Eidgenössisches Institut für Geistiges Eigentum
Institut Fédéral de la Propriété Intellectuelle
Istituto Federale della Proprietà Intellettuale
Swiss Federal Institute of Intellectual Property

SME-IP · 3rd Report

Case Studies on SMEs and Intellectual Property in Switzerland

Publication/Publikation No 6 (07.09)

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Editor

Swiss Federal Institute of Intellectual Property
Stauffacherstrasse 65/59g
CH-3003 Bern

Authors

Sascha Friesike (project lead HSG)
Nadia Jamali (project lead ETHZ)
Martin Bader (HSG)
Nicole Ziegler (HSG)
Nikki Hafezi (ETHZ)
Niccolò Iorno (ETHZ)
Eric Schreiner (ETHZ)

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http://www.ige.ch

Editor and Publisher
Swiss Federal Institute of Intellectual Property
Stauffacherstrasse 65/59g
CH-3003 Bern

Authors
Sascha Friesike (project lead HSG)
Dr. Martin Bader (HSG)
Nicole Ziegler (HSG)
Institute of Technology Management
University of St.Gallen (HSG)
CH-9000 St.Gallen

Dr. Nadia Jamali (project lead ETHZ)
Nikki Hafezi (ETHZ)
Niccolò Iorno (ETHZ)
Eric Schreiner (ETHZ)
Department of Management, Technology, and Economics
Chair of Technology and Innovation Management
Swiss Federal Institute of Technology Zurich (ETHZ)
CH-8032 Zurich

Steering Committee
Prof. Dr. Roman Boutellier (ETHZ)
Prof. Dr. Oliver Gassmann (HSG)

Printed Copies & Download
Swiss Federal Institute of Intellectual Property, Bern
kmu@ipi.ch
http://www.ige.ch (under “Institute/Projects and cooperation/SME-IP”)

Foreword

How does a company optimize the protection and use of its intellectual property? The answer to this question is particularly difficult for small and medium-sized enterprises (SMEs), as long as they are not sufficiently familiar with the intellectual property protection system. In order to remedy this situation, to foster knowledge, and to motivate SMEs to deal with intellectual property in a confident manner, the Swiss Federal Institute of Intellectual Property started the project SME-IP in March 2007.

The publication presented here gives the results of the third study carried out within the framework of this project. The observation that only little is known about the concrete use of intellectual property by Swiss SMEs served as starting point for the analysis. Consequently, the study set itself the target of encountering this information deficit by a systematic analysis of concrete cases in which it was examined whether and how the companies concerned use formal and informal protection methods for their intellectual property.

The study additionally identifies ways of further improving the Swiss intellectual property protection system to optimally respond to the needs of the SMEs. Recommendations were made on how to better sensitize companies to the various aspects of intellectual property and how they can increase the value added by the conscious use of their intellectual property. Finally, statements were made as to how far the range of services available to Swiss SMEs can be improved.

We commissioned two research teams from the University of St.Gallen (HSG) and the Swiss Federal Institute of Technology Zurich (ETHZ) to carry out this study. In the course of their work, the teams could revert to the findings of the first two studies which were carried out within the framework of the SME-IP project and which have already been published in this series.

I would like to express my sincere appreciation to the two research teams for carrying out this study. My particular thanks go to the 24 Swiss SMEs who were prepared, in several interviews, to supply information on their experience with the intellectual property rights system and the existing range of services and to contribute their ideas, needs and suggestions. This cooperation has substantially ensured the success of the study.

Roland Grossenbacher
Director General of the Swiss Federal Institute of Intellectual Property

Berne, July 2009

Vorwort

Wie schützt und nutzt ein Unternehmen seine geistigen Leistungen optimal? Die Antwort auf diese Frage fällt besonders kleinen und mittleren Unternehmen (KMU) schwer, solange sie mit dem immaterialgüterrechtlichen Schutzsystem nicht ausreichend vertraut sind. Um Hilfe zu bieten, Wissen zu fördern und KMU zu einem bewussten Umgang mit ihrem Geistigen Eigentum zu motivieren, haben wir im März 2007 im Eidgenössischen Institut für Geistiges Eigentum das Projekt KMU-IP gestartet.

Die vorliegende Publikation stellt die Ergebnisse der dritten Studie vor, welche im Rahmen dieses Projektes durchgeführt worden ist. Ausgangspunkt der Arbeiten war die Beobachtung, dass nur wenig über die konkrete Nutzung des Geistigen Eigentums durch Schweizer KMU bekannt ist. Die Studie setzte es sich folglich zum Ziel, diesem Informationsmangel durch eine systematische Analyse von konkreten Fällen zu begegnen, in denen untersucht wurde, ob und wie die betreffenden Unternehmen formelle und informelle Schutzmechanismen für ihr Geistiges Eigentum nutzen.

Die Studie zeigt zudem Wege auf, wie das Schweizerische Schutzrechtssystem für Geistiges Eigentum weiter verbessert werden kann, um optimal auf die Bedürfnisse der KMU einzugehen. Empfehlungen darüber werden ausgesprochen, wie Unternehmen besser für die verschiedenen Aspekte des Geistigen Eigentums sensibilisiert werden und wie sie durch die bewusste Nutzung ihres Geistigen Eigentums die Wertschöpfung erhöhen können. Schliesslich werden Aussagen darüber gemacht, inwieweit Dienstleistungen und Angebote für Schweizer KMU verbessert werden können.

Mit der Durchführung dieser Studie haben wir zwei Forscherteams der Universität St.Gallen (HSG) und der Eidgenössischen Technischen Hochschule Zürich (ETHZ) beauftragt. Die Teams konnten bei ihrer Arbeit auf die Ergebnisse der ersten beiden Studien zurückgreifen, welche im Rahmen des Projekts KMU-IP ausgeführt und bereits in vorliegender Publikationsreihe veröffentlicht worden sind.

Den beiden Forscherteams spreche ich meinen herzlichen Dank für die Durchführung der Studie aus. Mein besonderer Dank gilt den 24 Schweizer KMU, welche sich bereit erklärten, in mehreren Interviews über ihre Erfahrungen mit dem Schutzrechtssystem und den existierenden Dienstleistungen Auskunft zu geben und ihre Ideen, Wünsche und Anregungen einzubringen. Sie haben damit den Erfolg der Studie erst möglich gemacht.

Roland Grossenbacher
Direktor des Eidgenössischen Instituts für Geistiges Eigentum

Bern, im Juli 2009

Avant-propos

Comment une entreprise peut-elle protéger et utiliser de manière optimale ses biens immatériels ? Cette question pose bien souvent du fil à retordre aux petites et moyennes entreprises (PME) tant qu'elles ne se sont pas suffisamment familiarisées avec les systèmes de protection des droits de propriété intellectuelle. C'est pour contribuer à la diffusion du savoir dans ce domaine, mais aussi pour apporter un soutien aux PME et aiguiser leur conscience de la gestion de leurs biens immatériels que l'Institut Fédéral de la Propriété Intellectuelle a lancé le projet PME-PI au mois de mars 2007.

La présente publication présente les résultats de la troisième étude réalisée dans le cadre de ce projet. Partant du constat qu'il n'existe que peu d'informations sur l'utilisation concrète du système de propriété intellectuelle par les PME suisses, cette étude s'est fixée comme objectif de combler ce déficit d'information en procédant à une analyse systématique de cas concrets, laquelle a permis de déterminer si les entreprises concernées utilisent les mécanismes de protection formels et informels et, dans l'affirmative, de quelle manière.

L'étude présente en outre des possibilités d'optimiser le système suisse de protection des biens immatériels pour l'adapter au mieux aux besoins des PME. Elle formule ensuite des recommandations sur la manière de sensibiliser les entreprises aux divers aspects de la propriété intellectuelle pour leur permettre d'accroître la création de valeur en utilisant sciemment leurs biens immatériels. L'étude esquisse enfin des pistes de réflexion sur les moyens d'améliorer les services et les offres pour les PME suisses dans ce domaine.

Nous avons confié cette étude à deux équipes de recherche de l'Université de St-Gall (HSG) et de l'Ecole polytechnique fédérale de Zurich (ETHZ). Dans leur travail, les équipes ont pu s'appuyer sur les résultats des deux premières études réalisées dans le cadre du projet PME-PI déjà publiées dans la présente collection.

J'adresse mes sincères remerciements aux deux équipes de recherche pour la réalisation de cette étude. Mes remerciements particuliers vont aux 24 PME suisses qui nous ont fourni des informations sur les expériences qu'elles ont faites avec le système de protection et les services existants et qui ont partagé avec nous leurs idées, leurs souhaits et leurs suggestions en acceptant de participer à divers entretiens. Sans leur précieuse coopération, cette étude n'aurait pas vu le jour.

Roland Grossenbacher
Directeur de l'Institut Fédéral de la Propriété Intellectuelle

Berne, juillet 2009

Prefazione

Come deve comportarsi un'azienda per proteggere la sua proprietà intellettuale? Rispondere a questa domanda è difficile soprattutto per le piccole e medie imprese (PMI) che non conoscono sufficientemente il relativo sistema di protezione. Per fornire un aiuto, promuovere la diffusione del sapere e motivare le PMI a gestire meglio la loro proprietà intellettuale, nel marzo 2007 l'Istituto Federale della Proprietà Intellettuale ha dato il via al progetto PMI-PI.

Questa pubblicazione presenta i risultati del terzo studio condotto nell'ambito del progetto, il quale si basa sulla constatazione che le conoscenze delle PMI svizzere in relazione all'utilità concreta della proprietà intellettuale sono scarse. Lo studio si propone pertanto di ovviare a questa lacuna tramite un'analisi sistematica di casi concreti volta a stabilire se e in che modo le aziende interpellate fanno uso di meccanismi di protezione formali e informali per la loro proprietà intellettuale.

Lo studio illustra inoltre alcune possibilità di miglioramento del sistema svizzero di protezione della proprietà intellettuale al fine di rispondere in maniera ottimale alle esigenze delle PMI. Sono formulate raccomandazioni per sensibilizzare più efficacemente le aziende in merito ai diversi aspetti della proprietà intellettuale e mostrare loro in che modo possono aumentare il valore aggiunto grazie a un uso consapevole della proprietà intellettuale. Infine, l'indagine si sofferma sui margini di miglioramento dei servizi e delle offerte per le PMI svizzere.

Lo studio è stato realizzato da due team di ricercatori dell'Università di San Gallo (HSG) e del Politecnico federale di Zurigo (ETHZ), i quali hanno potuto appoggiarsi sui risultati dei primi due studi condotti nel quadro del progetto PMI-PI, già pubblicati nella presente collana.

Ringrazio sentitamente entrambi i gruppi di ricercatori per la realizzazione dello studio. Un ringraziamento particolare va inoltre alle 24 PMI svizzere che in occasione di diverse interviste si sono prestate a fornire indicazioni circa le loro esperienze con il sistema di protezione e i servizi esistenti nonché idee, desideri e suggerimenti: senza il vostro contributo non sarebbe stato possibile raggiungere questo successo.

Roland Grossenbacher
Direttore dell'Istituto Federale della Proprietà Intellettuale

Berna, luglio 2009

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Executive Summary

Today more than 90 percent of Swiss companies are small and medium-sized enterprises (SMEs). Their ability to innovate and to sell services or products is crucial to the Swiss economy. Little is, however, known about how these Swiss SMEs protect their intellectual property (IP).

This report explores this question, providing analysis and insight into the management of intellectual property in Swiss SMEs. The report is the result of a study carried out in collaboration with both, the Institute of Technology Management of the University of St.Gallen (HSG) and the Chair for Technology and Innovation Management of the Swiss Federal Institute of Technology Zurich (ETH). The study was commissioned by the Federal Institute of Intellectual Property (IPI).

The study is part of a broader research project, commissioned by the IPI, on the topic of intellectual property in Swiss SMEs. The two previous studies are:

- Radauer, Alfred; Streicher Jürgen (2008): "Support Services in the Field of Intellectual Property Rights (IPR) for SMEs in Switzerland - A Review." 1st Report of the IPI SME-IP Project. Swiss Federal Institute of Intellectual Property (IPI), Berne; and

- Keupp, Marcus M.; Lhuillery, Stéphane; Garcia-Torres, M. Abraham; Raffo, Julio (2009): "Economic Focus Study on SMEs and Intellectual Property in Switzerland." 2nd Report of the IPI SME-IP Project. Swiss Federal Institute of Intellectual Property (IPI), Berne.

In order to improve and motivate our knowledge and understanding of SMEs' behaviour and perceptions towards the protection of intellectual property, the research team began by conducting a literature review to compile what is known on the issue thus far.

Several European studies have revealed that the management of intellectual property is handled differently in SMEs when compared to large corporations. According to these studies SMEs seem to heavily rely upon factual protection methods such as lead time advantages or secrecy. Furthermore, multiple studies address financial issues, which ultimately have an impact on an SMEs' IP protection decisions.

To gain practical data and information, the study team carried out 24 individual case studies among a diverse collection of Swiss SMEs. Firms from all major Swiss industrial sectors and from all major industrial regions were interviewed, sampled, and analysed to assure the consideration of a wide variety of IP management practices.

One objective of the present study was to conduct interviews among firms that actively use legal protection methods (such as patents, trademarks, and industrial designs) and those that do not. As a first result the research team derived five mutually exclusive clusters, into which all 24 firms fit. Three clusters covered the companies that actively use legal protection methods:

- Patentees: Companies with a primary focus on patents.
- Trademarks: Companies fostering only trademark protection.
- Multiple users: Companies utilising more than one legal protection method.

Two extended clusters represent the companies that do not actively use legal protection methods:

- Intuitive non-users: Companies whose choice to refrain from legal protection for their intellectual property is not based on a strategic decision.
- Purposeful non-users: Companies that intentionally decided to refrain from legal protection.

The 24 case studies provide a powerful insight into the IP-related behaviour of Swiss SMEs. Policy recommendations were extracted from a comparison of the gathered results with the two primarily conducted studies.

Two sets of policy recommendations were established. Initially, policy recommendations for the IPI were extracted. These policy recommendations are based on the Swiss innovation environment, to which the SMEs are exposed. In the subsequent stage, policy recommendations for the SMEs themselves were established.

Policy recommendations for the IPI include:

1. Establish a clear role of the IPI. At present, SMEs do not have a consistent view of the IPI.
2. Position the IPI within the Swiss innovation system and determine which Swiss institution has certain responsibilities.
3. Promote existing IPI services, as most SMEs would be interested in support services but have no knowledge of their existence.
4. Build a platform for SMEs to facilitate information exchange among similar like-minded companies on the topic of intellectual property.
5. Support SMEs in their search for adequate support services and establish a first contact point for SMEs dealing with intellectual property.
6. Improve the general education on intellectual property.

