- Initiated the work with thinking from a product portfolios perspective, but each business unit has it's own responsibility for handling their patent and the IA/IP group is only a support function
- Patent is a tool used to earn money. We protect technologies with the purpose of licensing and to control our technology

Are there strategic goals and/or visions about patent portfolios behind the decision or is it rather the important specific technical solutions that are patented?

- The market side is looking for a blocking effect on alternative solutions based on utility, while the engineering side is more thinking that someone else should not copy their "baby".
- Technical push or functional pull is dependent on the product segment.
- Our vision is to that the IP portfolio should be a living asset to the company, where a vast majority, perhaps up to around 70%, of the portfolio should be considered active.
- The IP portfolio should support our brand.

According to you, how does the industry in general perceive methods to go around patents, e.g. Invent around or minor modifications? When is it worth to go around and how can you avoid other actors to invent around your own patent?

- Invent around is the first investigated solution when the thought of dropping a developed solution is disregarded. If a patent claim is long or based on combinations of ideas it is usually possible to tweak somewhere.
- Not as clearly outspoken as within electronics or medicine, but sometimes we try to belittle the value of other patents in order to get lower royalties on licenses or cross licenses.
- Tries on a daily basis to invent around disturbing features through modifying the solutions. Invent around are steered by the business, it is often rather a wish from the customer, than the technology, that determines if we can go around the patent.
- Tries to make sure that we own our technology and that we get paid from other users of the technology. For new techniques it is more relevant to create broad "carpets" of patents rather than applying for essential patents.
- Generally we try to go around patents and to keep a straight face. Interesting to go around patents if there is a market, for innovative products without a market we usually do not try to go around.
- Too be clever in how to describe and create patents. To know what the core is and to be honest about it for oneself.
- Disillusioned about what PRV approves as patents. Have a feeling that the inventive step criterion has been lowered and that there is an effort by actors as PRV, lawyers and more active companies to create many patents. Comparable with the development of grades in schools, if teachers are evaluated based on the grades of their student, the grades are usually going up.
- It is more difficult to invent around a patent portfolio than a single patent.
- Important to check how well our portfolio matches the standards, if our patents are essential the competitors do not have the option to invent around, they need to license according to the terms of the standard.
- Opposition is rarely used, if it happens it is often utilized as an extra tool in a negotiation for a license agreement in order to get the contract settled.
- Yes, we work with invent around, even though we have some "not-invented-here-syndrome". Depends on the product if there is risk for copies, popular products might be exposed, but many products are unique for the different actors and the actors are satisfied with their own solutions. The level of inventive step is usually not very high in our industry, in combination with a lot of prior art makes it very difficult to protect against invent around.
- The strategy for the R&D department and the marketing strategy together set the base for the companies need. If a patent shows up within this area we try to invent around.
- Invent around assessments are qualitative and not quantitative. An invent around with the same function but different design might not be well perceived from the customers.
- Invent around are according to the rules. Analyze the amounts of man-months it would take to invent around. A patent taking 7 man-years feels good to have, but should we keep a patent that takes 2 man-weeks to go around?

- Patent pools and standards are increasingly important but not yet relevant in our industry.
- Licensing is often less expensive than inventing around, since patent issues often arises late in the process, which makes inventing around very costly

Generally, has the transformation against a more knowledge intensive society caused any new risks in relation to the business and technical development? (non-company specific questions)

- More, so called, open innovation already at research level, e.g. EU-programs and Vinnova, which splits the cost but gives less chance for exclusivity.
- "I do not believe that we have become better in handling the risks that appears, rather that the development goes faster than the possibility for us to handle it." There is a greater desire to appear and participate in forums than to protect ideas.
- A transformation from passive to more active electronic systems has been made, which gives a new and different patent situation with more niche companies. Traditionally the large companies had the power and no one had a patent of a part of the product/solution. In electronics it is rather that some actors have applications that are small, but included in several products.
- Important at technical breakthroughs that transforms the market to have a patent in the base.
- Patent can be limiting, a bottleneck that takes time and resources from working with other possibilities and options. Patent creates worries since nothing can be allowed to be missed and this creates too much focus on the defensive side. Risks both with time delays and recourses if patent landscapes are not carefully checked.
- Globalization has had effects; the consequences that can occur for example with patents in China can't be ignored.
- Overlapping technologies is slowly entering the industry, e.g. control-systems and sustainability, currently investigating how and what fields that will affect the future.
- Technologies are getting more complex and the requirement of open standards is a risk since we need to work together with our competitors. Before a standardization meeting the companies apply for all patents judged as relevant and then there is a race through the patent offices about who gets which patent and which technologies that are included in the final solution.
- The standard is open for everyone, the knowledge is therefore spread to actors that did not contribute, which is a risk since they do not have any other obligations than avoiding infringements, while the contributing actors are committed to license their technology and knowledge.
- Within the product development we do not cooperate with our competitors, it only occurs in the process of standard setting.
- Large risk with the evolution of new global standards, a lot of resources is invested in development long before it is decided upon which technique that will fly and if the world chooses a competing technique, the invested money are lost.
- The open standard's has created a communication system that works more or less globally and where both contributing and non contributing companies has gained value in forms of royalties or access to the base technology.

- Generally we see that there is always someone else that tries to swipe the knowledge. We are focusing on knowledge and even though our products are not always superior to the other at the market, we are skilled in adopting them to the customer.
- We are leaking a lot of knowledge; inevitable when you work together with a customer since you both need to share experiences. Leaking knowledge could mean that we eventually risks blocking ourselves.
- Extremely important to control our knowledge and our IAs through contract or IPR. Sensitive to prosecute our rights against a customer, with a patent it is easy but without IPR it can be very difficult in a dispute about a contract.
- All actors always have as a starting point to own the full result, this is a matter of negotiation and most common is that we get basic technology, while the counterpart gets the more application specific parts.
- A full IA approach can be valuable in negotiation about how to split the result and which background that is brought into the project. This is an extremely effective way to do it, but it requires a lot of resources and is and more commonly for more important development co-operations, e.g. a factory purchase.
- We believe China will be a threat, today they are not good at mechanical solution but they are quick learners. They are starting to patent more, mostly in ICT and they will systematically become better.
- We work more and more in cooperation's with different alliances, companies and universities where we together develop new solutions.
- The top management is driving the strategy that we should be a knowledge engineering company, but don't seem to have understood that we are leaking knowledge when we are working close to customers and suppliers. What we can do is to inform about the risk and how to minimize it in order to utilize the potentials.
- Assumes that controlling knowledge and knowledge questions is increasing in important.

Briefly, which are your company's main risks?

- Our products are built upon a technical standard that is mature and there are several competing technologies giving the same result.
- An increased patent rate is also causing new risks
- The employee turnover in Asia is around 50%, which causes knowledge leakage.
- Better negotiation among large actors where both parties have own interests. Larger actors have usually an interest in changing patents; small actors are only interested in money. Troll's have not been present earlier, even though we in the 80-90:s paid some royalties to different actors.
- The IP risks are not seen as imminent, the market is mature and satisfied.
- The risks that the patent department sees are a part of the risks the whole company faces.
- Information leakage and patenting. Our knowledge focus makes patenting crucial, else we risk writing of our rights and giving the patent to someone else that can block us.

- The dependency of licenses for important technologies

Are these the same risks as you in your role as responsible for patent questions see's as most prioritized?

- Same risk for the IP organization as for the company. Open innovation is also utilized internally, which increases the risk of uncontrolled information leakage. An internal social media where the employees can discuss new ideas has many opportunities, but also many risk for leakage and theft, which can cause individuals a lot of pain.
- NPEs
- The risks are synchronized
- Tries to integrate IP at the business side.
- IP issues are today handled higher up in the hierarchy and clearly considered to be more important than five years ago. The development has gone fast.
- The IP risks conforms with the risks of the company

Have these risks changed over time?

- FTO has been discussed more the last five years than before, which is both connected to risks and the growth of our company.
- Information leakage has occurred in the traditional areas due to that reduction of staff has caused employees to move up and down in the value chain, as well as to customers. In China some employees quits and starts up new companies with the gained knowledge.
- The risks have changed and there is much more awareness today about risks as well as possibilities. The handling of patents is changed today compared to 15 years ago.
- The open standards in combination with the globalization has increased the risks since we now compete with actors globally instead of regionally, since the developed standards is used around the globe
- The main difference is that both our customers and we today want to own the IP. Another difference is the control, one company a few years ago demanded us to deposit all our product data and specifications at their place, with the motivation that they need to be in control and able to deliver even though we might disappear, which we of course refused.
- The important factor for us is the knowledge itself; the IP is just a tool.
- Actively work to decrease the dependency on others.
- The risks are at different levels, but one is revenue loss.
- More focus on knowledge, I do not think that everyone realizes this is what it is about: to develop, package and sell knowledge.
- The risk of leaking information backwards is often forgotten, you need to control the suppliers earlier and strengthen both the IP situation and the contracting. This is size dependent, a

large company might have long communication channels while a smaller one can handle the communication in the coffee corner.

- In theory all inventions by consultants are according to our contracts owned by us. However, no one knows where the consultant has been in the past or where he/she will be in the future. Do not want to change that since you want the experience, but it is a risk if the consultant shows you a solution that was developed for a competitor.
- Actively work to decrease the dependency on others

How have you changed the risks? Does the patent work contribute to minimize the companies overall risks? How do you think that these risks should be handled?