Policy recommendations for SMEs in Switzerland to improve their IP management include:

1. SMEs are urged to inform themselves about the issue of IP protection.
2. Not only should SMEs inform their management about intellectual property but also raise the general awareness among their employees.
3. SMEs should evaluate their existing IPRs on a regular basis and take action based on these evaluations.
4. SMEs should question old IP strategies in order to remain up to date with the changing market.
5. SMEs should assess when to consult a patent/trademark attorney.

1 Introduction

This document is the final report of the study "Case Studies on SMEs (Small and Medium-sized Enterprises) and Intellectual Property in Switzerland" conducted on behalf of the IPI. The study is part of a multi-study research project on SMEs and intellectual property (IP) in Switzerland. The aim of this particular study is to understand better how Swiss SMEs use the IP system.. In order to gain this insight, 24 case studies have been carried out by the research team and are presented in this report.

IP management has attracted increasing attention over the last years, since the knowledge-based economic environment puts intellectual property in the centre of interest. This tendency is strengthened through the internationalization of markets and the rapid development of information technology. Knowledge has become a good which is a key success factor in companies with complex product and process technologies. Transferring knowledge into an asset such as intellectual property, and further managing the intellectual property has become increasingly more important for every company. Many large and international companies have already implemented IP management in their corporate strategy and organization of the company.

However, smaller companies rarely make use of any intellectual property rights (IPRs). The fact that SMEs have a huge innovation potential and furthermore are increasingly affected by global competition, points to the importance of IP management for them too. However, SMEs engage little in the active management of intellectual property. Therefore, the objective of this research study is to find reasons for this discrepancy for the case of Switzerland. The investigation is realized through a qualitative multiple case study research.

This study is based on two other studies commissioned by the IPI and conducted in the context of IPI's project "SME-IP". These two studies are firstly a report on the support services available for SMEs in Switzerland and secondly an economic focus study on SMEs and intellectual property in Switzerland:

- Radauer, Alfred; Streicher Jürgen (2008): "Support Services in the Field of Intellectual Property Rights (IPR) for SMEs in Switzerland - A Review." 1st Report of the IPI SME-IP Project. Swiss Federal Institute of Intellectual Property (IPI), Berne.

- Keupp, Marcus M.; Lhuillery, Stéphane; Garcia-Torres, M. Abraham; Raffo, Julio (2009): "Economic Focus Study on SMEs and Intellectual Property in Switzerland." 2nd Report of the IPI SME-IP Project. Swiss Federal Institute of Intellectual Property (IPI), Berne.

Structure of the Study

Chapter 2 - Literature Review: The literature review provides an overview of the literature used. It provides a basic summary on the topic, shows different IP protection methods, discusses the differences between users and non-users of IPRs and provides industry-specific information on IPRs.

Chapter 3 - Model Building: The research model provides information on the model chosen to conduct the case studies. This chapter will explain the basis for this decision as well as the model itself. The chapter also includes the questionnaire and interview guidelines that were established.

Chapter 4 - Methodology: The methodology holds information on the method we will use. This chapter explains the case selection we developed in cooperation with the Economic Focus Study Team and the IPI. The selected cases will be presented. Furthermore the chapter provides the reader with information on our data collection and data analysis.

Chapter 5 - Case Studies: This chapter is the report's main part and holds the 24 conducted case studies. The presented studies are clustered into five groups. Three user groups (multiple users, patentees and trademarks) as well as two non-user groups (intuitive non-users and non-users on purpose). Every cluster starts with at least one in-depth case study to introduce the reader into the given cluster. Each cluster is followed by a recapitulary cross-case analysis. These cross-case analyses point out the most important characteristics of every cluster based on comparative tables.

Chapter 6 - Case Studies - Common Findings: The purpose of the common findings chapter is to compare the conducted case studies with each other in order to identify similarities and differences among them. The chapter is divided into a section covering companies that use legal protection methods and a section covering the remaining firms.

Chapter 7 - Conclusions and Recommendations: The report ends with conclusions and recommendations drawn from the presented case studies as well as the two studies mentioned earlier (SME-IP 1st Report: Support Services in the Field of Intellectual Property Rights (IPR) for SMEs in Switzerland - A Review; SME-IP 2nd Report: Economic Focus Study on SMEs and Intellectual Property in Switzerland). The first set of recommendations is directed at the IPI while the second set of recommendations is directed at SMEs working in the current IP environment in Switzerland.

2 Literature Review

Intellectual property has been a subject of increasing interest during recent years. Thus, the demand for and results of scientific research work regarding intellectual property has been steadily growing. Many studies exist about the role of IP systems in large firms that have experience in using these systems. However, large firms and SMEs operate differently in terms of business strategy regarding innovation and IP management. Therefore, findings and policy recommendations from studies about large companies cannot be directly applied to this study on SMEs.

Literature research reveals that studies with a particular focus on SMEs and IP management are rare. In the literature review for this project, emphasis was given to studies in Europe for comparability purposes. The national patent systems in Europe are quite similar and thus, comparable for this project. Existing European studies will be considered to find similarities concerning IP activities of SMEs regarding Switzerland and other European countries.

For reference, this project will use the European Commission's definition of an SME:

- micro 1-9 employees
- small 10-49 employees
- medium-sized 50-249 employees

When a definition of an SME is different than the European Commission's criteria, the source and reasoning for the difference will be noted.

Chapter 2 is structured as follows:

- Overview of existing studies regarding IP issues in SMEs within Europe
- Different protection methods that have been considered by past studies
- Different industry specifications and their impact on IP activities

2.1 Overview of Literature in Europe

An overview of precedent studies on IP activities in Europe, which include the purpose and scope of the investigations, as well as the preliminary results, will be provided in this section. Structurally, Pan-European studies are first presented, followed by studies of the situation in Switzerland, Germany, the United Kingdom (UK), etc.

Pan-European studies

The University of Dublin conducted a survey and personal interviews with 600 SMEs from all European Union (EU) member states that obtained a European or US patent

between 1994 and 1997 (University of Dublin, 2001). The objective of their study was to assess the impact of patent infringement and its financial consequences like litigation costs. The results reveal that two-thirds of the questioned firms (approximately 400 firms) had experienced some form of alleged patent infringement activities. Since the majority of these SMEs did not have the adequate financial means for patent infringement suits, 80% of the affected firms did not file a suit. Furthermore, the study showed that fear of possible infringement activity and litigation costs have a detrimental effect on whether or not SMEs implement and/or use patents in their business strategy. Due to the size discrepancy between SMEs and larger firms, patent defence litigation expenses have a harder impact on SMEs because larger competitors simply absorb the cost as part of their much larger budget. In conclusion, patents as a means of safeguarding intellectual property are not considered cost-effective for SMEs. SMEs rather rely on secrecy and lead time advantage for their IP protection.

Another example of a Pan-European study was based on telephone interviews with 974 companies (up to 250 employees) randomly selected in four industry sectors: chemical, pharmaceutical, engineering and other forms of manufacturing (Derwent, 2000). The countries chosen to participate in the study were the UK, France, Germany, Italy, The Netherlands, Spain, Sweden and Finland. The findings of this study revealed that only 30% of the SMEs were users of a patent system. The majority (70%) of the SMEs did not patent their innovations or use patent searches as a source of information.

Companies in the pharmaceutical sector are an exception regarding the non-use of intellectual property. Almost half of the companies from this sector (49%) have been involved in patenting activities. Furthermore, results varied when comparing the different countries. Spain had the highest level of SMEs patenting at the national patent office, and Dutch SMEs had a high percentage of international patents. German SMEs were also active patent system users; while on the contrary, UK SMEs show the lowest patenting activity of the seven other European countries. In conclusion, the reasoning of the interviewed firms to not use a patent system in their business sector within their country was either not relevant or not revealed.

Studies in Switzerland

Two studies that analyze IP activity of SMEs specifically in Switzerland were found during the literature research.

The first study analyzes IP activities in the biotechnological sector in Switzerland (Thumm, 2003). The 53 returned questionnaires from Swiss private companies and research institutes reveal that in the biotechnological sector, IP systems are considered as an essential means for a return of investment for research and development (R&D) activities. As a research-based and innovative industry sector, the patent application activity in this sector is considerably high when compared to other industry sectors. However, this study draws attention to the differences between the patent activity with

larger companies and SMEs. These differences would reveal whether company size influenced patent activity.

Only a few small companies with less than 50 employees use patents to protect their inventions. Additionally, only a few SMEs considered themselves to have a very high expertise about intellectual property, and thus, did not implement an IP system in their strategic management plan. Complementary to the University of Dublin 2001 study, secrecy and lead time advantages play an important role in IP protection. Within the Swiss biotechnology sector, the main motive to patent is to protect the innovation from possible infringement activities and preventing the competitors' patenting activities. On the contrary, the main motives for not patenting are disclosing the invention and costs. (Unlike the University of Dublin 2001 study, patent litigation cost was not the primary concern because patent litigation has a low prevalence in Switzerland.) In summary, Thumm's study reveals an increasing number of patent activities within SMEs with a high number of employees in the Swiss biotechnological sector.

The second study from the University of Neuchâtel investigates how IP systems within SMEs have been developed in the "Arc Jurassien"-region, how SMEs manage their intellectual property and what kind of experiences they have made (Amgwerd et al., 2004). The authors reasoned two main findings from the survey results of 42 private and public organizations that participated in the study. Firstly, the use of IPRs in SMEs exceeds the simple function of protecting innovations, and is increasingly considered as an important strategic instrument for investment and financing decisions. Secondly, the use of IPRs depends on the industry sector. Companies in research-based sectors are very active in patenting, and, in the consumer product sector, companies have a tendency to use trademark and industrial design law for protection. Conclusively, this study found that the use of IPRs is not only to protect knowledge but also for strategic means.

Studies in Germany

Two studies were found that investigated the relevance of patenting in German companies. Both studies do not limit the study to SMEs, but the studies considered company size that incidentally gave interesting findings about smaller company behaviour.

Licht and Zoz (1998) explored the relationship between R&D expenses and the number of patents in different patent offices. The finding was that R&D performance positively correlates with company size and propensity to patent. Small firms apply less often for patent protection than large firms. Furthermore, smaller firms apply more often at the national patent office than foreign ones.

The second study consisted of a survey of all German companies that submitted a minimum of three patent applications at the European Patent Office in 1999 (Blind et al., 2006). Hence, this study is more representative of the behaviour of large firms

because patent application activity is more likely with larger firms. Additionally, a small firm is defined as having one to 249 employees, and medium-sized firms are defined as having 250-1999 employees.

The study revealed that patenting activitiy increases with company size or in other words, the larger the company, the higher the propensity to patent. Another finding is that patent activity and industry sector are not deciding factors for the user companies in this study. Additionally, the study reveals that the four most important means of protection are lead timeadvantage, patents, trademarks and secrecy .

Studies in the UK

"Intellectual Property and Innovation Management in Small Firms" (Blackburn, 2003) reveals findings from the research program "Intellectual Property Initiative" from UK's Economic and Social Research Council. With the main objective to investigate the relevance of IP systems for British SMEs, the results show a clear correlation between company size and the use of an IP system. Additionally, a significant dependency of IP activity and industry sector was found. The patent system plays a minor role for SMEs, except for companies operating in the biotechnological or electronic sector. Small companies prefer informal methods such as secrecy to protect theirintellectual property. However, the patent system is considered useful for SMEs as a source of information.

One part of Blackburn's book consists of case studies in South-East England (Kitching, Blackburn, 1999). Telephone interviews were conducted with 400 SMEs and 101 SMEs had an additional personal interview. The firms were chosen according to four different industry sectors: computer software, design, electronics and mechanical engineering. The results from these interviews show that SMEs prefer informal protection methods: 76% rely on trust in a business relationship, 66% rely on lead time advantages and 63% rely on spreading know-how among their employees. Only 30% of the interviewed firms stated that they have ever used the patent system. Reasons in favor of using informal protection methods instead of an integrated IP system are that informal IP protection is cheaper and requires less formalities than formal IP protection. Additionallly, the firms stated that they are more familiar with the use of informal protection methods.

Another study mentioned in Blackburn's book was conducted by Hall et al. (1999, 2000). This investigative study consisted of two parts: a questionnaire survey and personal interviews. The questionnaires were sent to SMEs in the UK that examined the use of a patent system as an information source in a quantitative way (Hall et al., 1999). The survey revealed that from the 390 participating firms, the more active users of patents are more likely to use the patent system as a source of information than non-users.

Following the questionnaires, in-depth interviews with 23 out of 390 of the SMEs from different industry sectors were conducted. Both users and non-users were included. The interviews confirmed a positive correlation between patent activity and use of patent information. However, the majority of the sample firms scarcely used the patent information found. Only 2 out of 23 firms, which were both from the pharmaceutical sector, had a "proper" patent information management system. The main barrier for use was the slow processing system; 18 months to publish a patent application is considered hindering. One proposed solution for the slow processing system was to implement the use of the Internet and a more user-friendly interface with the requirements from the applicant firm. Additionally this study suggested more training support for SMEs in order to raise awareness of the patent system and its opportunities.

The Oxford Intellectual Research Centre and the Manchester School of Management conducted a third study with the empirical purpose to compare the acquisition of patents and trademarks. Specifically, this study focused on the industry sector and firm size of selected UK production and financial companies (Greenhalgh et al., 2001). They utilized the World Intellectual Property Office (WIPO), the European patent office (EPO), the UK Intellectual Property Office and further IP-related data as a source of information. The results reveal that trademark and patent acquisition depends on industry sectors. Trademark acquisitions are more important in the consumer product sector, while patents are more important in the production technology sector. Concerning the correlation of firm size and IP acquisition, the findings of this study show that smaller firms have a disproportionately higher activity. This result was found for both patent and trademark applications. In addition, they asserted a general decline of patent applications in the UK during the 1990s.

Studies in the Nordic countries

Since Nordic countries have a large number of SMEs, studies have been conducted to analyse how these companies protect their innovations and how they use an existing IP system.

The Norwegian STEP Centre for Innovation Policy in cooperation with several official institutions based a study on an analytical framework and expert interviews with Norwegian SMEs. This study evaluates the relationship between those SMEs and IPRs considering the needs, concerns and problems of the companies (Iversen, 2001). The results reveal that many SMEs use IPRs, however, large companies are still considered the most frequent IPR users. Investigating the relationship between the industry sector and use of IPRs also reveal a significant distinction between large and smaller companies. For example, SMEs dominate the patent applications within the electrical engineering sector. Another finding regards geography; the most active applicants of patents and trademarks are concentrated in urban areas. Iversen used the Norwegian definition of SMEs: a small company has 1-19 employees, and a medium-sized company has 20-99 employees.