- Try to use patent as decision supporting information and not only as a shield, e.g. patent landscaping.
- To apply for many patents is one way to reduce some risks. Another observed example is to become friendly with a firm like an Intellectual Ventures and get a license for their portfolio of 30 000 patents.
- Defensive patent aggregations where actors tries to incapacitate competing patents is an interesting thought, but it does also impoverish the patent system
- The industry tries to identify ways to go around the patent system, with e.g. cross licenses and by keeping straight faces until someone pokes them. Patent troll is a hinder in this since ownership of a billion patents won't make a difference to them, which makes insurances a hot topic.
- Patents as much as possible of our technology; try to transfer know-how to patents in order to increase the protection and decrease the risk of information leakage.
- Consultants go around in the industry and follow the current projects.
- Individuals have the rights to their own experience, requires craftsmanship to allow them that freedom and still make sure to acquire knowledge in our area. Expert consultants are living on their knowledge and the ownership of the results needs to be regulated in the contracts.
- Largest effect has been created by canalization far down into the organization; the awareness is disseminated to the individuals that work with the question on a daily basis rather than to two patent experts. The processes have definitions about how the patent questions should be investigated.
- Good if external innovators that comes with own ideas has patents, otherwise the situation can be very complicated about who owns the idea if the original idea was dropped, but the company launches a similar product later on.
- To create a strong patent portfolio and to have a competent group that works with licensing, to be good in licensing and in asserting our patents.
- Keep tracks of the competitors patent through a patent monitoring service.
- Work actively with IA and IP and to get the employees aware of that they are rather selling and protecting the function of the IA, than the actual product.

How do you see the interaction between other actors at the market and its impact at your freedom of action? Is the competition different today compared to the past and has the importance of the interaction changed?

- Ad hoc dependent, no clear trend but someone needs to take more risk than the other in an interaction. Contract clauses about IP is discussed more today than ten years ago
- Not enough with contracts with the consultancy firm when it comes to resource consultants, important to make sure to acquire the inventions from the individual.
- Most customers have tightened the ownership of what to own, the standard contracts have become tougher.
- The new interaction is handled through a higher internal awareness.
- In some areas we work closely with the customers, but that is when the technique is so complex that we need to be part of the process.
- Through the privatization of our customers the attention for ownership of IP has increased; a company in a monopoly situation does not have the same incentives to manage its resources as a company exposed to competition.
- The IP question requires more and more discussions in each cooperation agreement with suppliers, the question has gained importance for them.
- Increasingly important to control the information flow to our suppliers in cooperation's, can be complicated if the supplier chooses to sell to competing companies.
- In order to compete, the goal is to keep the knowledge within the company; many have been disappointed when they have lost IP and the rights to the results due to poor contracting in cooperation deals.
- EU and other governmental bodies are investing money in R&D and this makes the IP question very central. No one has exclusive rights to the results if the solution is developed together, which requires a holistic perspective. This causes no issues if the involved actors are non-competitors, but that is not very probable.
- To develop own platforms and systems is very expensive and the development phase is so high that there is not enough time to get the investment back. Therefore cooperation's and IPR licensing has increased in our industry.

What is your definition of "FTO" (FTO/FOA)

- Partly to make searches on a product or system level and partly to check the different functions that a product performs.
- One part that is also included in FTO is to investigate the relations in the value chain, the choice of supplier might be limiting my freedom, e.g. if a supplier holds a license but offers less choices. This action enables risk adverse operations.
- Make sure that we can utilize everything we develop and pay for, it should not be owned by our customers or by a consultant. We should not sign of any contracts where we sell our rights. We should be able to use the technology for more than one customer if we have paid for it,

while if the customer paid they are allowed to block us. This is both a legal and business perspective on FTO.

- FTO is a fuzzy concept.
- To have the possibility to develop and launch ideas at the market and no one should be able to stops us from doing it, which means that you have protected the idea, that no one else has protected it or that it is not possible to protect.
- Get lost money. To have a patent on my technology is no protection, but it gives me increased possibilities to negotiate with the actors that is close to my technology. FTO is to have a portfolio strong enough for me to be able to negotiate with anyone that tries to stop my business. It has a commercial definition.
- Clearly how we are blocked for a specific solution, how can we act and can we produce and offer the solution to the customers as intended. Legal perspective
- Mostly used on the technical side, which is separated from patent intelligence, FTO is performed when a clear concept is developed and commercialization is approaching.
- Patentability should not be confused with FTO. Patentability is a defined search for a solution; an FTO is made for a whole product and much more complex.
- Patent intelligence aims to steer the F&U, FTO investigations are much more complex and includes all kinds of possible infringement areas and technologies
- FTO + patent intelligence = patent strategy
- FTO for a clip on a pen might be to check if it is mentioned on a conference, for the whole pen it might be to discover that the plastic producing process is patented in EU.
- An investigation to ensure that no one else has patented the solution that our company intends to produce/license.
- If the concept FTO is used in a contract an external expert should perform the analysis.

Is FTO a prioritized question for your company?

- Yes, FTO is prioritized for the patent organization
- Yes, it is rather prioritized, both for the company and the patent organization.
- Yes, FTO is prioritized since we need to be able to develop new product and service and to build new factories without the risk of being stopped.
- FTO is located early in the process.
- We strive for technology leadership and our survival is dependent on us owning our technology, patents are a kind of receipt on our leadership. A strong patent portfolio enables us to get some of our development cost back through royalties and it allows us to enlarge the market through letting new actors in to the market. We discuss technology leadership rather than FTO, but the principium is an important question.

- No, FTO is too tough, costly and time consuming. We rather work together with the legal department with raising questions to the agenda about patenting.
- Tries to sometimes bury our heads in the sand; it is still often possible to act on the market , due to a lot of old prior art, without patent or making infringements for the fundamental technology. However, the patent landscape is more important to niche players.
- A business area that has taken part in tough and painful litigation is checking FTO continuously and is more careful than the company in general.
- Yes, FTO is a prioritized question
- Our products consist of so many components that it is almost impossible to clear them all. FTO is performed when a suspicion exists or before large business deals.

Has your company acted in any way to handle the risk with FTO?

- Start with classical FTO opinions, create knowledge about what exist today, decide upon level for searches and see what should be developed. Continue with looking at the transaction and/or relation basis if there is any good supplementary information.
- Searches themselves will not give the complete truth since you want to know quite a lot. FTO is for me a proactive work.
- Reactive works requires checklists and a clear strategy for how to handle for example C&D letters; a high strategic level for the reactive work is often not enough.
- Increased the awareness among the individuals that participates in the projects, sign the contracts and interact with customers and/or suppliers.
- Indirectly. It is clearly stated in the innovation process. The employees know that the question about patents should be raised; otherwise an error has been committed.
- We are living in the scenario that we are committed to license out our patents, we are constantly in negotiations with other actors and this is rather business as usual than a threat.
- The best scenario is if you can get the supplier to be responsible for FTO for products you are purchasing and then only control your our own processes and materials.
- Patent mapping enables tracking of the competitors R&D and control of our own in a potential direction, no reason to aim for an area with 30 patents.
- Patent opposition is included in the proactive work tasks.

Please tell us shortly about the development around patents. Has there been any larger reorganizations or modification of the business plan that has impacted the development? Has any specific cases affected the development or has there been a strategic reprioritization?

- My predecessor had a more administrative role; the person was skilled in trademarks and only coordinated at the patent side.

- The company was growing and developed a wish to make more work in-house and therefore they choose to hire an engineer that can collect ideas, communicate with the marketing department and initiate the work with creating clearer processes.
- Grown through acquisition and kept the original department. Worked well and has given a decentralized patent organization, only two departments in Asia have been started by the company.
- Reorganized the organization and appointed responsible personnel for the IP-questions - transferring against a centralized organization. Exist an interest in creating a better control regarding the handling of patents, difficult in a decentralized organization. Somewhat of a strategic reprioritization, that happened in a larger reorganization.
- Patent is included in all processes, both infringements and patentability.
- Has resource consultants but has not seen special risks, although clarity is important
- The industry woke up through a launch of a new global standard when one company started to patent a lot and demanded royalties from all the other players. This was a wake up call for us and we have gone from a company with a modest patenting to a company with an extensive patent function with refined processes and strategies to handle that organization.
- A company new to patenting does well in starting from the inventive side. We hired patent engineers that had as a task to collect inventions and to increase the awareness of the importance of owning the development.
- A large organization with patent engineers spread around the world sooner or later has a demand for synchronization of the work.
- A natural consequence of increased patenting is a demand for reviewing the costs.
- The breaking point for when it is relevant to transfer to a more structured organization is uncertain, but some structure is always relevant in order to be independent from other actors
- The product development process is being reviewed; today it has some gates, where patents are tick-boxes that are unclear. For example a patent check should be done in gate one, which many perceive as a patentability check rather than the intended infringement searches.
- The main factor behind the organizational development is a push from the key player within patenting and several cases where we lost further business due to poor contracting.
- First step was when the IP department was moved to the product development and the manager recognized that this part of the organization was in need of development.
- Easier today to ask for resources, grown with several persons the last six months and we have a favorable situation.
- Some people believe IP should be a centralized unit, but that rarely works. The IP unit needs to permeate the organization, the issues can occur anywhere and the central unit cannot discover that; they cannot be present at all times.
- Our patent organization is divided into three units at different geographical locations.
- The size of the IP organization needs to be balanced, a too strong unit does not work in the large organization.
- The knowledge question is getting more important, but also the global aspect, e.g. sending PCT applications instead of regional.
- A young company has rarely old cemented principles and are open for new ideas and processes

Can you with a rough sketch, draw your organization and mark the potential touch points between the product development and the product organization?

- The product development process has a gate structure with pre-defined activities. The patent coordinator has a recurring task where the patent work is connected to the gates.
- Our company is a line organization where the patent organization is located under both R&D and certain sub-department.
- The patent coordinator is driving the patent work in the project groups, but is also working in the line organization with patent and trademark as well as with the more reactive work.
- Our corporate lawyers does not write patents or give opinions, external agencies is used for this purpose
- Decisions about patent questions are taken on a group level, in a patent committee, with advice from the patent coordinator.

- Classic matrix organization with supporting functions and a stage-gate product development including a research, a pre-study and an engineering phase. Patent is a checkbox throughout the gate structure.
- The patent organization is located to the large development hubs. Each product area has it's own patent engineer that drives the common dialogue.
- Some technology push, aims to protect early.
- Focus on good patent disclosures from the technicians that can be a basis for the patent applications written by the patent organization. Ideas are welcome from day one, but several ideas/application can later on be united. Some technicians are good at checking priority data at Espacenet, but this is not encouraged.
- Tries to collect all ideas and inventions in a categorized database.
- The patent strategy is based in the technology areas and research/customer projects; the timing for application differs.

- Input for new development comes often either from the market department about entering a new area or through a new idea given by an entrepreneur that has been selected for development. We have both product development and an innovation process that runs in parallel.
- The development process starts with a pre-study and a feasibility study and if the idea is determined to be feasible the IP situation is checked. If the idea comes from an entrepreneur that has an IPR is easy, or else we send the idea to an external agency to check both infringements and patentability. Activities around patents does not come back later on in the gate structure.
- Searches for prior art comes often back from the agencies with a security of 78-80%. Next step in securing the idea is to send a patent application, neither a patent application has full security, but at least no one else can patent the idea if you have a pending patent.
- The patent process is initiated by the individuals working with the solution and then escalated to the R&D director. The R&D persons contact the external agencies themselves. The patent coordinators at our company are only working with the coordination of our current patents and processes and not actively driving patent questions. They are coordinators and I do not believe it should work for them to phone the projects and ask for patentable solution, the

questions would probably then fall between chairs. The coordinator can never have the same energy for the solutions, and the energy is really important in this work.

- Clear gate structure, patent is included in the pre-study and is not a continuous process. The responsibility is given to the R&D department, there is no special patent department
- Network between the patent engineers and the projects in the product development. The patent engineers belong to the patent organization, but are working closely with the projects.
- The responsibility of the patent engineer is to create a patent portfolio and the more experienced the person is, the more strategic work is included in the work tasks. We have innovation boards that discuss patent questions.
- The IP organization is divided into six different geographical locations and the aim of the IA/IP group is to work with business development within this area. The local units handle operational patenting, FTO searches and local contracting.
- Group IA & IP includes a local IA & IP departments that are operationally resp. for patenting, counseling, contracting etc., an intellectual Assets department (headed by me) which is a strategic IA & IP function resp. for developing and implementing SKF's overall strategies, work, processes and tools in relation to intellectual assets and property, as well as to take some operational resp. for "high profile" projects, co-operations etc.
- The patent coordinators are reporting to the head of development and are located both under the segments and under the different areas in the matrix organization. Their responsibility is to prepare material for the head of development about which patents that should be applied for and maintained.
- The IA/IP group keeps track of the patent portfolio, while the patent coordinator controls patent landscape in the specific unit.
- A need for discussion forums has been seen and several boards within the units and segments have been established. There are both operational and strategic boards, where the operational board consist of IP and development persons that proposes strategies for the strategic board and are, later on, responsible for execution, while the strategic board consist of higher management and is the board that is formally setting the IP-strategy and is ensuring that it is followed.
- External patent agencies write applications.
- The intention is to develop the organization to be able to handle licensing and to get income from this direction.
- The IP organization can support both the product development and the business development, but it is the "Intellectual Assets" department within Group IA & IP that primarily supports business development.
- In the past "Patent watch" was the only source of information for competitors' patents, except for some sporadic work. The last years we have developed a standardized and structured way to work with intelligence work, e.g. search, mapping, analyses, conclusions, actions, on requests for the units that has a need for it and secured that the work is done at a level adjusted to the area.
- The group technology intelligence group works with IP publishing and some other aspects of these questions. Group IA & IP's patent intelligence work will be co-ordinated with the brand new Group Technology intelligence, which is under discussion.

- R&D, IP, business and legal should work together with these questions and the IP department should have the connection to the patent office. Today an idea starts in the R&D department and is pushed over to the IP department, which hands in an application to the patent office. This is not in correlation to the MELT model⁶¹, where the different backgrounds should cooperate in order to create an IP-community. In the future there should be a holistic business goal and clear communication channels so all actors can interact about the IP questions.
- The IP department owns the process, not the questions, and should have clear communication channels and collect input from other departments in order to synchronize goals and actions. A central unit can't possibly have the holistic view regarding all implications a license deal or litigation can cause another department.
- Communication is formally going through an IT system and through the responsible patent coordinators in the R&D department. However, the informal network is also well established.
- Gate-material where the project should tick of patent questions.
- The construction unit is responsible.

Are there set decision points for product development where the patent questions are included and in that case which role has the responsible person?

- The application can be sent early, this is often determined if there is customers present or not.
- The company has a gate system for product development where patents are included from start.
- Yes, we have checkpoints but the current system is criticized since it has too many steps and is too unspecified. Our proposal is to have a first step where a snap shot of the market is created and then keep passive until the concept is set in details and before making the FTO searches. FTO is too costly to make on a general concept.
- Have innovation boards, but these are more specific to some areas and do often lack a holistic perspective.
- The norm for what is commercially marketable comes from the business side. For example I heard about another company that came up with a solution where the battery is used as a lid to press down a Sim card, which is a brilliant invention, but it is so simple that no engineer would ever dare to even propose it.
- The exact decision points are under development, it is about clarifying who should do what and what is expected.

Who is most often initiating the question about a potential patenting? Do you have an incitement structure?

- Patent ideas can come from anyone. The developer does often not realize until late in the process that they have an invention, therefore a gate activity called invention report is enabling the patent coordinator to catch new inventions himself early on in the process
- Monetary classic incitement structure for patents

⁶¹ See <http://www.chalmers.se/tme/EN/melt> for more information

- Patent initiation differs from case to case. Most classical is that the inventor is reporting the idea, but there are cases where the patent organization has initiated and driven the patenting process.
- The developer/project leader has as a task to check patentability and infringements in the stage-gates and they then contact the patent organization. The R&D manager is responsible to secure freedom and to apply for patent.
- The patent department is conducting searches to investigate the patent landscape early on in the process and the patent engineers have the continuous responsibility for each area. The patent engineers are located in the matrix organization and have close contacts with the patent organization.
- The technically responsible persons inform the patent organization if they believe a patent should be applied for and via this hands over the task to the patent organization that drives the patent application process.
- Global incitement structure with local events as awards and dinners. Measures the amount of inventors, wants to disseminate the innovativeness.
- Commercial value is the crucial factor, not inventive step.

- Both ways, the patent engineers might help younger and less experienced developers with searching for patentable inventions, while more experienced researchers comes with own ideas and concepts to patent search.
- Core of inventors with a tail of less patent active researchers. Education and motivation is the key to get new inventors.
- Contradiction between short-term goals and long-term strategy, the project leader wants to fulfill his goals and patents are run in another dimension. It is especially hard to motivate this work when the project is short of time/resources or works closely with customers and prioritization is a must.
- Yes, we have monetary rewards and dinners.

- New patenting within a project is initiated and driven by the project leader. The patent coordinator and the responsible manager handle other projects, as continuous improvements.
- Our incitement structure is monetary and divided into three steps, one for applications and one for granting and a third step when patent has been kept alive a certain number of years.

- The patent coordinator or the engineer is today driving the patent work. Difficult, since the technicians are often locked into a different value-system than the business side; they have different core values. Only in the best of worlds are they able to delve into each other parts. However, if you know what you are looking for in regard to patents, you can most often find it.
- R&D employees have a lot of different tasks and perhaps they should not be given additional responsibilities, therefore we have given the task to the patent coordinators.
- Incitements are discussed and a monetary system exist in order to motivate the extra work patent requires

- The inventor or the responsible person for the external sales often initiates patents.

Do you have a selection process for what should be patented? Are there criteria's or set values?

- Questions as: Within which area is it crucial for us to have patents? What is it that makes the customer choose us? Which features give us a competitive advantage?
- Commercial value, a technically fantastic solution that no one uses is worthless.
- VP in research and VP in engineering discuss where to patent based on a given material on a special quarterly meeting.
- No formalized selection process in terms of a paper form, we trust the experience of the patent engineers about what should be protected.
- Yes, there is a point where a company needs to start controlling the costs and without a selection process it gets too expensive.
- Since the future is hard to foresee, the company does rarely know exactly what inventions that will get valuable, but prioritization is necessary.
- We are not aiming for a Nobel Prize; technical value is only valuable if it can create business. The crucial factors are that someone else is willing to pay for using it and that is more dependent on the competitor's business strategy than our own.
- Our policy stated that we only patent if the technology is visible at the end product, trade secrets for production methods are however not optimal anymore since suppliers alternates between the competitors and discusses what they have seen in order to increase the competition.
- We are working on implementing IP strategies right not with that are focusing on the selection process.
- A number of criteria's are stated as expected potentials, cost improvements, quality, sales, external services and to prevent competitors. Also an analysis of the business from a cost-rate perspective is performed to decide upon the potential profitability.