Another study regarding Nordic countries, such as Norway, Sweden, Denmark, Finland and Iceland was based on personal interviews with biotechnology and information technology-based companies (Moulin and Lie, 2005). In each country and each sector, 3-4 companies with a reputation of using an IP managements system were interviewed. The purpose of the study was to identify good practice standards in IP management, and to analyze supporting services relating to national policies regarding IPRs. As a result, biotechnology-based companies are considered active and professional users of the patent system. These companies have implemented IPRs in daily business culture and management style. On the contrary, IT companies rarely used patents nor developed business processes involving IPR management. The preferred method of protection within the IT sector is copyright. While many SMEs consider the costs of the IPR system as too high, registering designs are rarely used despite the relatively low registration cost. Conclusively, a desire for information is reflected by the strong demand for more frequent and better IPRtraining programs.

2.2 Protection Methods for Intellectual Property

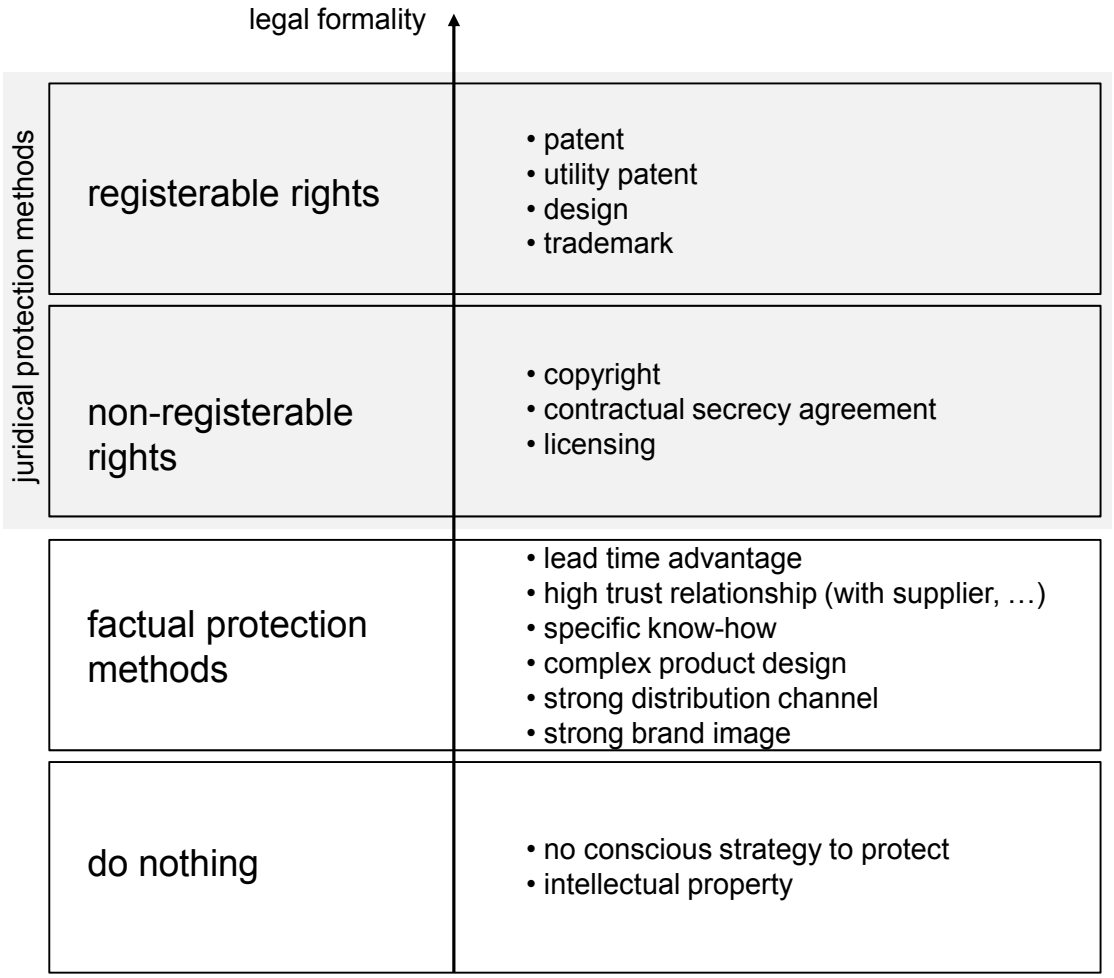
Several possibilities exist to protect intellectual property. Scientific research mainly concentrates on patent protection. Hence, in literature one mostly finds information about patent activities. However, especially for SMEs, alternative protection methods like lead time advantages and secrecy play an important role. Before going into detailed literature review about firms' IP protection behaviour, the framework below gives an overview of existing IP protection methods.

The protection methods can be divided in two main categories, juridical protection methods and factual protection methods. The juridical protection methods can be further divided in registrable and non-registrable legal rights. Patents belong to the registrable rights. Registrable means that the invention must be applied for at a national or international institution. In addition to patents there is in many countries the utility patent, also called petty patent. It differs from the patent in terms of examination, protection time and costs. Whereas in most countries a patent application is examined for novelty before being granted, the utility patent is not examined. Due to the lower effort the costs for a utility patent is lower than for a patent. As to the protection time, patents are protected for 20 years, utility patents for 10 years.

In Switzerland, patent applications are not examined for novelty. This examination is demanded from the patentee, or he has to take the risk of patenting a technology that already exists. The utility patent does not exist in the Swiss IPR system.

Trademarks and the design of an innovation can also be registered. A non-registrable right is for example the copyright. It automatically protects an original work, without application or registration. Licensing also belongs to this category. In this case a firm acquires the right to use an invention from the inventor. Or the other way around, a firm sells the right to use its invention to another party.

Graph 1 Protection Methods for Intellectual Property



Further, secrecy can be part of the juridical protection methods. The innovator can conclude confidentiality clauses in customer and supplier contracts as well as in employment contracts. But secrecy can also be a factual means of protecting intellectual property. Instead of concluding a contract on confidential aspects a firm may rely on high trust relationship with its customers or suppliers. Specific know-how, complex product design and high trust in the employees can also be a form of secrecy protection. Many firms also use lead time advantages. This reduction of the time to market enables firms to bring the invention to the market earlier than the competitors.

Firms may also establish a strong distribution channel network or a strong brand image in order to differentiate from competitors.

Finally, there is the "do nothing" attitude. There are firms that do not consciously act in order to protect their inventions.

Registrable and non-registrable rights

Statistics of the year 2007 report that the number of European patent applications has increased by 20.5% since 2003 (EPO, Annual Report 2007). 4.2% of the European patent applications came from Switzerland (EPO, Annual Report 2007). In 2007, the number of patent applications with origin from Switzerland increased by 6.4%, which is well above average compared to the member states of the European Patent Organization. Despite these increasing numbers, the findings of surveys mainly reveal that patents are not the most important means of protecting intellectual property. This finding is in particular significant for SMEs. The Derwent study (Derwent, 2000) discovered that only 30% of the sample SMEs have ever applied for a patent. In a survey with UK SMEs, half of the firms did not apply for patents even if they assessed the inventions to be patentable (McDonald, 2003). The University of Dublin (2001) reveals in its examination for the European Commission that patenting is considered to be not cost-effective for SMEs. According to Kitching and Blackburn (1999), the registrable rights - patents, trademarks and industrial designs - are used less than non-registrable ones. Their results show that trademarks and patents were applied by 52% (trademarks) and 30% (patents) of the firms. In comparison, contractual confidentiality clauses as non-registrable rights are used by 75% of the SMEs, 60% rely on copyright protection.

Factual protection methods

Factual protection methods play a major role especially for SMEs. As patents are often considered to be too expensive, SMEs are likely to choose protection methods with low additional costs. Non-juridical means of protection like secrecy or lead time advantage do not implicate direct additional protection costs. Hence, for SMEs factual protection methods are often considered to be more adequate than juridical ones. The University of Dublin (2001) discovered that SMEs rather rely on secrecy and lead time advantage than on patents. The findings are confirmed by Harabi (1995), Arundel (2001) and Blind et al. (2006) who all show that lead time advantage is the most effective means of protection. Arundel (2001) found out in his investigation that 50% of his sample firms consider lead time advantage as most important protection method. Secrecy ranked second with 18%, followed by complexity (17%) and patents (9%).

Kitching and Blackburn (1999) reveal in their study that SMEs prefer factual protection methods to juridical ones. Trust relationship was considered as most important protection method. It has been used by 76% of the firms, followed by lead time advantage with 66%.

Motives for and against patenting

The literature shows that SMEs are in general less likely to use patents as means of protecting their intellectual property than other methods. The motives for and against patenting mostly coincide in the presented studies.

The main reason for SMEs not to use patents are the costs. These costs include both patent application costs and the costs for defending a patent. Especially the second argument, the costs for defending a patent, seems to be important for SMEs. The fear of patent infringement and litigation costs has a significant impact on the SMEs` decision on patenting because they often do not have the financial means for such efforts (University of Dublin, 2001).

The next reason not to patent is the disclosure of information (Arundel, 2001; Moulin, Lie, 2005; Harabi, 1995; Thumm, 2003). A lot of firms view disclosing information to be a high risk, particularly the way that only specialists can do to reproduce the technology. Further, the Derwent study (Derwent, 2000) reveals that an important reason for SMEs not to patent is that patents are considered not to be relevant in their business sector.

On the other hand there are important motives in favour of patent applications. The major reason for a patent application is the protection of an innovation. This argument is followed by the blockade of competitors (Blind et al., 2006). Besides this, there are further arguments why firms chose patenting as means of protecting intellectual property. Especially for SMEs, Blind et al. (2006) discovered a high emphasis on improving its own position in relation to cooperation partners by holding patents. This finding is also presented by Harabi (1995). According to his results, patents play an important role in terms of enforcing the firm's negotiating position towards other firms or governmental agencies.

2.3 Protection of Intellectual Property in Specific Industry Groups

In the following section, a brief account of principal studies of the use, effectiveness, strategies and obstacles of IPRs by principal industry groups is presented. Industries are regrouped approximately according to similarities observed in empirical studies of IPRs.

Chemical and pharmaceutical industries

The early finding that R&D in the pharmaceutical and chemical industries depends more on patent protection than in the mechanical sector is still valid (Taylor et al., 1973). Patent protection was found to be a more important appropriation mechanism to return benefits from innovation in the pharmaceutical sector than in chemistry, and in the chemical sector more than in most other industries (Levin et al., 1987; Cohen et al., 2000).

In this context, the character of the innovations in the concerned sectors plays an important role. The real value of patent rights strongly depends on how the patent holders and the courts estimate and handle the potential and actual infringement of these IPRs (E. von Hippel, 1988): patents for pharmaceutical and chemical compounds are generally considered effective while a patent in the electronics sector is for the

most part of little value in itself. In addition, patents in the pharmaceutical and chemical sector can be marketed rather easily and generate royalties.

Technologies in the pharmaceutical and chemical industries are often described as so-called discrete technologies (Cohen et al., 2000). In these sectors, IPRs effectively define monopoly rights over a specific compound or a category of compounds or processes which are essential to the production of these substances. The concerned products are reportedly likely to have strong market power or even a monopoly position for their specific application. Moreover, an objective and efficient terminology exists that allows to explicitly and clearly describe the scope of the patents, thus resulting in legal certainty about the patents' validity and extent.

The discrete nature of innovations in these two industries has a considerable implication. Patent rights may be used as an easy mechanism for a company to license the technology to established companies or new entrants in the market. However, the same mechanism can be used to bar competitors and new entrants from important technologies, thus impeding competitors' innovation efforts and delaying their access to new technologies (Arora et al., 2000). Correspondingly, patent strategies in this sector often aim at building patent fences around a core invention to prevent competitors from patenting substitutes to these inventions.

Aside from the similarities regarding IP protection in the pharmaceutical and chemical industries, the pharmaceutical sector is different in an important aspect. The initial cost of developing an innovative compound in this sector is generally significantly higher than in the chemical sector. Once the innovative compound is known, copying would be possible at typically lows costs, which are often much lower than in other high-tech fields. Accordingly, without patent protection, investment in pharmaceutical R&D and drug development would be suboptimal from a social point of view. For this reason, patent protection plays an outstanding role in this industry (Pazderka et al., 1999).

Unlike sectors where complex technologies prevail, such as in the electronics industries, SMEs and inventors in the chemical and pharmaceutical industries face a situation where large companies tend to build patent fences around their core inventions to block competitors from using it and from entering into the concerned market. While this situation may hamper the SMEs' access to innovative technologies, it still allows them to populate technological fields that are not (yet) taken by large players. In addition, the discrete nature of technologies in these industries allows to develop products without touching the scope of large companies' IPRs and thus preventing litigation proceedings that may easily push the financial boundary of smaller companies.

Biotechnology industry

Biotechnology is widely considered to be a key technology for the economic development over the next years (Thumm, 2004). Similar to the pharmaceutical and

chemical industries, a large number of inventors and relatively small companies exist in the biotechnology sector, which open new routes to novel products, processes and services in the pharmaceutical, chemical, agricultural and food sector. Not surprisingly, this sector has attracted the attention of a number of research groups over the last years which have examined the role of intellectual property for companies in this domain (Thumm, 2004).

It was found that patent protection is an important incentive for R&D in Europe's biotechnology sector. In addition to the initial purpose of the patent system, i.e., to protect inventions and to foster their distribution, patents are increasingly used in different ways. Administrative peculiarities and strategic uses of patents tend to prevail in the biotechnology sector over the initial idea of protection and distribution of knowledge (Thumm, 2003, 2004).

This general view of the biotechnology sector was accentuated by a study on the UK biotechnology sector (Thomas, 2003). It is assumed that the reported findings can be generally applied to other developed European economies. Owing to the rapidly changing technologies, the biotechnology sector continues to challenge the national and regional patent systems and legislations, implying a persistent legal uncertainty regarding the scope of IP protection. This uncertainty and the continuing changes in the legal framework require significant efforts to keep the companies informed about the IP framework, which smaller companies tend to fail to do owing to their often limited IP resources.

In the biotechnology sector, much of the innovative activity giving rise to new technologies and products has taken place in small companies (Thomas, 2003). IP protection significantly influences whether new biotechnology companies will be able to enter and maintain a sustainable position in the biotechnology sector. In this context, two different IP strategies were identified: to use patent protection and to use secrecy as appropriability mechanisms.

IP protection is considered to be the crucial appropriability mechanism for biopharmaceutical SMEs in order to survive in the sector and to appropriate benefits from their innovations in the market. Almost all companies in the biopharmaceutical sector collaborated with multinational pharmaceutical enterprises. In this context, IPRs are not only used to protect the SMEs' innovations but also to provide an asset to maintain an important position in the biopharmaceutical sector because multinational companies will reportedly only cooperate with SMEs having strong IP portfolios (Thomas, 2003). Accordingly, the role of intellectual property in this field is twofold. On the one hand, pharmaceutical multinationals access products and technology from biopharmaceutical SMEs by cooperation agreements which are supported by registered IPRs. On the other hand, SMEs in the biopharmaceutical industry use IPRs as a mechanism to establish the cooperation with these multinationals. It is reasonable to assume that this twofold relationship can generally be found in the pharmaceutical industry.