How do you avoid infringing your competitor's patents and how do you identify that other persons are infringing on you? Is this handled continuously or case-by-case?

- The question about infringements is included in the product development process and if it does not show up there we get to know it sooner or later, even though it is preferable to find out in the development phase.
- Personally I would like to keep track of if other actors are infringing on us.
- We have technicians that check Espacenet and send the results to the patent organization. This is however not encouraged; we rather see that they focus on sending invention disclosures that truly present the idea.
- No bouncing back and forth with the inventor after the invention disclosure is sent; the patent organization takes over the work.
- Continuous benchmark of competitor's products, but also surveillance of applications and granted patents.
- Database over applied and non-applied solutions categorized by area. This database should always be consulted on a global basis in order to avoid "theft" of inventorship of a patent that

has been considered irrelevant in another country.

- Tries to foresee what other actors invent.
- Uses an external agency. Espacenet is ineffective; to get a result with 60% security is not a good decision support material for a board. Only rough checks in the start up face can be made internally, if you do not invest in setting up your own internal IP department.
- Important to actively choose a patent agency that knows the industry. Different patent agencies are good for different areas dependent on their specialization, experience and focus.
- Continuous work connected to the standards, we know that anyone using the technology included in the standards need to use our patented technology, more or less a set list of actors.
- If we are infringing, it's discovered both reactively and proactively, either through the receiving of a warning letter or through work with the patent watch and the patent landscape.
- To discover if competitors are infringing is mostly done by the sales force that spots new products when they are discussing with the customers. This is an unconscious process and there are no official communication channels.
- We have an internal successful anti-counterfeiting team that is focused on closing down factories that makes exact copies, these copies has however not been consider to make patent infringements due that they don't copy the actual bearing design, but puts the SKF logo on their own bearing (mainly Asia). Also, when they actually copied a patent protected design, they usually copy the brand as well which is much easier to enforce than a patent.
- The big five actors respect each other and side steps are accidental.
- Infringement searches are included in the end of the R&D-process for the larger and more important cases. All R&D should not be investigated for patent infringements. Sometimes a company has to be practical and it is more important to investigate the important technologies than to leave no stone unturned.
- Infringement searches are done on important techniques that many people is in need of, e.g. a new engine that has 800 horsepower that consumes 0,2l/mil versus a new way to attach a sticker.
- In important areas the clearance is done continuously and its importance is defined based on commercial and techno-economical values. A pen that can draw a line that is 30 km long instead of 10 km is a great technical invention, but if the commercial norm is that a pen is lost or broken before the ink runs out the techno-economical perspective would show that the pen is not fulfilling the customer needs.
- The value norms are changing over time, the challenge is to determine when which one is applicable
- This is case dependent

Do you use external agencies and in that case, in which way? How integrated are they in the patenting process and how much information is given to them?

- Yes, the patent coordinator is having the contact with external agencies, but the inventor is included at the meeting

- Patent prosecution. Only basic work, we send them prior art, information about the invention, what we consider the invention to be and what we would like the patent claims to address. No strategic purposes are communicated.
- Patent prosecution. Only basic work, we send them prior art, information about the invention, what we consider the invention to be and what we would like the patent claims to address. No strategic purposes are communicated.
- We use outside councils to draft and prosecute patent applications.
- Information sharing needs to be balanced, but generally the quality of the applications increases if the agency understands our purpose.
- If a specific claim is the core for us, a modification of that claim might cause that the patent does not fulfill our purpose anymore and the agency needs to be aware of that, we do not want to pay money for a patent no one will use.
-
- External agencies are used to write applications, since our internal people often are busy with more important work. In some business areas we steer the consultants very strictly, we often give them a draft for the first claim and they do not get more information than absolutely necessary, this does however depend on the local IA & IP department.
- Sometimes we use different agencies for complementing patents, which requires control so that they do not infringe each other.
- Not interested in broad claims, rather to get the content that is relevant for us.
- Moving towards having fewer agencies and instead extend the cooperation and the information sharing with a few.
- Two types of external agencies, bulk supplier and niched specialists. The bulk suppliers are delivering work according to spec where price is the critical factor and the specialist gets to work with questions that the company can't answer themselves and where external knowledge is needed.
- FTO shall be handled internally; a consultant can't know the goals, so only distinct services are bought in. Internally we break down the questions in smaller sub questions that we can map at the overall solution and if there is vagueness in the sub questions we can take in consultants.
- Faster to make FTO internally, 80% of all hits can be filtered out when a person skilled in the area views them and you learn about the technique in the same time.
- Patent mapping and breaking down in assets is not a main area today.
- We use external agencies for drafting and the handling of patent applications.

Do you educate your employees in IP questions? Which is the lowest level versus the optimal level for a technician?

- The patent pitch is often considered interesting, but a lesson in novelty or patentability most people perceive as very boring.
- The in detail work is to be taught when the need occurs, while education should focus on processes and practical issues
- Basic knowledge is to know the ABC's of patenting: Non-obviousness, industrial application and what can be patented.

- Optimal level is an R&D department that themselves makes searches in patent databases. Searches teach the researcher a lot about the patented technology and are inspiring.
- R&D receives courses from the patent organization and they also learn by doing over time. Important education is the patent policy of our company and to get them to send many applications rather than fewer, in order to minimize the risk of missing the important ones.
- Yes, continuous education in basic patent knowledge, which is the lowest level.
- Not optimal if the technician knows everything, choose the level in advance, or else it cost too much in time and resources.
- The patent process is important, but not full education for the developers.
- Basic level is to know the three patentability requirements and to have a basic understanding for what they mean. Basic knowledge for a researcher is to be aware of that the inventive step can be fairly low and that everything should be reported.
- The optimal level is a gradually better understanding for the inventive step and to be able to help the patent expert with the argumentation in negotiations and with the patent offices.
- The cooperation between the researchers and the patent organization is continuous throughout the application phase and a good researcher is someone really good in this cooperation.
- Has run a two-day course in IPR for engineers, which includes basic knowledge about IPR as well as some strategic angles. Nowadays we run half-day sessions due to the complexity with booking two days in a row.
- Basic level is to know patent and understand that they give a monopoly and that the company can both block and be blocked. Inexistence of global patent and the awareness of that the patent claims sets the protections in the end is other important issues.
- Optimal level is to get developers that understand the IA-concept. They would in that case not describe the product for us; they would rather give us a list of which IA they can see around it.
- Intends to create a course called "IP management for management" for the business unit directors, up to the vice president level. This course would aim to open the eyes for the potentials and show that IP can create business and not only protect products. This does not have to be through licensing, to have the correct portfolio could also create business in different ways.
- Difficult to launch high-end products without a market for the basic technology. Therefore one business idea could be to publish the basic parts of the solution in order to create a functioning market and then only patent the edges that gives the company the competitive advantage in the high-end area.
- Extensive training is required, even though some individuals are more fit than others to be skilled in the area.
- Educations focusing on how to get an engineer to understand the difference between technical and commercial values.
- Yes, we educate our employees.

Do you work with competitor's patent information and in that case how? Who is utilizing the information? Is the collection done internally or with external help? Is patent information used as inspiration for own development?

- Competitors' patent information is useless if not the correct person utilizes it, this information needs to be given to the developers of new technologies.
- Patents in themselves create incentives and it is an extra spur to receive a paper with golden banners, more worth within the building than in a press release.
- Yes, information is collected about competitor's patents and disseminated internally. All collections are done internally. We send out everything internally that is published by our competitors and the thought is to use the material as a source of inspiration.
- Yes, but mostly only if there is something that is close to the market of our business
- The patent system is more of "bat" than a disseminator of information.
- The boat has left the dock, it is only lawyers and large companies that can penetrate and understand the patent market today.
- Own patent information could be used in order to identify gaps and potential developing areas.
- Competitors patent information is difficult to analyze, the statistics is often intended for marketing and the value of a patent is always set by its context.
- Easy to inspire and motivate the researcher through sending out information about how many patents the other groups internally have delivered.
- Derwent profiles, a standardized search profile that each week is delivered to the responsible persons. This system does however include a lot of noise and we are in the process of setting up an improved variant internally.
- The Thomson system with all included part for quick searches and landscape analysis. Espacenet has too many limitations and does not function for a systematic patent work. Important aspects are to have all information collected in one place, in the same format and to have more or less professional conversions of the patents.
- Utility models are not handled or ranked in the same way as patents. Most often we can easily find prior art and then we even ignore them. If no prior art is available we still pretty much ignore them, I do not believe anyone would attack a company with only a utility model; that would be too unpredictable. If it is used in that way it is as a part of a group of patents.
- Another department than the patent organization handles competitive intelligence.
- Initiated work with collecting external material for internal analysis.
- The challenge with the patent system is that a patent application is signaling that you are not allowed to do this until the technique is obsolete. This makes it difficult to use the patent information as a source of inspiration.
- Several of our constructors utilize external databases to obtain a holistic view of the area or of a competitor.

Do you use collaborations with other actors in your product development? Which risk do you see with these types of collaborations?

- Almost all actors utilize cooperation's, even though joint ventures might only be for the larger ones.
- Believes it is a lot of talk rather than an explosion about cooperation in development on a high technological level
- If a full investigation with background, foreground and side ground is done in relation to a negotiation, the counter part will leave before the papers even reaches the tables. The complexity is too high, most often it is simplified to that the actors keep their parts and agrees up on the parts developed together.

- Collaborations with suppliers but not horizontally. We try to own what is in our area of interest. Specific production processes the supplier can use for other customers, but we try to limit it off from pure competitors.
- The patent organization is involved in cleaning up contracts, not in writing them.
- The customers want to have more power and wish to be in a position where they can choose their suppliers, in order to press prices. This makes patent hold by suppliers an obstacle for them. The customer nowadays sees a competitive advantage with owning patents, which is a main shift in the industry. In the past the competitive advantage was to be first to market, not to own patents.

- We are rather independent as a company.
- Important to know from start when a non-disclosure is needed.
- Worked with customers that more or less took our ideas and patented them, impairs the trust and the climate for cooperation.
- We have become more proactive and less naive against customers, we patent what is in our area.

- Yes, cooperation's are increasing and especially when we are entering new unknown areas where we lack testing equipment for prototyping. With customers the cooperation is more about deciding upon which solutions we should have.
- A newly launched concept is the "resident engineer" that is fulltime at the customer sites. The concept has given win-win situation where the customers got great solutions and we a great business deal.

- Large opportunities with collaboration, but also risks with knowledge loss if not correctly handled. The development is performed in collaboration between the R&D departments, the IP organization is only supporting when needed.

- Very common with consultants or suppliers who design for us.

Do you utilize any specific tools or mindsets in order to ease the work around patents?

- The feature template is a good tool for visualizing, mapping and to get a starting point for discussions. To provide a numeric value might be debatable but it gives a hint compared to no number at all.
- Need for good patent databases and communication tools.

- Espacenet works better than expected, payment services are expensive and the question is if the cool stuff they can do offers much better results.
- Commercial database and the possibility to search on the patent offices official webpages.
- System for invention disclosures and granted patents that are available for the patent organization.
- Information about our and others published patents are sent out to everyone.
- Active networking in the organization rather than utilization of IT-systems.
- Dependent of the informal network and that the patent engineers trust the work of the patent departments.
- Tools available at the patent agencies for handling of documents, these tools differ between the agencies.
- We have an own system where our existing and pending patents are mapped up.
- Some kind of data system is necessary when the company has passed a point where a card index is no longer feasible. We are collecting ideas, patent applications and patents in a database that the patent organization can access.
- In the cooperation between the patent people and the development, the spoken word is the most important tool.
- Communicate the mindset of seeing patents as a currency within the organization; it is easier to deliver when you understand the purpose.
- Claim charts is the product of the patent organization and somehow the receipt of the value of the patent. It is a tool used to visualize that anyone that uses the standards will infringe the patent.
- I am skeptical to automatized visualization/analysis tools, they look great but they rarely show what they were intended to do.
- IA is way to approach the issue, but there are many different tools that do different things. Our analysis tools are processes that will never be dominant in the product development but that notch in to our other processes where they are applicable and needed.
- Manual analysis of patent is today required, no automatic tools can perform the job independently.
- The method for performing FTO searches is crucial, an important area where we need to get a better holistic picture and we have rebuilt our processes to go from 99 to 99,5% security
- Patbase

How would you personally believe that companies today should act in an optimal way in order to create freedom of action from both a business and legal perspective?

- Personally I believe it needs to be both a proactive and a reactive work. The proactive is about knowing the necessary input and on which level the FTO search is desired on, as well as report systems and communication tools. Reactive work requires check lists and perhaps process maps and proposals on possible solutions.
- FTO is primarily the awareness of the value chain and to find the balance for how much the patent risk should be allowed to steer the business, e.g. is it worth to leave a supplier for an IP

risk?

- Patenting is better than opposition; opposition gives only freedom from one patent while patents can be a part of a strategy for an area you want to dominate.
- The patent organization should go into the project and make sure the patent really protects the area.
- The strategy should be created with the product responsible person and the patent department is only a service organization that realizes the strategy.
- Two overall goals, freedom to use and to own what we develop. This gives us ROI if anyone else uses the solution.

- Extremely important to implement the work far down in the organization. A department that does not work with the technology on a daily basis does not make a good job with IP.
- Important to know the basic patent knowledge and how important the work is.
- Get patent to be a natural part of the work.
- The board should take decisions about innovations and patents, or at least a decision about the framework so other can follow the guideline.
- “It’s most important to have an innovative culture rather than innovation or patent departments. It’s most important that this exists in the management and in the organization. It has to be a part of daily activities, it is a slowly-progressing work”

- Compare with a teenager that does not want to do their homework, the argument that knowledge and higher grades leads to the possibility for themselves to control their future is usually raising the motivation. Same goes for a company, you need to know what you are doing and how to manage the resources in order to earn money and to keep the control.

- I have not decided upon what I believe is the best way, right now we intend to strengthen the role of the IP coordinator in order to let them become a bit more strategic than today, instead of only coordinating. This would allow us to work more with the high-profile cases, such as mergers or acquisitions, where it is important to really know what you are doing.
- Choose the units that are relevant and that are most exposed, otherwise it takes too long time.
- Costly FTO searches are not always necessary, it is more important to be part of the control/project groups with the sponsors and to get the information about what is actually needed.
- Education is very important as well as that the knowledge taught is actually used in the gates, or else it is forgotten within 6 months.

- The task starts in the internal work with FTO, but then it is important to communicate that the company is willing to take licenses and to accept to pay the royalties if that happens. C&D letters and court cases might be prevented through a clear communications about these questions.
- Insecurity can lead to a halt in potential licensing questions, even though the IP and business department are positive to licenses. Individuals working with the question once a year might perceive licensing as dangerous and the best would be if these people were not involved in the decisions.
- Crucial to realize own limitation, if Sahlgrenska ask me to perform brain surgery I realize that I lack competence for this task, which unfortunately is not the case with IP issues. Insecurity very often leads to a “no”, independently of the context. The question is if it is increasing the

competence or improving insight about the required competence that is needed.

- I believe companies should be open for licensing, both for increasing income and in order to reduce patent disputes.
- Niche companies should have a patent watch for their competitors.

When do you consider that it's worth to apply for patents and how should the process be designed? Who should manage the issue and who should be responsible for the different parts? How would you personally think about the decision process?

- All new products with a commercial basis shall be protected.
- Project form where expert functions for e.g. patent, environmental issues and law are engaged in order to create a knowledge basis for the project. No one has the full competence today as an individual.
- Different perspectives are communicated from the customers, some of them approves that we have patents, but they do not want to pay to get access to our underlying patents. They also want to have access in order to be able to produce the same product at a competitor, but most of them at least understands that licenses is required for that.
- The patent responsible person should make sure to get the correct information and see to the risks.
- Product owners shall lead the work and apply early.
- Who actually executes the administrative work is not interesting.
- In a very small company it should be the inventor, when the company grows it might be delegated to someone else.
- An invention that is patentable and that someone else would like to use should always be patented, independent of the company size

Do you see a connection between actively working to create freedom of action and an organizational structure and way to work?

- The link is to have clear input, clear output and clear processes regarding the activities in between. In reality that means that a dangerous patent can't only be sent out, it needs to be clearly communicated to the people with rights to handle what can be done about it.
- Within a project, the responsibility rests with the project management.
- Reactive questions ends up higher up in the organization, the patent coordinators role is to bring the question to the agenda and to collect decision material.
-
- Well functioning network, formal and informal, where people trust each other. The patent department is formally only in its own network, but participates informally in most projects.
- Make sure to go through with the business without too many risks.
- We have experience about how close we can go the other actors and how offensive they are, however if they change employees this might also change.
- Important to have a clear idea and vision from the start about the business idea and patent.
- Strategic decisions about how many patents or essential patents that should be taken and form the organization based on that. Many patents require perhaps an own department, while an

organization handling a core of essential patent might be designed differently.

- It is a question of scale, in a smaller company it should be in the consciousness of everyone while in a larger it could be shared by a few since you then divide the responsibility in the company
- Patent intelligence is a component that should be performed early in the process and the progress of the identified patent application should be monitored. The latest technology is in the form of a patent application and since large changes can be made until the granting of the patent, a potentially dangerous application can become non-problematic over night.
- Licensing is only one piece of the puzzle and how important it is dependent on the industry. Patenting is a one-man show, while the society is built more on interaction and where knowledge is floating over the borders. Licenses are a legal construction for how to control the utilization and the distribution.
- IP needs to start and end in the business.
 1. Strategic planning
 2. R&D & creating rights
 3. Extract value

Other discussion areas

- Important not to exaggerate the risks, rather look at the possibilities and the constructive parts of the patent work.
- More and more open innovation. Our customers are driving this development and they seem to intend to own the platform and to get the suppliers to develop it. The platform gives an opportunity to build on each others solutions
- The development is conducted on a global level, intends to create standardized solutions so several actors can use it, which gives us a better pay-off from the product.
- Production is partly owned by us, e.g. assembly and key components.
- Most important is to know what you are going to use the patent for, a patent is not protecting a product; it is blocking others from doing the same thing as you.
- Hypes come and go faster and I believe most actors in the industry are aware of the importance of IP today. Requires cooperation higher up, a single individual does not have the complete knowledge to take a substantiated business decision today, but the competence is available within the organization.
- There might be a lack of awareness about the required knowledge at smaller less mature companies and the risk is that the IP rights are lost. It is important to realize when expert competence is necessary, either it is internal or purchased.