A number of biotechnology companies does not use patents while still having a notable economic impact. These companies which mainly rely on secrecy are typically suppliers of sector-related materials. They reportedly acknowledge the importance of protecting their innovations and use intentionally secrecy, technical improvements and lead time advantage to maintain their position in the market. Compared to biopharmaceutical SMEs, they use a different kind of products, which are characterized by rapid innovation and short development cycles. While biopharmaceutical companies are rarely vertically integrated, the supplier companies design and produce products in-house and have rarely cooperations with large companies.

Supplier companies generally do not require venture capital to start up. They often rely on private investors instead (Thomas, 2003). This finding reflects the fact that the R&D expenses and other costs are typically much lower outside the biopharmaceutical sector. Accordingly, supplier companies are more independent from other players and financiers. On the other hand, however, the entry barrier for new entrants is low and competition in this field is much higher than in the biopharmaceutical sector.

Apart from the supplier field, i.e., in the dominant part of the biotechnology sector, patents are used to protect the innovations. The lack of a significant IP portfolio reportedly will prevent the concerned companies from raising venture capital or funds.

The results of Thomas' study suggest that SMEs in the biotechnology sectors tend to trust in the validity and strength of their IPRs while they were found to have little experience of infringement issues. In addition, only very few biotechnological SMEs seem to have in-house capacities to monitor the infringement of their intellectual property.

Semiconductor, computer and communication industries

These industries, the so-called electronics industries, differ from other high-technology fields. They strongly depend on microelectronics and show distinct cyclical variations in the economic development. In addition, economies of scale play an important role in this sector because new factories for the production of microelectronic devices, which produce components having circuits of the currently smallest dimension, require a sufficiently large production capacity to become profitable. The corresponding high investment costs add to the high costs for R&D in these industries. Moreover, the cumulative nature of the underlying technologies makes it difficult for companies in this field to successfully compete without having access to the IPRs of many other firms (Levin, 1982).

In contrast to patents in the pharmaceutical and chemical sector, electronic devices typically affect many patent rights which often belong to different enterprises. In the electronics sector, it is therefore likely that new technologies would infringe patent rights of other companies in this field. Aside from a rather low number of patents which were upheld by courts in infringement proceedings and therefore may be considered

sound, the principal value of patent rights in this sector is not their legal quality but that they are assets for settlements and negotiations (Hanel, 2006).

As in many industries, companies in the electronics industries do not use patents as the most important measure to appropriate economic benefits from innovations. Cohen et al. found for the U.S. manufacturing industries that the key appropriability mechanisms are normally secrecy, lead time and complementary capabilities (Cohen et al., 2000). In the electronics industries, however, patenting plays a more important role, which shows in fact that the majority of the companies receiving the most U.S. patents are in the electronics industries.[1] This finding reportedly reflects that patenting is used to become or remain an important player in this field. In this context, patents are often used to both block competitors from using the company's own technology and enter into negotiations with these competitors. As the study presented by Cohen et al. suggests, the patent holders do not only protect own technology but also influence competitors by controlling technologies that these competitors need, often resulting in cross-licensing of technologies (Cohen et al., 2000). In this respect, patent rights allow for the reciprocal access to other technologies and to steadily improve and expand the company's products and processes, which is considered essential to be a major player in the rapidly changing electronics field.

According to the as-described situation in the electronics domain, SMEs would be required to intensively use the IP system in order to be an accepted player and to get access to the essential technologies. However, the data suggests that the costs associated with patent protection, in particular for patent defense and litigation, disproportionately prevents smaller companies from using the IP system to protect their innovations (Cohen, 2000), putting them at a structural disadvantage in the face of the competitive environment in the electronics industries.

Software industry

The software sector offers a large variety of services and products. Similar to the electronics industries, companies in the software field have to cope with significant growth of the market and rapid change in the relevant technologies.

Innovations in software generally face market failure owing to the software's nature as public good, which is characterized by non-excludability and non-rivalrous competition. The second principal market failure in the software field emanates from the presence of network externalities, which exist in product markets where the utility of a product increases with the number of other consumers. Network externalities are also inherent in product standards that allow for the interchangeability of complementary products, such as computer operating systems (Merges et al., 2003). While a widely adopted

[1] In the semiconductor industry, the gap between the minor importance of patent protection (compared to other appropriability mechanisms) to companies on the one hand and the widespread use of patents on the other hand is particularly obvious (Hall, Ham-Ziedonis, 2001).

product standard may offer significant benefits to consumers and companies in this field, the standard may also keep the software industry in an inferior situation, thus impeding technological improvement over the current standard (Merges et al., 2003). This problem has a particularly adverse effect on SMEs which often lack sufficient market power and financial resources to make the market accept their own innovations and products.

Computer software, owing to its nature as a written work intended to serve utilitarian purposes, resists easy categorization in terms of IPRs (Merges, 1996). Apart from secrecy as a major mechanism to appropriate benefits from software innovations, copyright and patent protection play an important role in appropriation. While the protection of software was often ensured by copyright protection in the early days of the software industry, patents relating to computer programs become increasingly important. However, the level to which patent protection is granted to software-related inventions varies in the different IP regimes, reflecting the differentiation of national software industries and the corresponding different legal requirements for the protection of domestic innovations (Graham et al., 2003).

In this situation, SMEs in the software industry face a number of challenges, which are not unique to small companies but affect in particular the opportunities for action of these enterprises. Corresponding to the situation in the electronics field, the cumulative nature of the underlying technologies in contemporary software makes it difficult for companies to successfully compete without having access to the IPRs of other firms. In addition, some companies aggressively enforce their IPRs, deterring in particular smaller companies from entering into relevant markets as these smaller enterprises fear costly litigation proceedings. Similar to SMEs in the electronics industries, it is assumed that small companies in the software sector are at a structural disadvantage in the face of the competitive environment in this field.

3 Model Building

In this section the development of the research framework is presented. The framework helps to indicate and explain the main aspects that the case studies should investigate and thereby builds the foundation for the data collection. The reference framework is based on literature related to IPR strategic management, technology management and patent portfolios.

Portfolios are instruments for analyzing and visualizing strategic positioning and lines of attack. The diversity of portfolio techniques is immense, although every technique has its blind spot as a result of the choice of axis dimensions. This contribution is based on the so-called St.Gallen approach to the management of technologies and patents. The approach was developed in the early 1990s at the Institute of Technology Management at the University of St.Gallen, Switzerland (Boutellier, Hallbauer, Locker, 1995) and has been constantly fine-tuned to practice on the basis of numerous industry projects. The framework is an adaptation of the St.Gallen Patent Portfolio Management approach to SMEs.

Before defining the framework development stages we would like to give an overview and definition for the user and non-user enterprises, which are the target of this study.

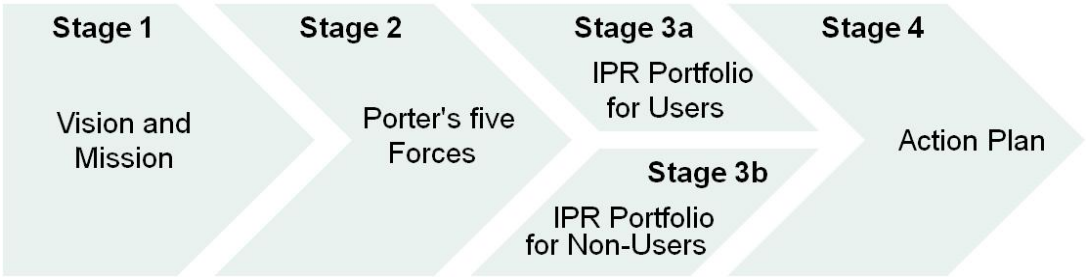
The USERS: are SMEs which use registrable IPRs (patents, trademarks and industrial designs).

The NON-USERS: are SMEs which do not use registrable IPRs. Firms using factual protection methods, e.g. secrecy, lead time advantage etc., hence also are defined as non-users.

3.1 SME IPR Management Framework

The framework consists of four stages. Stage one defines the mission and vision of a company. The stage two determines the competitive intensity and attractiveness of a market by using Porter's fives forces analysis, developed by Michael E. Porter in 1979 (Porter, 1979). Stage three is using the IPR Portfolio Model. The model is modified depending on the enterprise condition: For firms using registrable IPRs, the Patent Portfolio Model is used to define the strategies of their IPR management, whereas for firms which do not use registrable IPRs, the Technology Portfolio Model is used to determine their strategies regarding new inventions. The fourth and final stage of the framework deals with the action plan, and policy recommendations for IPR management strategies, which will be derived from the case studies' results.

Graph 2 The Framework stages



In order to successfully perform the case study research, a detailed questionnaire guideline has been developed. This questionnaire guideline focuses on the stages one through three as well as general information regarding the enterprise. The elaboration of the questionnaire guideline is described later in this chapter.

The following sections give an overview of the individual stages including the tasks and steps to be pursued in each stage.

3.1.1 Stage One: Vision and Mission

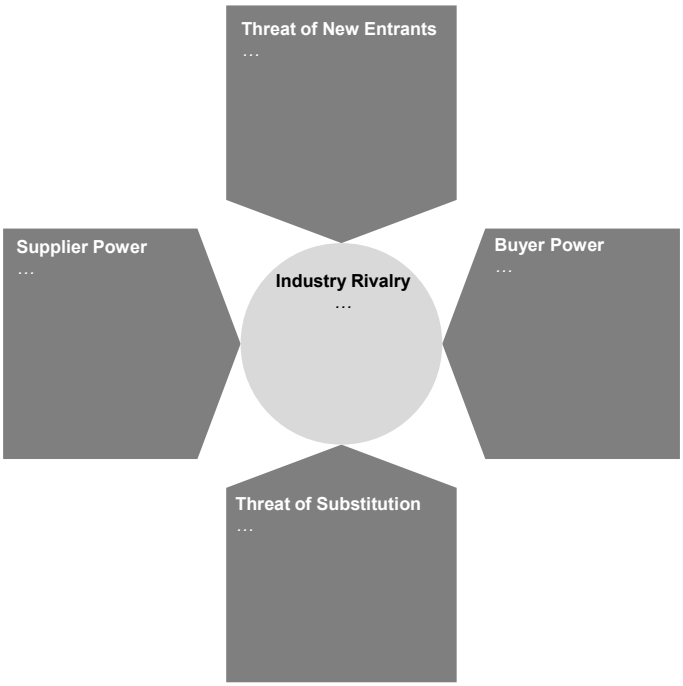
This reflects the normative frame for corporate strategies. These are supplemented by medium-term objectives and general corporate values. A guiding principle of this kind is necessary in order to enable an assessment to be made of the challenges that present themselves in relation to corporate competencies. In this stage it is significant that vision and mission are specific. The mission statement communicates the firm's core ideology and visionary goals, generally consisting of the following three components: core values to which the firm is committed, core purpose of the firm, and visionary goals the firm will pursue to fulfill its mission.

3.1.2 Stage Two: Porter's Five Forces

Michael Porter described a concept that has become known as the "five forces model" (Porter, 1980). This concept involves the relationship between competitors within an industry, potential competitors, suppliers, buyers, and substitutional solutions.

The following figure shows Porter's model, which is divided into five sections: supplier power, buyer power, competitive rivalry, threat of substitution, and threat of new entry. A detailed description of each section is presented below.

Graph 3 Porter's Five Forces Model



Supplier power

Supplier power deals with the question how easy it is for suppliers to influence the prices they demand from their customers. This is determined by the number of suppliers of each key input, the uniqueness of their product or service, their strength, and/or the cost of switching from one supplier to another. The fewer suppliers in the industry, the more powerful the suppliers are with respect to determining supply prices.

Buyer power

Buyer power deals with the question how easy it is for buyers to switch suppliers and thus how much they can impact on price competition. This is driven by the number of buyers, the number of providers, the importance of each individual buyer to the company's business, and the cost to buyers of switching from products and services to those of someone else. If a company deals with powerful buyers, the buyers are often able to dictate terms to the company.

Threat of substitution

This is affected by the ability of customers to replace a product or service through others to achieve the needed output. For example, if a company provides a unique software product that automates an important process, customers may substitute the software by doing the process manually or by outsourcing it. The existence of close

substitutes increases the propensity that customers switch to the substitute when prices increase, and thus weakens the power of the company.

Threat of new entry

Power is also affected by the ability of new competitors to enter the market. If there are low market entry barriers for new competitors in terms of effort in time or money to enter the market, and regarding the possibility of copying the product, then new competitors can easily enter the market and weaken the established company's position.

Competitive rivalry

The competitive rivalry is determined through the number of competitors and their products and services. If there are many competitors who all offer equally attractive products and services, the competitive rivalry is likely to be high. Furthermore, companies can compete aggressively in terms of prices, or they can compete through marketing and innovation strategies.

3.1.3 Stage Three: IP Portfolio for Users

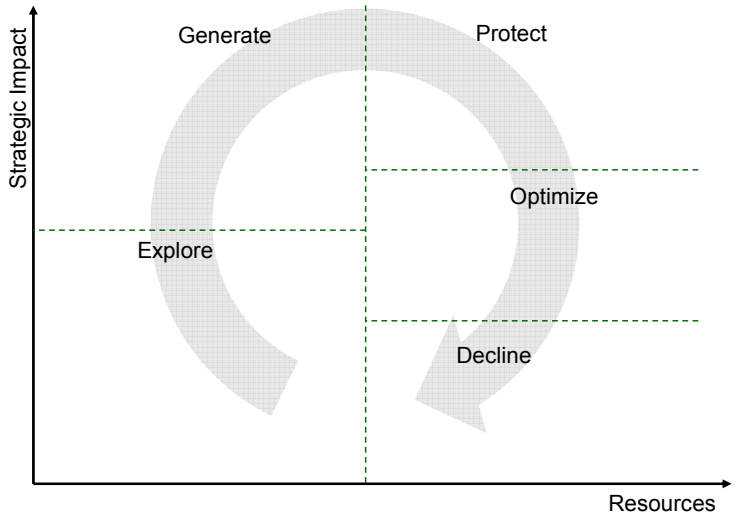
The IP portfolio model (Gassmann, Bader, 2007) is derived from the technology portfolio model developed at the University of St.Gallen in the 1990s (e.g. Boutellier, Hallbauer, Locker, 1995). The portfolio, as depicted in the following graph 4, is based on a two-dimensional diagram where the vertical axis represents the strategic impact of the technology for the company, and the horizontal axis represents the complexity or the needed resources for the company's competencies. The portfolio consists of five sections which follow a chronological process (indicated through the arrow) according to the life cycle of products: *Explore, Generate, Protect, Optimize, and Decline.*

In the following section, the five phases of the portfolio are explained.