Patent agencies

Have you seen a general development of the patent climate?

- Yes, mostly it is more in focus, which also we are partially driving. More focus on filing in EPO and PCT, not everyone is even interested in Sweden since its such a small market.
- The crisis and the financial situation of the companies have increased the awareness and more companies are creating strategies for a more careful judgment on how and what to patent.
- Licensing is not common among our clients, even though it happens.
- My personal opinion is that not many work with licensing as an income. In some intensive industries it is necessary, but I have no experience from it.
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- Some large companies have increased their licensing the last 10 years, but difficult to answer for a whole industry
- Automotive is an area where I believe a lot should happen in the next years due to the introduction of new technology areas. The logic from ICT and telecom does then need to be applied.
- Licensing is not common among our clients, some smaller ones use licensing as an income and I believe this will grow in the future.
-
- Yes, there has been a shift of how patents are perceived; I believe there is a more commercial perspective today.
- Licensing is not common among our clients and the same goes for cross licenses, only used by some certain companies.
-
- The knowledge in general has increased for both customers and the industry. Both ways, people working with IP have gotten an increased knowledge, while companies in general have a constantly low level when it comes to acquisition and valuation from an economical perspective.

Have you noticed any changes in the way your clients work with patents? Is there any specific event/case that has affected this development that you can tell us about?

- Applies for EPO patent and then validating the countries included.
- The tendency to apply for protection is following the economic situation, which might be a consequence of cancelled projects internally.
- The agenda is heading in the direction of more strategic focus on how to utilize patents as efficiently as possible.
-
- Willingness in the industry to become more strategic and to understand the patent tool. The feeling is that a lot can be done, but no one is really doing it due to a lack of organizational capacity.
- Patent agencies try to offer strategic help with these questions but large companies rarely take them seriously. They are seen as a consultancy firm for patents and there is a large barrier for them to get to the strategic projects.
- The usage of patents in a dynamical way is a large change. Today patents are used in cooperation's and in order to earn money. More interactions with universities and patents are used in European collaborations and for open innovation platforms.

- My hypothesis is that an increased awareness and the available IT and technology of today enables these kinds of platforms and developments across borders.
- Depends on the history, if a company has been advanced for a longer time it has probably not changed very much, but historically less advanced companies has tended to go in this direction.
- A global crisis and tough financial times makes everyone more aware of costs, which cause an increased focus on ROI. The increased media attention has probably also changed the way patents are discussed.
- More advanced industries does not necessarily mean ICT and telecom, the most advanced area the last 20-30 years is pharmaceutical products. Some areas are more suited for patent, for example is relatively easy to define the coverage in material technology.
- The knowledge and the awareness have increased, which causes more focus on risks and possibilities. The perspective is more expanded than only protecting own technologies, a more open and changed perspective on IP, infringements, licenses possibilities and how to use IP.

Shortly, which are the most prioritized risks that your clients are communicating? Which factors make these prioritized?

- The clients mainly wants to protect their ideas and get a monopoly, secondly they want to attract investors.
- Rather a lot of clients come to us since they have identified a risk or seen a risk with someone else's rights. We are often helping clients with attacking other IP through challenging validity or invalidation.
- Often clear that the client has seen a risk of infringing, the search is thus performed to map other companies rights to see what they themselves can do, rather than to find areas that are not very patented.
- For small companies a technical failure is often the most prioritized risk. IP is very important but few actors communicate that they know how to utilize it.
- There are cases where the claims are completely separated from what the commercialized offer is. This lack of knowledge is a risk for the companies.
- A common risk is the awareness of the complexity of the products. The development goes so fast that you feel you do not have a holistic picture, which causes an increased feeling of uncertainty and control over how it affects your business.
- The ownership question is an issue that is relevant for almost all projects, especially for smaller companies. Have had cases where it turned out that almost all rights were owned by another company and not the small firm itself.
- The usage of consultants increases the difficulty with controlling the ownership of new solutions.
- The largest risk for anyone that has patents is of course that another actor copies the product. My theory is that the value of IP is higher when production resources and possibilities for plagiarism increases. For example a medicine is fairly easy to synthesize and produce, which make the IP very valuable. A car or a machine is much more difficult to copy, which decreases the value of the IP. If this risk in the past was only for larger companies producing consumer

goods it is today valid also for smaller companies making more complex components, due to the possibility to purchase advanced production resources.

- The development in Asia is dependent on the development of the production technology.
- Companies with a structure for IP questions come to us in the phase of the final analysis. The clients have themselves found the relevant documents and are interested in an opinion of their relevance.
- Companies with a less structured IP more often stumble over risks, and there we offer tools that enable them to do it better. We do not know their industry and the competitors as well as the client, we let them find the material and perform the first filtering, then we can give them an opinion

Have these risks changed over time?

- The ownership issue has not increased, but the awareness for the issue has. To be aware of the issue is transforming it from an issue to an internal weapon.
- These risks have developed in the last ten years.
- Infringements are the largest risk and will remain to be.
- Not the area we work most intensively with, protection of client's technologies is the main task.

How do you believe the patent work should be handled in order to minimize the companies overall risks?

- Capture the complexity, the patent information is an available tool to understand and collect information about the environment. Patents as an information source that is included in the strategic work.
- The methodology around IA, where patent is seen as a part, would be an optimal situation for me. The patent department would then not only handle the patent questions, they would rather be a part of the IA function that should permeate the whole organization and also be responsible for patenting. It is however unclear exactly how this should be organized.
- Patent information and the capacity to review the dynamical parts as what to use the patent portfolio for, e.g. licensing, blocking and HR-incentives systems.
- Many companies have the skill to discover infringers and clearing the functions of new products, but few has an organizational structure to handle a request for licensing.
- The protection against plagiarism is intellectual property rights. No one aims to take less high-quality patents, perhaps you could start further back with the purpose of developing something that should be protected and to turn the development in that direction, this is however difficult for advanced products and it is not sure if you can find a patentable solution this way.
- The possibility to invent around is dependent on the industry, e.g. a medical substance is impossible to go around while most mechanical patents easily could be twisted. If there is a standard involved you cannot invent around, then you would not use the standard anymore by definition.

- To value a patent has should take into account both the difficulty to invent around and how other persons would like to utilize the solution.
- 1. Monitor what competition is doing. 2. Create tools e.g. tradable objects that can be used in order to “buy” the company out of a situation in a way that is financially favorable for the client. I.e. investing in own IP is clearly cheaper than to pay royalties, thus to protect your own technology in order to create those possibilities.

Please tell us your definition about FTO.

- Defined investigation of a certain market and its existing IP, simply put to see if there is a risk of infringing. The range of an FTO differs a lot.
- FTO is a remarkable concept in the perspective that you can never know if you have it. FTO gives a hypothesis related to if someone can sue you and make money, but you can never know for sure. This is the pure judicial arena; perhaps you can widen the concept to the business side and realize that both of us lose money if we sue each other so we shouldn't do it.
- The interesting aspect comes when the concept is wider than to make a FTO investigation via a patent agency, the interesting aspect is when you purchase patents and licenses in order to create freedom.
- Know of cases where a large company ran into the portfolio of a small company, which caused that the larger company considered acquiring the smaller actor
- To avoid making an infringement, it is a legal analysis of the current situation. An FTO can not be done on an unlimited material, the material needs to be well defined and the question is to see if any of the desired actions are covered from a legal perspective.
- FTO is something you want to have for yourself and not something only done in order to show a manager. The same thing can be investigated for 10 years before a Japanese patent from the fifties shows up and discusses the same thing. A product development process that is focused on a small detailed is needed if you should be able to afford doing this on a continuous basis.
- Broad term, the proper definition is that FTO is a complete verification of the freedom of use. This can be done on each product, but it is very costly to secure that no non-functional parts, e.g. an alloy that is protected, is used.
- The common method is to accept a certain degree of uncertainty, where risk is minimized but not ruled out, but is performed to a reasonable cost.
- Up to 95% security is possible to reach to a reasonable cost, the last 5% is however very expensive. 90-95% is the common meaning of FTO in the industry and that is ok as long as all parties are aware of it.
- The difficulty to reach 95% has gone down a little due to better-organized databases and translation possibilities, which is contrary to the fact that there are more and more applications handed in.

Is FTO considered to be a prioritized question for your clients?

- Yes and no, but I do not think FTO is a prioritized question in general. The questions is dependent on the industry, e.g. telecom and automotive.

- Some industries will probably be better off without reaching an advanced IP level dependent on the nature of the technology.
- Compare Pharmacy and Telecom, you cannot invent around a molecule, while in telecom the technology builds on each other and you can probably go around a patent.
- Very uncommon, due to the complexity, that customer asks for a full FTO investigation. The most common limitation is to instead choose a specific competitor since the active actors at the market most often is well known.
- More of a legal risk in a competitive situation than a universal legal risk; if a competitor has a patent they will probably fight us, but a non-competitor could probably be ignored since would probably not sue us anyway.

Have your clients communicated that FTO has been the crucial factor for their way to act?