Explore

In this first phase the company collects ideas for a new product. The strategic impact and the needed resources are still relatively low, however, it is an important step to create new inventions. In this phase of research and development, the company might follow different strategies such as focusing on internal know-how, or including also external sources of information (e.g. customers, academic institutions, patent databases etc.).

Graph 4 The IP Portfolio Model



Generate

The exploration phase is succeeded by the phase where the ideas are realized through the generation of new products. Prototypes are developed, and, at the same time, the protection of the technology becomes an important aspect. If a patent application filing is envisaged, the patent application for the technology must be filed before the prototype is presented to public in any form. In this phase the company considers its motives for or against a juridical IP protection.

Protect

The protection phase is characterized by high strategic impact and high complexity. The decision about IP protection has to be made including the assessment of the protection in terms of corporate strategy and financial aspects. For example, the company considers, in case of juridical IP protection, if this protection should be effective on national level only, or if it should also be extended to other countries. Furthermore, the long-term IP strategy is defined which also includes the enforcement strategy in case of IP infringement.

Optimize

This fourth phase regards the product and IP optimization processes of the company. These processes might be realized through regular monitoring of the existing IPRs in order to assess their efficiency. Furthermore, these assessments might reveal weaknesses in the entire IP strategy, and give the company the chance to improve their IP strategy.

Decline

The monitoring processes of the optimization phase is also used for deciding about the continuation of an IP protection. If the protection does not generate additional profits to the company, the abandonment of the IPR should be considered. This decision might even affect the entire product, such as withdrawing the product from the market.

3.1.4 Stage Three: IPR Portfolio for Non-users

For the analysis of enterprises which are considered as IPR non-users, we applied the IPR Portfolio in adaptation from the Technology Portfolio of e.g. Boutellier et al., 2007. The approach distinguishes five portfolio sectors and resulting standard strategies, the time sequence of which corresponds to a typical product generation life cycle: observe, study, invest, optimize, and divest.

The Model in the following figure shows the five phases of the technology life cycle:

Observe

In this segment competencies are characterized by a strategic importance which is perceived to be still slight. As a rule, no budget is available here and responsibility for the radar lies with the person internally responsible for technology. The relevant competence, technology, product or service fields are to be actively observed, for example by visiting exhibitions and congresses, studying magazines, journals and the Internet, and by collaboration with universities.

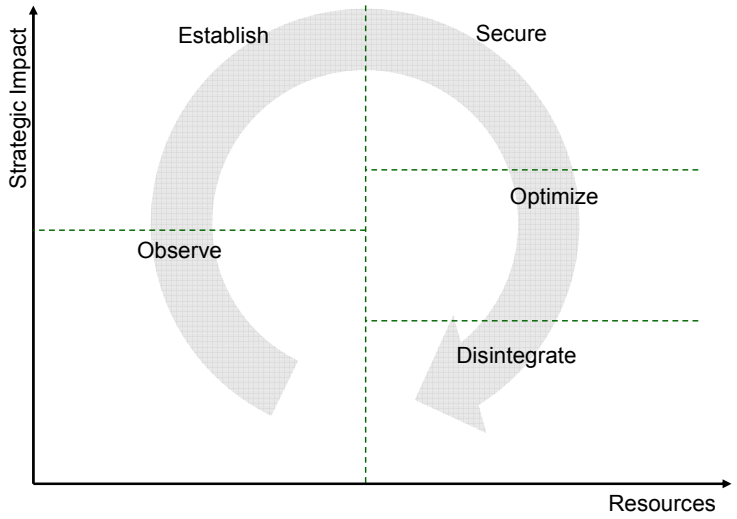
Establish

If the strategic importance from the customer, market, competitor or substitute technology perspective increases, initial experiences and competencies are to be generated, for example by means of prototypes. Projects in this area frequently have to struggle with a tight budget and chances of success are very uncertain. External partners are also sought and integrated to enable competencies to be generated as efficiently as possible.

Secure

A long-term high level of strategic importance stands opposite considerable internal resources. Long-term investment in the core area of competence is therefore necessary and useful to secure existing technologies and investment and to expand competitive advantages further. The desired return on investment must be achieved at least in the long-term, while short-term results are not necessarily to be anticipated.

Graph 5 The IPR Portfolio Model for Non-users



Optimize

If, despite considerable internal resources, strategic importance is only moderate or if the strategic importance may even be expected to decrease, it is sensible not to make any further large scale investments; instead, there is a need to optimize. The return on investment must be achieved in the short-term.

Disintegrate

If no competitive advantage is foreseeable over the next 5 to 10 years, the resources committed up to this point must be promptly curtailed so as to be available for new technology potentials. It makes sense to continue with the technologies and products only as long as revenue can still be achieved. There should, however, be no further investment in the expansion of competencies.

3.1.5 Stage Four: Action Plan

The final stage of the framework is the action plan, where the defined strategies of IPR management will be derived from the previous stages. In this stage, the action plan begins with prioritization and planning of policy recommendations for the IPR management strategy implementation actions, the execution and measurements of effectiveness.

3.2 Questionnaire

The elaboration of the questionnaire guideline for the interviews with the companies is based on the framework described above. The questionnaire guideline indicates that

the interviews have been conducted in a semi-structured manner. Here, qualitative questions are asked allowing the respondent to freely answer from his experience without being forced to answer within set boundaries as is the case in structured interview guidelines.

The interviews are conducted as personal conversation with employees of the company and entail the key questions regarding the management of intellectual property. This procedure allows the interviewee to tell freely about his experiences without being interrupted due to fixed questions. However, following the key questions, several sub-questions are asked helping the interviewer to check if the relevant aspects for the question have been answered. An example for such a key question with sub-questions is shown in the following figure (The entire questionnaire guideline can be found in the appendix).

For the purpose of simplification, hereafter the term *questionnaire* is used synonymous with the term *questionnaire guideline.*

The structure of the questionnaire corresponds with this study's research approach and consists of four parts:

1. General questions regarding the company
2. Questions regarding the company's competitive environment
3. Questions regarding the company's R&D and IP strategy
4. Concluding questions

General questions regarding the company

The first *introductory part* serves to collect general company information such as industry sector, number of employees, R&D and IP expenses etc. This part is also helpful to start the conversation with the interview partner instead of jumping directly into the main part. The issue of intellectual property is, however, a subject that can be critical for the company regarding the disclosure of information.

Questions regarding the company's competitive environment

The second part represents the phase *competitive environment* of the model. For each of the five forces, there is one key question. The objective of this part of the questionnaire is to obtain an understanding of the company's competitive situation in the market.

Questions regarding the company's R&D and IP strategy

In this part, the objective is to get an insight in the *R&D and IP processes* of the company. Therefore, one key question is asked for each phase of the IP portfolio. In this part, it is expected to get detailed information regarding the R&D and IP strategy of

SMEs that could not be provided by the questionnaire survey conducted by the IPI earlier (for this survey, see chapter 4).

Graph 6 An Example of the Structure of the Questions

III.2 Generate: How and when does your company decide to seek formal IP protection (including patents, trademarks, copyright and design)?

a) What are some motives for seeking IP protection?
   a. Freedom of Action
   b. Blockage of Competitors
   c. Creating another company
   d. Increase the interest for an acquisition by another company
   e. Optimize the ROI (Return on Investment)

b) For patents, how is the monitoring conducted and how often?

c) For all forms of IP, are competitors identified?
   a. If so, what methods are used to identify competitors?
   b. What identifies and defines a competitor?
   c. Is the search limited to certain countries? If so, why?

d) Is there an analysis of competitor activities?
   a. What is considered (i.e. market share, profit, IP, etc.)?
   b. How is this information used to benefit your company?

e) Are potential in-licensing agreements considered? If so, through what means and for what purpose?

Concluding questions

The concluding part consists of questions regarding the *experiences* of the companies with the IP system, the IPI, IP infringements etc. Furthermore, it includes questions about *how to improve the IP system for SMEs in Switzerland*. Hence, this part is expected to provide important hints regarding the derivation of recommendations, i.e. for the last phase of the model.

4 Methodology

The research design for the overall IP project of the IPI consists of four distinctive phases. The first phase, an SME questionnaire survey (1), has already been established by the IPI. The second phase is a benchmarking study regarding the "Support Services in the Field of Intellectual Property Rights (IPR) for SMEs in Switzerland" (2), which has already been finished[2]. The third phase is the "Economic Focus Study on SMEs and Intellectual Property in Switzerland"[3] (3) and the fourth phase is the "Case Studies on SMEs and Intellectual Property in Switzerland" (4). Due to the high contiguity of the two last phases, the third and fourth phase are accomplished in parallel with reciprocal inputs. In the following paragraphs, the research design of the fourth phase, the case studies, will be presented.

Understanding the implementation of intellectual property by SMEs is a complex and context-bound managerial issue. For this reason an explorative case study research approach is used (Yin, 2003). However, while the study will be qualitative due to its context, it is positioned between deductive and inductive qualitative studies, being neither only a test of an already developed theory nor a mere development of a new theory. Rather, it is an extension of existing literature and theories on intellectual property at SMEs as well as an extension of the interim results given to us by the Economic Focus Study.

The qualitative research process is structured to maximize internal and external validity. *External validity*, in the context of qualitative studies, refers to the extent to which the results are transferable. *Internal validity* is the approximate truth about cause-effect or causal relationships (Lincoln and Cuba, 1985). A multi-case research design is employed (Eisenhardt, 1989). 24 case studies were completed to provide a broad understanding of the behavioral differences in SMEs towards intellectual property. All the case studies stem from Swiss SMEs. The contact persons of the SMEs were managers in charge of intellectual property, technology and innovation management issues.

An In-depth case study analysis with eleven firms out of the 24 cases was performed. The selection of the SMEs for the in depth cases was based on the unique IP

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[2] Radauer, Alfred; Streicher Jürgen (2008): "Support Services in the Field of Intellectual Property Rights (IPR) for SMEs in Switzerland - A Review." 1st Report of the IPI SME-IP Project. Berne: Swiss Federal Institute of Intellectual Property (IPI).

[3] Keupp, Marcus M.; Lhuillery, Stéphane; Garcia-Torres, M. Abraham; Raffo, Julio (2009): "Economic Focus Study on SMEs and Intellectual Property in Switzerland." 2nd Report of the IPI SME-IP Project. Berne: Swiss Federal Institute of Intellectual Property (IPI).

experiences these SMEs had, the geographical region they belong to and the industry sector in which they operate.

The SMEs were questioned in a secondary interview round. The interview questions were mainly focused on the IP experiences, and the successful and unsuccessful experiences these companies had with the IP system. The eleven chosen companies for the in-depth interviews are presented in chapter 5.

As seen in the preceding chapters, we have created a questionnaire as well as a framework for the 24 personal interviews conducted. The questionnaire guideline is based upon our literature review, inputs we received from the IPI and the study team of the related sister project, the Economic Focus Study. The case selection is based on the same sources and will be discussed in the following paragraph.

4.1 Case Selection

24 case studies were conducted for this study. Half of the 24 case studies were carried out by the ETH Zurich and half of them by the University of St.Gallen. Doing this, the ETH Zurich conducted their case studies in the areas of Zurich, Basel and Luzern, mainly focusing on the biotech, pharma and medical technology industries. The University of St.Gallen conducted their case studies in the other Swiss regions focusing on the industries not covered by the ETH Zurich, i.e. mechanical engineering, textile, plastics etc.

Input from the Economic Focus Study Team and the IPI

All cases were selected on the basis of the companies' use and non-use of intellectual property and the variety of their experiences in using intellectual property. Therefore the Economic Focus Study undertook a cluster analysis. A cluster analysis is a data mining tool which allows to discover, without strong a priori assumptions, the existence of groups in data. The Economic Focus Study Team analyzed all 1106 companies that took part in the questionnaire survey (first phase of the overall project "SME-IP" by the IPI) to obtain the cluster analysis. Therefore they included questions about the companies' use of IPRs, motives to use or not to use IPRs as well as further given information on IPRs to create the clusters.

A total of six clusters were created, three of which describe different forms of IPR users and three of which describe different forms of IPR non-users. The following paragraph presents these six clusters:

1. **User 1: "Multiple users"** - This cluster consists of companies using industrial design and trademarks while they use patents less frequently. These firms are quite well informed about the three measures. They use industrial designs and trademarks for the same three reasons: to protect themselves against competitors, to protect against counterfeiters, and to promote their brand or design.

2. **User 2: "Patentees"** - This cluster consists of companies which focus on patents. In 54% of the cases, the firms are well informed regarding the use of patents and trademarks but they do not use industrial designs for IP protection, as they have little or no knowledge about industrial designs. These firms exhibit the same dominant motivations for using IPRs as those in the first cluster: to protect themselves against competitors, against counterfeiters, and to promote their brand or technology (also for negotiation reasons).

3. **User 3: "Trademarks"** - This cluster comprises IPR using firms which use exclusively trademarks, a legal tool they know well. These firms do not patent because this IP measure does not apply to their innovations because they are not patentable (e.g. software in Europe) or because the patent system is considered too complex and somehow too expensive. This category of IPR users seems to be the only one concerned by EPO's efforts to reduce patenting cost.

4. **Non-users 1:** This cluster comprises companies which are well-informed about the management of intellectual property and which state that IPRs are not relevant for their activities as well as too expensive and too complex. These results constitute a kind of paradox here: these firms are claiming that the IPR system does not apply to them or is insufficient in its scope of protection, and at the same time they are claiming that this system is too expensive or too complex to be applied as well. However, they declare to be quite well informed compared to other non-users or even companies using trademarks only.

5. **Non-users 2:** This cluster includes companies which have no information or knowledge about IP systems and think that they are too complex.

6. **Non-users 3:** This cluster is made of all companies that are not ignorant about the IP system but that are not able to provide reasons for their non-usage of it other than that their inventions can be protected neither by industrial design nor by trademarks or even patents. Note that unlike the first non-user group, cost is not a specific concern to these companies, even if they are better informed about the IP system.

For every cluster the research team defined an archetype (e.g. a company that is the ideal example for a "multiple user"). Every archetype is defined by its hypothetical answers to the considered questions. Afterwards all the companies which took part in the IPI survey were ranked according to their variance to the defined archetype. The ranking of the companies shows which companies come closest to the defined archetype. The case studies of this study are conducted with the archetype companies or the company closest to the archetype (in case that an interview was not accepted by the company).

A danger that lies within this approach is that companies which come close to a certain archetype might be similar companies and therefore show a similar behavior pattern regarding their use of IPRs. To avoid the risk of receiving identical case studies, heterogeneous companies within every cluster were chosen. This makes it on the one hand possible to compare the interviewed companies, and on the other hand it gives the chance to find multiple reasons for a similar behavior regarding the use of IPRs.

Given the six presented clusters, both teams, the ETH Zurich and the University of St.Gallen, selected multiple firms from every single cluster. To guarantee a broad coverage of Swiss SMEs the selected firms within every cluster differ in industry, size and region.

As a second step, we chose ten out of the 24 interviewed companies to conduct in-depth case studies. Subsequently, these cases were further deepened and analysed to derive policy and service recommendations (see chapters 6 for further analysis and chapter 7 for recommendations).

The three proposed non-user clusters turned out to be impractical. Conducting interviews with non-user companies, a differentiations between the three clusters was virtually impossible. Therefore the study team decided to transform the non-user clusters from the initial three into two more exclusive ones. The two new clusters are

Intuitive non-users

Companies not using any IPRs and not being well informed about the system yet. These firms have never applied for an IPR for multiple reasons and they do not have detailed knowledge about the IPI and the IP system as a whole.

Non-users on purpose

This cluster consists of companies well aware of the IP system. However these companies do not have registered IPRs and prefer factual protection methods.

4.2 Data Collection

The sources and treatment of data are key elements in every research method. As the qualitative case study research – being a relatively young method – is often regarded with certain skepticism, a convincing scientific data collection strategy is crucial for the acceptance of the study. In this project we are geared to the theoretical construct of Yin (2003), who emphasizes the importance of validity and reliability as pillars of the design of qualitative research. The *external validity* is proven by application of the replication logic of multiple case studies. The *internal validity* is achieved by the triangulation of the SME data – using multiple sources of evidence. Replication logic means that it is tested whether the results already found can be replicated by analyzing new cases which should, according to theory, yield the same results. Triangulation of data is enhanced by the nature of this project and its cooperation and coordination with the

Economic Focus Study team. The tactic for realizing the aforementioned issues is the creation of a case study database.

In consequence, to ensure the validity and the reliability of the project results, we follow Yin's (2003) three principles for data collections:

- Multiple sources of evidence
- Creating a database
- Maintain a chain of evidence

Multiple sources of evidence

This principle refers to internal validity. Different sources of information, e.g. interviews, company reports, documentation, allowed us to collect data from different viewpoints and different argumentations. These data differ from each other albeit they are highly complementary and permit the development of a profound case study. Additionally, by following the principle of triangulation to obtain convergent evidences, the validity is strengthened (Eisenhardt 1989, Yin 2003). Concerning the literature, we especially considered literature with similar findings as well as conflicting literature to support user and non-user arguments. Additionally, the quantitative analysis of further IP-related data (econometric results) provided further insights and guidance for the qualitative research contribution.

Creating a database

As mentioned earlier, multiple case studies tend to accumulate a great volume of data. We investigated 24 case studies including 12 user and 12 non-user cases. Therefore, treating the flood of data efficiently is a crucial success factor for the applied research method. The realization of a structured data construct allows an overview of all collected data. Furthermore, the database was a shared tool for the project partners, the study team St.Gallen and the study team ETHZ, and thus, both partners were not limited to written reports in which the data is compacted (Yin, 2003). Overall, a well-composed database increases significantly the reliability of the case study research for the project team.

Maintain a chain of evidence

This principle of maintaining a chain of evidence also aims mainly at increasing the reliability. The chain of evidence in this project is a structured and a systematic coordination of quantitative and qualitative research design. It allows an external observer to retrace the derivation of any evidence from the beginning to the end of the project (Yin, 2003). The different milestones and coordination meetings were visualized in the project planning.

4.3 Data Analysis

The data collection of the multiple cases is followed by the analysis of the data. Therefore two parts are differentiated: The within-case analysis and the cross-case analysis (Eisenhardt 1989, Yin 2003), which are briefly described in the following.

Within-case analysis:

Starting with the within-case analysis, this aims at structuring the received information of each single case. Each case is treated individually in a separate case study. In this way, the volume of data is put into a first structure which is helpful for subsequent analysis.

Cross-case analysis:

After having created individual patterns for each case, the cross-case analysis aims at identifying general patterns across the cases by comparing them. Examining cases in different ways is above all a means to mitigate biases. The differentiation of the two extremes "users" and "non-users" enables an advantageous illustration of contrasting patterns ("polar types") in a transparently observable way (Eisenhardt, 1989; Eisenhardt, Graebner, 2007).

As support for the data analysis, a database was created to represent the data in a clearly arranged way (Eisenhardt, Graebner 2007), and to facilitate an objective analysis. Based on this analysis, general and more specified patterns are derived which are furthermore enhanced by the inputs from literature, ultimately allowing a profound analysis of data.

5 Case Studies

This chapter holds the 24 conducted case studies. The presented studies are clustered into five groups: three user groups (multiple users, patentees and trademarks) as well as two non-user groups (intuitive non-users and non-users on purpose). Every cluster starts with at least one in-depth case study to introduce the reader into the given cluster.

Each cluster is followed by a recapitulatory cross-case analysis. These cross-case analyses point out the most important characteristics of every cluster based on comparative tables.

Outline for case studies

For this project the study team conducted 24 interviews with SMEs in Switzerland. In order to manage all the data appropriately, the team construct the cases in a "story" telling the structure of the SMEs. The structure is based on the reference model as well as the associated questionnaire, which is described in the model building section of this report. The model consists of four stages: "Mission and Vision", "Porter's five forces", "IPR Portfolio" and the "Action Plan". The questionnaire covers the first three stages. Additionally to the interviews, we used other data sources such as the firms' annual reports, brochures and their homepages. The action plan in the form of policy recommendations derived from the case studies results can be read in this report's last chapter.

The objective of this structure is to have all the cases written in a homogeneous arrangement, since this will be the comparison basis for the cross-case analysis. The structure of the stories is oriented according to the model and the questionnaire. The structure for each case is as follows:

- Company profile
- R&D and IP strategy
- Ideas for improving the IP management in SMEs[4]

Company profile

The first part "Company profile" consists of the presentation of the firm including information about products, facts and figures, vision and mission etc. Furthermore, the questionnaire part "Porter's five forces" is included, giving information about the firm's market position, main competitors, product substitutes etc.

[4] In-depth case studies have an additional section called "IP experiences".

R&D and IP strategy

This part describes the SMEs' R&D and IP management. The objective here is to present the story of the firm. It is a description of how the SME manages its R&D and in which way it treats its intellectual property. The stories differ a lot among the SMEs, especially between IPR users and non-users.

Ideas for improving the IP management in SMEs

In this part the ideas of the interviewed SME are summed up about how to improve the protection of innovation for SMEs. In order to improve their own protection strategy, we expected the SME to provide us with important information about gaps within the IPR system, the service providers, the access to information, etc.

Every single case is an individual story. There may be parallels between some of them, but there are also cases that differ more than expected. By conducting the personal interviews, we obtained as much insight in the SME's behavior as possible.

In this way we created 24 cases with different stories but with the same scheme, which allowed us to conduct cross-case analyses.

5.1 Multiple Users

The following sections present the case studies conducted with users of the IPR system. The users are clustered into the three segments "multiple users", "patentees", and "trademarks".

The multiple user cluster consists of companies using industrial designs and trademarks while they use patents less frequently. These firms are quite well informed about the three measures. They use industrial designs and trademarks for the same three reasons: to protect themselves against competitors, to protect against counterfeiters, and to promote their brand or design.

The following companies will be presented in the cluster of "multiple users":

- cuboro AG (HSG) In-depth case study
- Zumbach (HSG)
- Infochroma (ETHZ) In-depth case study
- Prionics (ETHZ) In-depth case study
- SI-Group (ETHZ) In-depth case study
- IROC (ETHZ)
- Peka (ETHZ)

5.1.1 cuboro AG

Table 1 cuboro Company Overview

Name	cuboro AG
Industry	High quality wooden toys
Size	5 employees
Markets	Worldwide
IP	Trademarks, industrial designs, copyrights
Mission	*"We want to become a significant part of the high quality and educational toy market."*
Founded	1985
Responsible	University of St.Gallen

Company profile

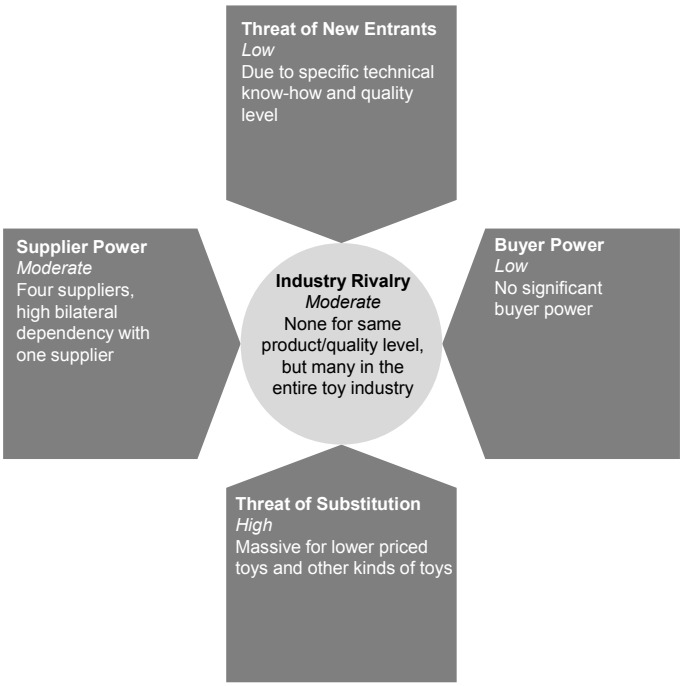
The cuboro AG (table 1) produces highly sophisticated toys made of wood. cuboro is located in the canton of Berne and has five employees, including the general manager who is also responsible for the IP management. However, IP issues are only a relatively small part of his job.

cuboro's company vision is to *"become a significant part of the high quality and educational toy market."* Additionally, cuboro emphasized that the firm's culture is based on fair trade and respect for the environment.

Currently, cuboro sells four different products: (1) cuboro: a marble run for the entire family, (2) cugolino: a marble run for children, (3) babel: a three dimensional puzzle and (4) alhambra: a didactical puzzle.

Graph 7 gives an overview of cuboro's competitive environment. cuboro has four different suppliers: a Swiss joinery for the wooden marble runs, a Japanese supplier for the marbles, one supplier in Rumania for the puzzles and one in Austria for the wooden elements. While cuboro's dependency on the latter three is not significant, there is an total dependency on the joinery. However, this dependency is of bilateral nature as 80% of the joinery works are for cuboro. It must be mentioned that there is no written contract between both firms. Instead, both partners rely on confidence and values.

Graph 7 cuboro's Competitive Environment

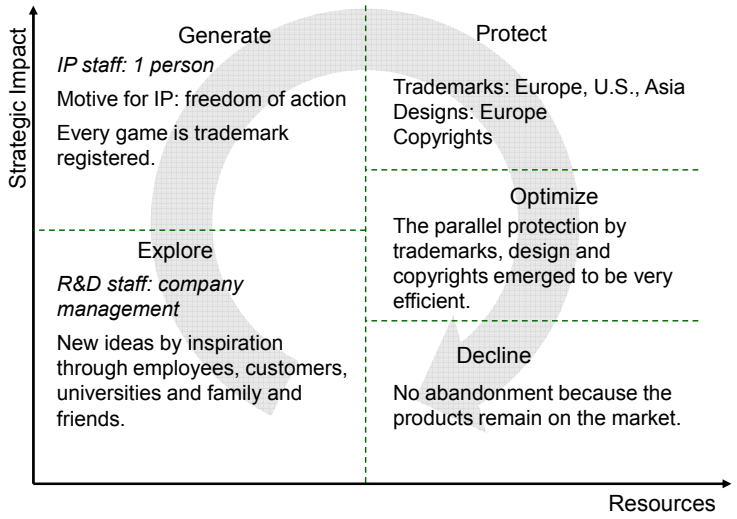


cuboro judges the customer's buying power as low. cuboro is acting on international markets and has customers all over the world. In total the company has approximately 1000 customers, while eight main customers accord for two-third of the turnover. The products of cuboro are specific and unique and the company does not have direct competitors in terms of the same quality level. However, the over-all toy market is large and cuboro is facing many competitors selling toys at a lesser price point. The threat of new market entrants for products with the same quality level is low as it is difficult for new entrants to obtain the specific technical know-how. This is also the reason for the non-existence of high quality substitutional products. However, there is a massive threat of substitution by toys in the lower price segments.

R&D and IP strategy

cuboro's development of new products is realized by the company's general manager. He is constantly improving the existing products or creating ideas for entirely new games (Explore) (graph 8). Sources for inspiration are cuboro's employees, family members, friends as well as customers and universities. Even if the company does not actively search the contact with universities – it is more the case that the universities approach cuboro – cuboro is open-minded to find inspiration by them.

Graph 8 cuboro's IP Portfolio



Originally, cuboro was driven by the idea of marking an own invention as such. This personal interest was especially strong when the company started. Today, cuboro uses its IP strategy mainly to ensure freedom to operate. Besides this motive, cuboro is becoming increasingly conscious of the financial impact of a legally protected invention. cuboro has a clear IP strategy (Generate). The company registers a trademark for every single game they introduce to the market. cuboro uses three types of protection methods: trademarks, industrial designs and copyrights. Trademarks are the most important means of formal protection for cuboro. The company has registered trademarks on every product in Europe, the U.S. and Asia (Protect). The company is named after its first game "cuboro", which is also protected as a trademark. This main trademark thus stands for the entire company. Design protection is also used for every product, but unlike trademarks, the designs are not protected in the U.S. due to the different legal system. cuboro uses the copyright to protect their game instructions. Experience showed, that the double (trademark, industrial design) or even triple (trademark, industrial design, copyright) protection strategy is quite successful (Optimize). This makes it more difficult for free riders to imitate cuboro's products. Furthermore, cuboro is able to defend its products in case of infringement from several sides. cuboro does not file patent applications because their products do not meet the required characteristics of technical novelty.

cuboro never exits the IP protection for its products mainly because they never withdrew a game from the market (Decline). cuboro judges the existing IP protection as sufficient. Even a higher IP budget or subsidies would not change cuboro's IP activities.

IP experiences

cuboro's most important means of protection are trademarks and industrial designs. The company holds four trademarks - one trademark per product - and about six industrial designs. Additionally, cuboro's game instructions are protected through copyrights which cuboro deposits at an attorney. The company has a good know-how regarding IP protection and manages its intellectual property mainly on its own without an external attorney.