- FTO affect they way you act, the most common way is not to ignore the fact if a competitive patent is discovered, it is rather to be risk-aware and keep on eye on the competitor and estimate the potential resources the other part has
- It is very uncommon that a product development process is dropped due to a negative FTO investigation. The actions are usually reactive and awaits the other parties action, licensing has occurred in these situation but if that is not a possibility it would anyhow take years until the case is decided upon in court and you would have to seize the production. In Europe you have nothing to lose since you will have to pay the same sum reactively as if you would have been proactive, in contrary to the USA.
- The later a negative FTO is discovered in the development process, the more you have to lose.
- Yes, it has certainly happened that clients communicate FTO as the deciding factor.

Please tell us shortly how you see the market development around patents. Has the climate changed? Are there similarities/differences between the industries?

- There are large differences between the industries.
- Generally the large companies are driving the developments since they have larger recourses, the small companies does not have the same resources available in making investigations and collecting information, which causes less possibility to take informed decisions.
- One difference is the growth on non-practicing entities, as well as patent pools. For example Google aims to collect patents that can be used as defense if a company is sued. The market for purchasing and selling patent with the aim to protect yourself has started to increase.
- Large actors with small portfolios in telecom often purchase patens on a case-by-case basis; this is a situation that perhaps also automotive industry will have to handle in the future.
- In some areas the technology development rate is so quick that patents are increasingly irrelevant.
- The cost awareness has increased, but that might be due to the financial crisis.

- The entrepreneurial world has a large focus on IP, sometimes unnecessarily large, and changes there get a lot of attention. In larger companies I do not believe it has occurred any larger developments around IP.
- We have seen that products gets more complex and that several technological fields are mixed in the product, e.g. in medtech where areas as chemistry, electronics, control systems, IT and mechanical technologies are included.
- Companies that are non-competitive are not very threatening; it is very difficult to sue a company that produces something that happened to be covered by a claim in a completely different industry, e.g. a company that produces pacemakers that are using a patented solution for circuits that originally was intended for a server. This is very difficult and I do not believe any company would try it; therefore it is only other pacemakers companies that are dangerous.
- I do not believe you will enter other patent landscaped in a larger extent. If you need complex components from another area you most often purchase them from the original developer, which exhausts the patent rights.
- If the company is not extremely focused on earning money on their IP I do not believe there is any large difference behind smaller and larger companies way to work. It depends on the amount of developers; if you have 100 developers you generate enough patentable ideas for having an internal process for how to write and report invention disclosures. If you have 10-30 developers you will not get continuity in the process. I would say the limit for when to start an internal structure with a coordinator is when you reach around 100 millions SEK in turnover. In this case I have seen many companies go from zero, to both one and two coordinators.
- I have not noticed any difference in the pace of patenting.
- For patent agencies I believe it has gotten tougher due to the fact that the competition has increased and you need to find better sales arguments than that 'we write the best patent applications'. The clients have increased knowledge about industry standards for fees, which they did not have 15 years ago.
- The climate between the customers is following the business cycles, when the economy is flourishing no one cares very much about what the competitors are doing, you more or less protect your own technology. In recessions the market share gets important and perhaps a tougher attitude against infringement is applied.
- More and more applications are handed in to the patent offices. The statistic from PRV is however not a good source, Sweden is not an important market and many patent reaches us through other channels.
- Globalization is a new risk; you can easier reach new markets with your product.
- More interaction between competitors and with actors in the value chain. Personally I can say that I have been more involved in these questions, but I can't say if there is a common trend.
- I do not believe that actors have full control over risks with the new interactions; it is probably good that they use help even though the knowledge has increased about the importance of contacting competitors and to secure whatever it could be about. The awareness of that they need help with the analysis work is there, but they cannot themselves perform it.

Which factor do you consider as the crucial factors that have affected the development?

- Non-practicing entities has affected the development, as well as the pace of the product development.

Can you see a change in the behavior about how actors act at the market?

- Litigation gets more common and the patent portfolios are increasing. Technologies are building on each other more and more, which causes more patents. I think one main reason is that people have discovered the possibility to earn money in this area.
- I tend to think there are more R&D collaborations and platform where companies cooperate and share risk. I believe the prerequisite, the technology, the competence and the contracts are there, but I cannot highlight any research performed in the area.
- It is common in cooperation's that the buyer has an idea that the consultant or the developing partner shall guarantee that their products does not infringe any other rights. Most consultants find this very uncomfortable and it is difficult to work in that kind of context. Most buyers do not know why they require this; they more or less make this up without knowing how it should work in reality. Most larger suppliers do not accept these clauses in general.
- In America the new laws states that you are only allowed to sue one part of the value chain.
- Important to decide upon potential patentable results in advance, most common is that the parties keep their own inventions. To share rights is very difficult since the rules for joint ownership is very tricky and poorly described legally.
- More actors in the value chain want to own IP today, especially applicable for actors early on in the value chain.
- Important to keep the rights in the places where you have distributors. It has happened to our clients that the distributor licensed the trademark and when the owners wanted, could not change distributor without changing their trademark.

Do you in general consider patent work to be an offensive or defensive tool? Why does your clients apply for patents and are they working with portfolios or individual patents?

- For small companies it is financially important to get an IPR in order to secure investments, e.g. The Dragons den, as well as preventing large companies from stealing their ideas.
- The large companies does not look for financial support, they are interested in being one step ahead of their competitors and to protect themselves. They are able to put several patents around a core, so no one can even get close to the central invention
- Always compare the value of a patent against the cost.
- Many companies prefer pending patents since the product development is performed in parallel and you never know where you will end up. The base for all patent applications is to communicate that you are on your way to protect the idea.
- The purpose is to protect oneself, which is not always synced with the creation of applications. An invention disclosure is sent to the patent organization, but they have no clue why the patent is important and how it should be used. The claims are written on a component/system level and very few companies are advanced in this area.
- Differs, but the most common method is to take individual patents. It is also very common with centralized departments that lack a holistic view of the portfolio, not unusual that departments search in commercial databases to find their own patents.

- Defensive, protection is most actors' main purpose. The desire is to patent competitor's potential products in order to prevent them from utilizing it.
- A patent is always covering a technology area and never a product. The goal is to cover the area of the technology included in the competitors products, never your own. It is mostly a question of wording.
- More "bomb carpets" than technical portfolios, you aim wide rather than having a fundamental idea about where to go. I believe the companies' work with portfolios, but rather on a product level than on a technology level.
- I believe most actors generally try to include as much as possible in the applications. This however causes large cost since not all content can be used. Either you create a protection for the area you believe you will be able to do under the coming 20 years, or you patent everything and the utilization becomes rather small.
- The nature of the property right is that it is a defensive tool, you can prevent others but you do not yourself have a right to produce the protected function. The right can however be used in an offensive way, but on a scale it would be a more defensive side.
- The purpose is in general to get a monopoly, to have this sole right and to be able to increase your number of choices, even if it depends somewhat of the size of the company.
- Not everyone wants to produce themselves; a number of companies that are pure IP-companies exist that have rights that they license out, which can be just as smart.
- Generally companies work from a product perspective, requires pretty large companies in order to work from a portfolio perspective.

Do you consider your clients to be so informed and aware of the patent landscape and its development that they can take informed decisions for FTO questions?

- Probably aware of the risk, but on a product level. The clients' does often have a high knowledge about which products/functions that is at the market, but they are not informed about all the applications that did not turn out in a granted patent. These is no issue for the FTO, but is ruins the novelty.
- No, but I believe the issue is not lack of knowledge about the patent landscape; it is even more the awareness of the value chain and identity of the actors in the market. Patent intelligence cannot only be used to collect patent information; it can also be used to take better-informed business decision.
- No, but the purpose for our service is to help them with taking these kind of decision. The required strategic background knowledge is available, it is not advanced legal matters, and it is a question about having a vision about what to do and in which markets. We try to not discuss the judicial or the administrative arenas that is our work.
- We want the client to express the goals for what they want to achieve, we have difficulties in doing anything good at the other arenas if we do not know the goal.
- No, I very often find that the clients are working in their own little sphere and I believe the analysis is based on their own thoughts and interpretations. It is a good way to let someone else takes a look that is not as subjective. We aim to deliver concrete proposals and in the best case also a solution that is what I would have wanted as a client rather than to know there is 50% security in an investigation.

Which is the most common profile for a typical client for you?

- Everything, we work with all types of clients.
- In general we meet the inventor and, if available, the IP department of the company. The inventor needs to describe the invention so we can write good applications and the IP department takes care of all other questions.
- More senior consultants work more strategically for the clients, but generally we do not work with integrated strategy.
- Many clients come with a more or less finished solution, rather than a product at an idea stage.
- All types, small and large companies as well as universities and start-ups.
- There is no typical client; our goal is to be an outsourced patent organization.
- A typical client for us is a middle-sized company without an internal IP department.
- Initially it is often pure patent work, to protect the ideas. We try to raise the competence of our clients so they are aware of the risks and possibilities with the patent system and to try to start work with additional parts within IP.

Which client department do you most often work with?