Asking cuboro about experience with the application process for trademarks and industrial designs, the answer was quite positive. The company stated that there is a lot of bureaucracy to surmount, but with the guidance of the IPI cuboro does not consider the application process as a barrier to register a trademark or a design.

In general, cuboro has made good experiences with the services of the IPI. The company used the IPI's advisory services for general questions, especially about industrial designs and trademarks, and for the navigation through the application process. cuboro always received the needed information. Besides the IPI services, the company considers the Internet page of WIPO as a good complementary source of information. cuboro especially appreciates the WIPO's trademark database. When filing a trademark application, cuboro checks if the name or a similar name already exists. The company firstly uses the telephone support of the IPI. Secondly, cuboro uses the trademark database of the WIPO[5]. Thirdly, an Internet search, especially via Google[6], is performed to check the uniqueness of the new trademark.

Patent and trademark attorneys play a minor role for cuboro. cuboro is well informed about its possibilities to protect its products. The strategy to protect every product without exception by at least a trademark is very clear and does not require an attorney. However, in case of IPR infringements cuboro cooperates with a trademark attorney. In fact, cuboro has had several cases of infringement. In the following section three infringement cases are briefly presented.

Imitation of product design

One case was the imitation of a marble run by a low cost U.S. manufacturer. The imitated product had a similar design and game play as cuboro's version. However, the imitation had another name which differed a lot from cuboro's. Therefore, cuboro could not take legal action against trademark infringement. As mentioned before, the design of the product in the given case was not registered in the U.S. because the design was too similar to another application tool from a "slatted frame". This made it difficult for cuboro to defend its product against the imitation. They contacted the competitor, which resulted in a conflict that lasted for a few years and that could not be solved.

5 http://www.wipo.int/ipdl/en/search/madrid/search-struct.jsp

6 http://www.google.com

Finally, after years, the competitor disappeared from the market. cuboro's name and quality prevailed.

Trademark infringements

A second infringement case was about a trademark infringement. Another toy company had published – by coincidence simultaneously with cuboro – a game with the same name as cuboro's. cuboro contacted the company and they came to the conclusion that the games were not similar at all in terms of design or topic. In the end, both companies agreed on a coexistence, using the same name, because there was no threat of significant negative impact for any of the companies.

In another case, a toy company used one of cuboro's trademarked names for a game. Not willing to accept cuboro's registered right – on the contrary implying cuboro would use the name to free ride – cuboro used a lawyer to claim its right.

The disclosures of infringements were made on the one hand by cuboro's weekly monitoring via the Internet, on the other hand due to hints from customers who discovered suspicious products. On the Internet, cuboro uses the websites of Google, eBay[7] and the WIPO. Through these websites, the company searches for product names and products similar to its own toys and checks if similar products compete with cuboro's products. Especially shopping websites such as eBay are considered to be a high risk for the diffusion of imitated products. Thus, cuboro monitors these websites in order to stop imitators as early as possible. In regards to Internet market places, such as eBay, cuboro states that it is rather difficult to get to the counterfeiters. This is mainly due to the fact that online market places are not very cooperative and often not willing to hand out the names and addresses of counterfeiters.

The infringement cases cuboro has been involved in until now could all be solved by an agreement out of court. In case that an agreement out of court is not possible and a legal procedure not avoidable, cuboro would defend its intellectual property in court as long as the costs do not exceed its financial possibilities.

In order to improve its own IP strategy, cuboro is very open-minded and appreciates discussions with others regarding protection of intellectual property. On exhibitions, for example, cuboro gets in contact with other companies and exchanges IP experiences. cuboro considers the contact with other firms to be important and profits from their experiences. In return, cuboro also discloses its own IP strategy.

Ideas for improving IP management in SMEs

Overall, cuboro is content with the services of the IPI. However, there is one suggestion the company has: It would be helpful to have on the Internet page of the IPI

[7] http://www.ebay.com/

one page containing the key information for IPR applications. cuboro suggests a step by step guide that teaches SMEs how to register a trademark / design in Switzerland / Europe / worldwide. The idea is to have this information on a single page, explained in a clear and brief manner.

Regarding the trademark application process, cuboro thinks that an additional service of the IPI that automatically checks existing trademarks would be good. The company would also accept an additional fee for this service as long as the costs do not exceed the own effort when doing the search by itself.

Furthermore, the low awareness of the IP issue was remarked. The term "intellectual property" or "IP" and the possibilities of how to handle it are not present in people's minds. One reason for the unawareness of intellectual property is that only people who are confronted with IP issues – through their job for example – are engaged in intellectual propertyIP and its protection methods. There is a need to increase the perception of IP issues. Therefore, cuboro believes that the topic of intellectual property should be integrated into the educational system.

5.1.2 Zumbach

Table 2 Zumbach Company Overview

Name	Zumbach Electronic AG
Industry	In-line measuring, monitoring and control systems for the wire and cable industry
Size	250 employees
Markets	Worldwide
IP	Patents, trademarks
Mission	*"The ZUMBACH TEAM, in partnership with our customers and suppliers, is committed to providing the most accurate, reliable and comprehensive industrial gauging, process control and quality/production data acquisition solutions.* *All our efforts are dedicated to achieving customer satisfaction by delivering the maximum return on investment to every user of our products."*
Founded	1957
Responsible	University of St.Gallen

Company profile

Zumbach Electronic AG (table 2) is a medium size enterprise with 250 employees in the canton of Bern. The company was founded in 1957 and today it is one of the leading manufacturers of in-line measuring, monitoring and control systems for the wire and cable industry, (from wire drawing to fiber optics, including extrusion of insulation and jackets), for plastic extrusion lines (mono filaments, catheter, tubing, pipe or profiles) and for the metal industry (hot and cold rolling, continuous casting, turning, grinding, polishing to QC inspection stations).

The supplier power (graph 9) is considered moderate. However, Zumbach is facing stronger dependencies on suppliers, in cases where only single souring is possible. This is the case for some very specific technologies. In total Zumbach has a large amount of suppliers.

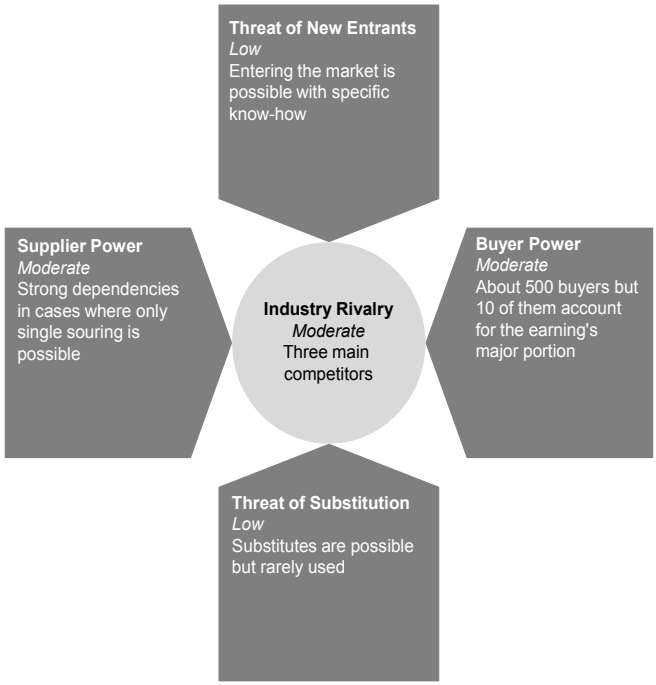
The buying power is considered moderate, with the exception for key customers and OEM's, who are buying large amounts. Zumbach experiences also higher price pressure in the Asian and Indian market. In order to be competitive in these countries, Zumbach has outsourced some of the manufacturing and also develops products for these specific markets.

The threat of new entry is considered rather low. Entering the market is possible with specific know-how, but due to excellent market positioning and high level of integration, it is very difficult to acquire a relevant market share.

Currently, Zumbach does not see any new technologies which could substitute core know-how or products. New technologies with potential are monitored informally and would lead to an R&D activity, if needed.

The competitive rivalry is moderate. While Zumbach is the only company serving the entire market, in average three companies compete for the specific submarkets.

Graph 9 Zumbach's Competitive Environment



R&D and IP strategy

The international R&D department (CH, ES, USA) counts about 40 employees. The head of the R&D department is responsible for the company's IPmanagement. Furthermore, Zumbach constantly cooperates with an external patent attorney. Established patents are solely managed in-house.

Zumbach is a family firm since its formation in 1957 and today has reached a size of 250 employees worldwide. Many strategic decisions regarding the company's management stem from the founding generation. In recent years the company has been handed over from one generation to the next. In this context Zumbach is facing changes in its strategic management and the company's organizational structure.

Traditionally, Zumbach had a closed innovation management. New technologies were created internally (explore). When external knowledge was needed Zumbach used to acquire small companies to include this knowledge into the AG. This method often worked for Zumbach but integrating the foreign companies into the Zumbach

cooperation did not come effortlessly. The technical sales and service department provides a market and customer oriented information channel to the R&D department.

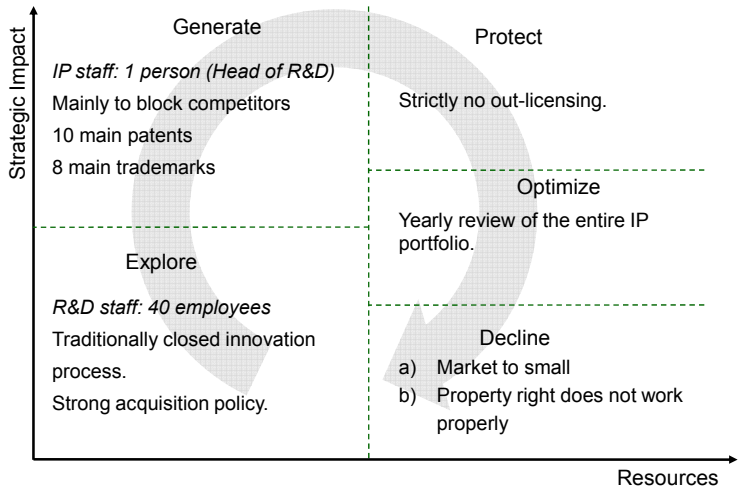
In its competitive market Zumbach seeks formal IP protection mainly to hinder competitors (generate). This allows the company to exclusively offer certain product features. When developing a new technology Zumbach works together with the company's external patent attorney. Zumbach hardly ever chooses secrecy as a protection method. Zumbach has an informal IP policy. Rather than deciding on the basis of a fixed set of criteria the company individually reviews the proper IP protection in every given case.

Zumbach has about ten major patents that protect the company's core business. In addition to that, Zumbach has multiple minor patents and eight international trademarks for their most important products. The company's licensing strategy is of a twofold nature. In-licensing is considered when possible. In contrast to the traditional acquisition strategy, in-licensing is thought of as a prominent future IP strategy. Out-licensing, on the other hand, has not been considered so far.

Optimizing the company's IP portfolio is important to Zumbach's. Every single property right is reviewed on a yearly basis. When a property right does not cover its cost and no other implicit reason is present the property right is declined. Zumbach has two major reasons to decline a property right: the property right does not protect adequately or the market is too small.

Zumbach was involved in several infringement cases. The company's policy is strict and infringements are almost always fought. In the context of acquisitions of intellectual property, Zumbach has learned, based on negative surprises, to be more careful when doing a technical due diligence.

Graph 10 Zumbach's IP Portfolio



IP management in SMEs

The Zumbach AG is aware of the services that the IGE offers but does not use them at the moment. The company sees a benefit in services that teach engineers the proper interaction with patent databases. Furthermore, Zumbach points out that such a knowledge would most probably be of help for many SMEs and would raise the general awareness towards intellectual property inside the companies.

5.1.3 Infochroma

Table 3 Infochroma Company Overview

Name	Infochroma AG
Industry	Pharma/chemical industry, chromatography field
Size	3 employees
Markets	Switzerland and Germany
IP	Trademarks, patents, trade secrets
Mission	*"To produce and market small sampling glass bottles for the pharma/chromatography industry with unique and individual solutions for the market."*
Founded	1967
Responsible	ETH Zurich

Company profile

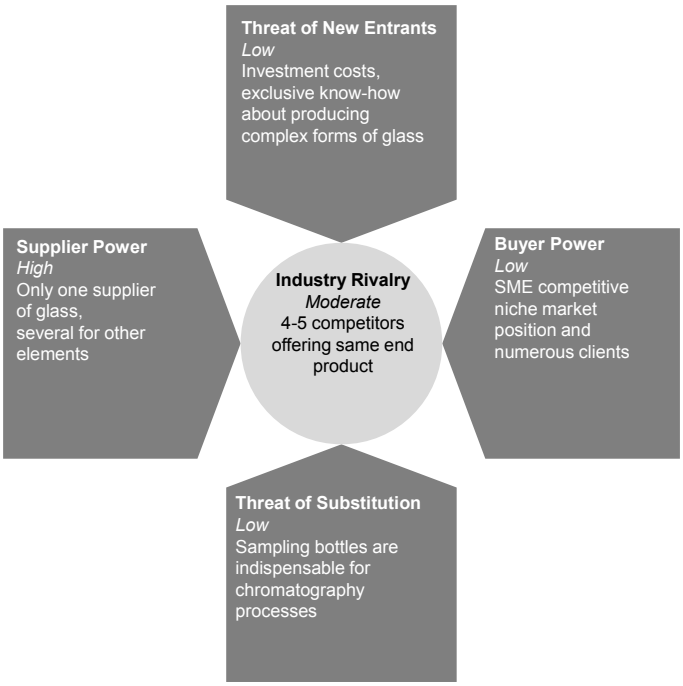
Table 3 shows the company overview. Infochroma AG was established in Zug in 1967. Its field of activities is the production and distribution of chromatography products. With only 3 full-time employees (up to 10 including part-time positions) the firm can be qualified as micro enterprise. Despite and maybe due to its relatively small size, the company has developed a close partnership with its German business partner, the firm Glastechnik Gräfenroda GmbH, sharing R&D and creating important synergies in the development of new products.

The Swiss SME distributes chromatography products that are manufactured by other firms, such as membrane filters, silicon sealing mats or syringe valves. Infochroma itself only produces a limited part of the products used during chromatography process, namely the glass sampling bottle. The distribution activities represent one third of the company's turnover, while its production activities constitute two third.

Graph 11 shows the competitive environment of Infochroma. Supplier power is high for glass, the basic raw material for the company. Indeed, it has only one supplier of glass, the German firm Schott, as this company offers a better price/quality ratio than its American competitors and allows to significantly reducing the rejection rate for end products. A new competitor, who does not originate from the glass manufacturing industry, would face significant barriers of entry. These barriers are the high investment costs for building a new glass factory, know-how regarding complex forms of glass and the construction of the machines to produce such glass. All these require skilled engineers and scientist. A detailed and exhaustive knowledge of glass properties is also needed in order to create new shapes of glass while ensuring its solidity, something that in some cases (for brown glass for example) Infochroma possesses exclusively.