- Generally we meet the inventor and, if available, the IP departments. The inventor is needed in order to describe the inventions so we can write good applications, the IP department takes care of all other questions and decisions.
- In general we do not work with strategy for our clients or help them with the planning of the process, this is especially uncommon for middle-sized companies.
- Many small clients come with more or less finished solutions. The invention does not need to be finished, ideas and concepts are just as good, however, a discussion about the advancement of the project might be important so that the application stays relevant throughout the process.
- In large companies it is most often the R&D manager or the CTO.
- Dependent on the size of the company, it is expensive enough to be on the agenda of the board, but larger organization has realized not all questions can be handled so high up and instead delegated it to another part of the organization. Business and technology is often closely linked and often handled by a technically experienced persons.
- Three touch points: the responsible person for the business, the technician and the lawyer. The last one is uncommon and but can happen when a company is in the developing phase of creating an internal law department or with a large company, that only occasionally applies for patents and therefore lack a structure, e.g. a building firm.
- The responsible person for development on an operative level. The board and the CEO is often initiating and following the work

Which is the optimal organizational structure according to you, in order to get an as efficient patent work and cooperation with your firm?

- The optimal process is a continuous cycle where several meetings is taking place during the project. Perhaps there is a system where we get invention disclosures and where we can recommend novelty searches and perform these early on. Then we can come back at a later stage in order to write the patent application.
- Important to get a good connection with both the decision-making person at the IP-department, as well as the technician and someone well informed about the market climate. We can impossibly know the best business strategy for each individual market.
- We need to get the necessary information about goals and purposes in order to create as good a protection as possible, also the history of the product might be highly relevant.
- A narrow patent is usually easier and quicker to get granted, a broad patent often requires a tougher process.

- When we work as development partner we have the goal to teach them about the intellectual assets in their company and the organization. We install tools for them to use and the optimal situation for us would be clients that uses the tools to create basic data and then we can come in and give an expert opinion based on that data.
- Another model I believe in is when we work as consultants and map assets and perform strategic work within a certain amount of areas. Here I would optimally see that we had a communication where they contacted us for high-priority cases.
- We meet the correct persons and work pretty much from a technology-push perspective, we investigate what they have and base our work on that.

- The optimal structure is when we can be at the customer site as often as possible and where we are able to follow the development process from an early stage. This is the setup where I think we can make the most cost-efficient work and make the timing for patent application the best. We prefer to be contacted already at an idea stage
- The critical issue with the world of IP is that the system is created in order to disseminate knowledge, but no one uses it that way. We have an idea regarding that companies could ask us for a technical function and we can propose how to do it, e.g. an ergonomically chair.
- A patent coordinator often performs the early work and we are contacted at a later stage. However, in an optimal setup we would like to do also these parts. We work close with the clients; the average cooperation is 10 years. We try to increase the awareness and knowledge of our clients over time.

- In general it is good to get the structure of the client communicated, so that we know who is responsible and how to contact in regards to different issues.
- People with a high competence that really know what they do are always desired. Some form of internal centralization that is not delaying or slowing the development is good. A good mix between internal coordination without bottlenecks and some sort of internal IP-network with competence with understanding and packaging IP-issues, where the questions are discussed in-house first, could be good.
- IP engineers are hard to find and costly to hire.

How does your clients in general handle the infringements questions? Is it usually continuous or sporadically? How is infringement on your own patents discovered?

- Both ways, some clients come with specific cases where they have run into a patent or a product that need to be investigated, while others have a continuous process for these questions. For example it can be relevant to follow a specific IPC class. We offer a service for these kind of continuous work where we send over documents we deem relevant each quarter.
- I do not believe anyone would make a conscious infringement. The work is often located in the stage-gates, but the ones that should know the landscape are the researchers, not the patent organization. The researcher makes searches, reads and discusses the technology and knows it best. For patenting a deeper investigation than in the continuous work might be needed.
- Sporadically in order to save money. FTO should not always be performed, needs to be balanced against available resources.
- Own infringements are often ignored until the counterpart contacts you, you do not delve yourself. The client most often discovers infringements themselves, they know pretty well through exhibitions and other sources what the competition is doing.
- We often rewrite patents and make them more explanatory and simplified. This is a way to show the employees what is actually protected in order to increase the amount of persons that can discover infringements. Often people have overconfidence in patents and are not aware that the idea they believe is patented is very different to the actual patent claims.
- Proactively many clients use surveillance services to track the competition, but that is more focused on opposition cases than on infringements. Some companies are using opposition very often, while others do not use it at all. Perhaps around 5% of all patents are challenged, and these are located in less intensive industries where it is still possible to have a holistic picture.

Is it common that you are involved in the education of clients' employees?

- Yes, we sometimes have education for our clients. Generally it's purely the basics about patents that's good if everybody knows about. How does the patent system work, why does different thing happens and how does the property rights work.
- The knowledge of the inventor varies, the experience and the quality of the deliveries are often based on the number of cases they have been part of in the past.
- Yes, we educate in mapping of technologies and our own framework for creating base documents.
- The basic level is to apply for patents and to be familiar with patent databases; the second level is the IA mindset.
- Easy to only see the end-result of R&D and miss all parts that have been developed in the meantime.
- Yes we educate mainly about increasing the awareness for IP questions. There are two aspects, what can be patented from a technical perspective and how is it done. The last part is too complicated to teach this way, so the focus is rather to get a mindset around the thinking of

technical solutions. More advanced models, as the razor blade model, is really difficult to sell in to people, these models have huge investments cost.

- The clients we have that is extremely IP focused does often have a business model that is based on that the company shall be acquired. They plan and build for having an IP structure that match the potential acquiring company in order to become more attractive.
- Yes, we educate our clients. Most often it is in the basic knowledge of patents so that they can handle their innovations identify potential patentable technologies and so on. This is basic knowledge, if not we do not speak the same language and my advice does not make sense to the client.
- Optimal the technician should be aware of the system and know how priority questions work and how the international application process is from A to Z. I.e. How to get from an idea to a granted patent in several countries. Some basic understanding in how to judge what is an invention or not is also desired.

In which way do you believe the patent organization can support the work with FTO?

- A patent coordinator that coordinates the questions, adds it to the agenda, discusses the issues and listen to the opinions of the inventor, since they often know the competition the best, would be good.
- The client does often have a thought behind the applications, this thought is however often not communicated, which causes that the protection is focused wrongly.
- Most of all, some kind of structure, a responsible person and a strategy for what a patent should be used for, e.g. licensing or other markets, could help many of our clients. Patents should be in the back of the minds of each technician.
- The patent organization has a responsibility, which is problematic since the organization is often considered to be administrative. They should educate and inform the researcher.
- It is about looking forward, you need to push solutions that are in your plan of development. Some activities where the participants imagine where they want to be in ten years could be useful for most companies. Questions as; what is limiting the product today and why does it look this way? If this issue were not present, how would it be then? Perhaps you can then reach the goal already today or see where you need to go in the near future.
- A lot to win with working more strategically with IP since the chance of getting away with a few fundamental patents increases.
- More advanced companies have a patent board that discusses the issues, but they are probably rather sophisticated and have their own patent organization.
- To have a basic level where the people understand the risks that can arise as well as having tools in the organization that can be used to probe the landscape and to identify and make a first judgment regarding a risk. To be able to make this first judgment of risk before the projects comes to far, a system that should send out an alarm already when the 'crazy idea" is discussed.
- When to apply is dependent on the technology and the specific project. Some kind of risk analysis should be done in combination with the judgment of the patentability.

Which tools do you believe would help your clients with infringement questions?

- Patents should be used for inspiration. Imagine all applications in the world that did not lead to a granted patent, there are tons of information available that could be used for learning in, for example, less developed countries.
- Difficult to get the information, perhaps the patent applications are too complicated or the knowledge about them is missing. I believe a lot of inspiration can be found in making own novelty searches.
- Larger companies have often access to patent databases.
- Espacenet has become better over time.

- In addition to all databases is Ipendo, which is software in order to handle patent data.
- I believe there is a need to understand all the arenas, to really understand the business area about how to build up and control the risk exposition contra the possibilities to defend yourself.

- Tools regarding the questions of when, where and how are good if there are enough ideas in order to have an evaluation process.
- The first fundamental aspect is to understand what is protected, if not the patent easily ends up in the drawers. Does not matter if it is a binder or software, many companies trust the databases provided by the governments.
- Sometimes we have created charts in A1 that visualizes the patent coverage and placed in the coffee room.
- Most companies have incitement structures, which can drive the innovation for new ideas forward. The structures are helping to overcome that it is pretty boring to fill in the forms.

- Difficulty in that when we perform an FTO for our clients we make the first selection of the relevant material, which means that client never get the full picture. We cannot know the customer's plans and discussions, only the information that is communicated. This can cause that material we find irrelevant might not be irrelevant for the client. We have developed software that enables the clients to make the first selection themselves.
- Pat base s a good database, my feeling is that the Thomson products is not as good in visualizing patent families as PatBase, everything else is very similar.

How do you believe that companies in general should optimally behave in order to create FTO?

- The companies do in general not utilize the fact that they have a patent, they are not very offensive.

- Hire more ICMers... It can be as easy as to start thinking in form of a concept. This has historically been a success factor. Think function and result rather than product.

Other discussion areas

- I believe incitement structures are important. According to law the inventor should get a reasonable compensation, which is important since I believe many companies would probably otherwise ignore this fact.
- Difficult to get people to start thinking in this way, time consuming work to change a mindset.
- The communication value of a patent is often important.
- Patent can be compared with a burglar-alarm in a house; it creates an uncertainty for the counterpart. This is the reason to why some actors consciously write tricky patents.
- You want to block others, you want to tie knowledge to your company, you want to increase the transaction value and you want to market yourself with a specific technology.
- In Sweden we have 5 court cases per year and 60 000 granted patents. 10 times as many disputes and we might write 20 C&D letters per year. We are about 4% of the industry.