Infochroma's products are not substitutable by others because sampling bottles are indispensable to chromatography processes. The buyer power of the SME's client is considered rather low. Indeed, Infochroma is in a strong position due to the competitiveness of its products. Moreover, the consequent diversity of its buyers contributes to reducing their power over Infochroma.

Graph 11 Infochroma's Competitive Environment



For all these reasons, the competitive rivalry Infochroma is facing can be qualified as rather low. Additionally, the firm's niche market position is also constitutive of the company's low vulnerability to competitors. This is often a typical characteristic of an SME.

R&D and IP strategy

Graph 12 shows the IP portfolio of Infochroma. As a micro-enterprise with only 3 FTEs, Infochroma is facing a lack of significant resources to invest into consequent R&D. Its CEO is involved in the company's R&D process and tries to implement new ideas.

Like many innovative SMEs, Infochroma cannot afford to go for an expensive "patent-all" strategy. On the contrary: The firm's management has to precisely perform a cost/benefit analysis regarding IP protection for an invention, which leads to a selective use of intellectual property. This particular use is selective as regards to the kind of IP

protection that is going to be chosen for a given invention: depending on its commercial interest and/or development chances, it will be protected by a patent or a trade secrets.

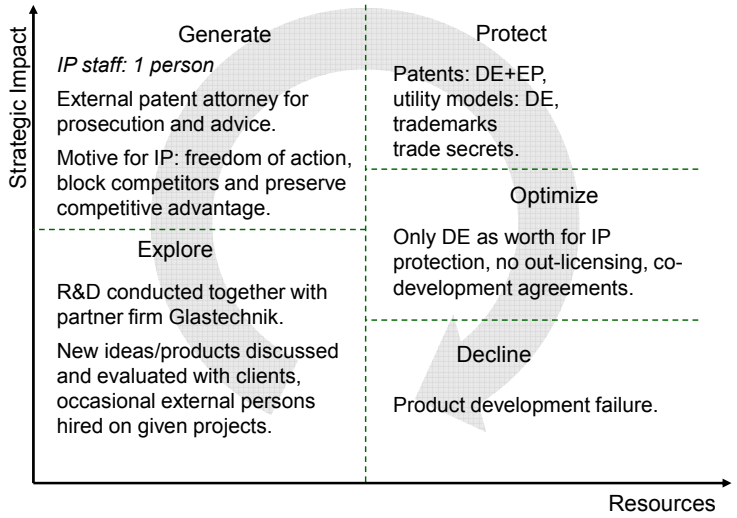
This IP use is also selective in a territorial sense: The IP protection is essentially sought in Germany. The reasons for this is because the sampling bottles are produced in Germany (in Glastechnik's facility), which is the main European market. In addition to the size of its market, Germany is also seen as the place where litigation is affordable to an SME, what enhanced the value of a German patent or utility model as its enforcement costs are reasonable.

The motivation for the company to apply for a patent is mainly to ensure its freedom of action and to block its competitors from producing the same; hence, IP protection is used as a way to preserve the firm's competitive advantage. It is also seen as a defensive tool: Having a registered IPR is a useful defense against an accusation of infringement. The patent can indeed prove that the firm invented something at a given time; it serves as a base to claim prior rights over the allegedly infringed patent.

IP protection would be discontinued if the product or technique cannot be successfully developed in order to reach marketability or if the product is a failure on the market. This situation already happened to Infochroma: Due to unsuccessful product development, Infochroma decided not to pay the renewal fees for a patent. As a consequence, the patent lapsed.

When it comes to IP protection, the SME can only protect its own developed products due to limited resources.

Graph 12 Infochroma's IP Portfolio



IP experiences

Like other SMEs, Infochroma does not have a formal method to determine how to protect new products or processes. When a new product is developed, provided that it seems prima facie inventive enough to be worthy of being protected, Infochroma's CEO asks his external patent attorney for advice and opinion on its patentability. If the response is positive, an application will be written.

Generating more R&D and IP through an efficient partnership

Infochroma's selective approach towards intellectual property is typical for an SME. Infochroma is closely working with its German business partner, Glastechnik Gräfenroda GmbH. This SME has 20 FTEs and is also working in the field of glass production. It has one employee dedicated solely to R&D.

Together with Glastechnik, the company has developed an interesting IP strategy concerning patents: Rather than dispersing its resources with many European patents, it has been decided to apply for German patents for inventions. Infochroma and Glastechnik have created important synergies, as these two firms are co-developing new products. The R&D costs are shared between both companies. The benefits of this joint work are shared as well: IPRs that are generated, for instance when an invention is patented, belong to both firms. In the case of a patent, Infochroma's CEO is also cited as an inventor or both, Infochroma and Glastechnik, are cited as applicants.

This original method to develop new products is particularly interesting in this specific industry. Indeed, R&D costs are high due to the fact that a new machine for producing the glass has to be developed, what requires both time and money. However, building a prototype is the last step in the R&D chain, as this prototype, when successfully tested, is then used for mass production. After the evaluation, Infochroma's CEO discusses the new product/technique with the president of the Board of Directors. If the product has been co-developed, he will also discuss it with the head of his partner Glastechnik. After this round of discussion, the CEOs will decide on the start of series production.

The partnership about shared R&D and IP has proven to be successful. Indeed, Infochroma possesses a total of 3 patents, which is quite significant for such a small company.

Besides patents, Infochroma also regularly applies for utility models in Germany (Gebrauchsmuster), a cheap and quick way to establish a priority document that is also a first layer of IP protection and allows gaining some time to further develop the product and possibly claim priority of this utility model in a later patent application. The company relies on trade secrets as well, used to protect inventions of less importance and machines utilized to produce sampling bottles.

Ideas for improving the IP management in SMEs

Infochroma is aware of the IPI and its services, but never made use of them. Infochroma's CEO is pretty aware of IP issues.

Concerning the services of the IPI, Infochroma does not have particular demands for service improvements.

As for litigation and application costs (another recurrent point of critic from SMEs concerning the IP system) Infochroma's CEO did not mention them as an issue. Indeed, the firm limits its IP protection to its key markets; hence, it does not have to multiply application costs and renewal fees but for exceptional cases.

5.1.4 Prionics

Table 4 Prionics Company Overview

Name	Prionics
Industry	Biotechnology; farm animal diagnostics
Size	100 employees
Markets	Worldwide
IP	Patents, trade secrets, trademarks
Mission	*"We focus our expertise to discover, develop and market innovative diagnostic solutions for the major farm animal disease to protect consumer health."*
Founded	1997
Responsible	ETH Zurich

Company profile

Table 4 shows the company overview. Prionics AG was founded in 1997 as a spin-off company of the University of Zurich. The company has 100 employees. In the early phase of its existence Prionics focused on new diagnostic solutions for mad cow disease, a field in which Prionics was rapidly able to become one of the world leaders. As the number of mad cow disease cases started to decrease, Prionics used its innovative potential to explore and grow in other markets. Today Prionics' focus is on the diagnostic solutions for most farm animal diseases.

Prionics has established an efficient network of subsidiaries and distributors in order to distribute and market its products in the respective core markets. Prionics is located in Schlieren, Zurich, while subsidiary companies can be found in Italy, the USA, Germany, the Netherlands and Argentina.

Prionics' products result from the combination of many different components. These are partly produced in-house. For the other components the company has established an extended network of suppliers. The supplier power is moderate.

Graph 13 shows the competitive environment of Prionics. The buyer power is considered moderate; Prionics' customers are usually reference laboratories, which need a special governmental accreditation to be able to practice. There are usually 3 to 4 reference laboratories per country. Prionics keeps a good overview of its customers landscape.

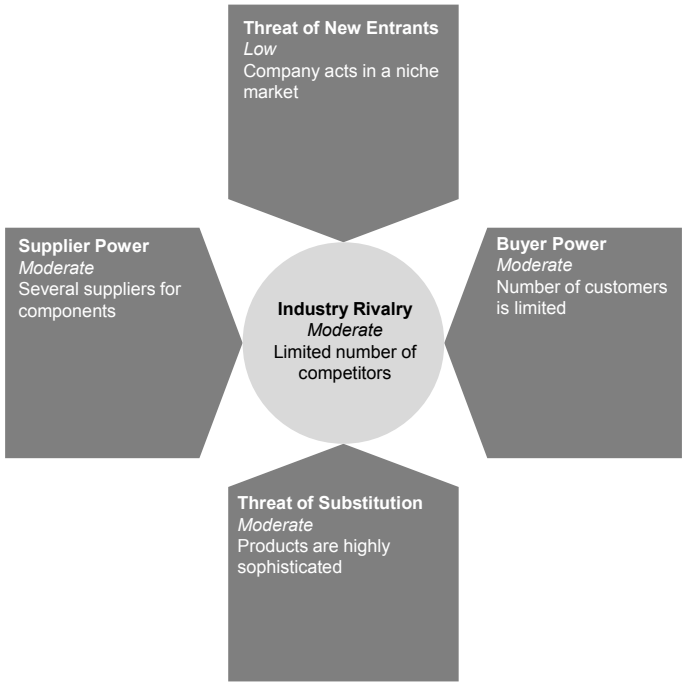
The threat of new entry is rather limited. There are several barriers to overcome in order to enter the market of diagnostic tests for farm animals. Another barrier is to build a strong customer network and the sophisticated technology, which makes it rather difficult for a beginner to enter the market of diagnostic tests for farm animals.

The threat of substitution is rather moderate. The market is, however, highly dynamic; research comes up with discoveries constantly, which could result in new patent applications.

The competitive rivalry is moderate due to the limited number of competitors.

Prionics' main competitor is Idexx, an American company, which is expanding in Europe in different market sectors through acquisitions. Their broad spectrum of activities and their financial capacity allow them to horizontally distribute their resources. Idexx is gradually becoming a monopolist of the farm animal diagnostics industry. Prionics has changed its one product family strategy of the mad cow diseases, and is expanding to innovative diagnostic solutions for other farm animal diseases.

Graph 13 Prionics' Competitive Environment

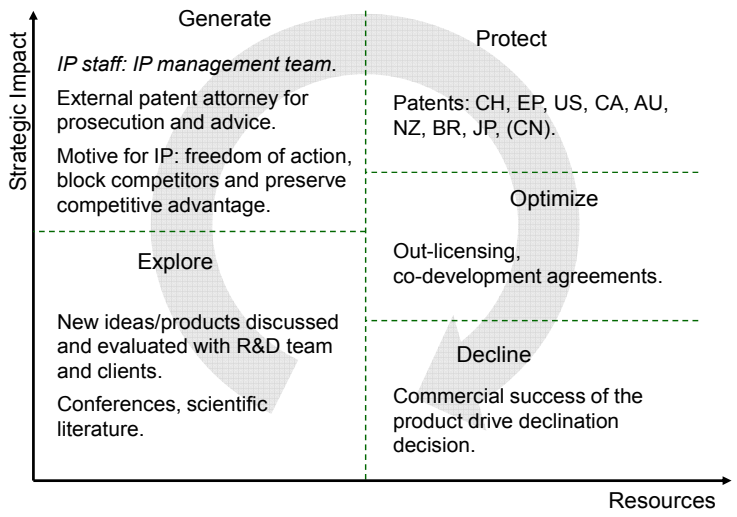


R&D and IP strategy

Graph 14 shows the IP portfolio of Prionics. The SME's innovation success is mainly due to its intense R&D activity. The company has two R&D facilities; one is located in Schlieren, Zurich and the second in Lelystad, the Netherlands. The total number of R&D staff reaches 25 FTEs and the budget that is yearly allocated to R&D, is around 12% of the total revenues.

Prionics has an IP department keeping track of the company's R&D activities. The department is composed of an IP management head, a patent specialist and a part-time employee administering the company's trademarks.

Graph 14 Prionics's IP Portfolio



Prionics' strategy is to have a strong IP portfolio. The company currently owns 29 patents and 21 trademarks. Moreover, the company is changing its IP strategy towards acquiring patents from other companies. The company files 3-5 patents per year. This is needed due to the extreme competitive environment of Prionics' markets and the appalling effects that litigation could have once a product is already established in the market.

IP experiences

Prionics has a well established IP management in its organizational structure. Although small, Prionics has an IP department and several other units, composed of representatives of other departments, who are meeting periodically to deal with important strategic IP-related decisions.

To identify new technological ventures, the R&D personnel regularly attends scientific conferences and keeps close relation to leading university labs as well as to governmental labs in order to stay up to date of the technological development in its field of expertise.

Prionics has a programmed patent and literature monitoring systems in place, which is used actively by the personnel in charge of IP questions. The patent specialist continuously performs a pre-screening of the current and future R&D projects at Prionics, she then develops a small database, which will be sent to the Screener Panel (composed of the heads of all R&D units as well as a representative of both the M&S and Production divisions). This database is then further analyzed and new opportunities or threats are identified. The results are transmitted to the patent specialist, who decides, in collaboration with the IP head, which cases will be presented to the Patent Committee for final decision on how to proceed. The Patent

Committee will, in turn, elaborate new strategies (in-licensing, patent purchase, project drop, etc.) and will transmit its conclusions to the Senior Management and partly to the Executive Board for driving the business decisions.

Once an invention is generated within Prionics' R&D units, the respective inventors can fill in a so-called approval form describing the invention. These forms will be examined by the Patent committee, which eventually makes the decision on whether or not to seek formal IP protection. Inventions with a potential of being winning products result in an immediate patent application filing. Most of the filings are done via the PCT system. For strategic patents a German application is usually filed, which is dropped after one year and filed as a PCT application. In cases where a rapid launch of a product is to be expected, national filings in the major markets for these products are done.

The geographical extension of Prionics' IP protection is also considered when it comes to the optimization of the IP strategy. When Prionics was in its start-up phase, the enthusiasm was leading the management of the company to seek worldwide protection. The resulting high costs led the management to reshape Prionics' IP policy. Today Prionics has clear rules to define where to patent. The focus is on those countries with potential competition due to big markets.

The commercial success of Prionics' products is the main criterion, which drives the decision on whether formal IP protection may be abandoned or continued. Twice a year the IP portfolio is screened and checked. For example, the geographical patent distribution and the profitability of the products are examined. Prionics' experience tells that the life cycle of a product in its field usually does not last the 20 years of patent protection. Patents might thus be dropped before their expiration. A further possibility is that they are out-licensed. In some cases Prionics uses the out-licensing strategy to its competitors. This is done if there is evidence that they are too advanced and that the royalties that could result from the respective agreements would be more profitable than the self-exploitation of the technology.

Ideas for improving the IP management in SMEs

The IP management team at Prionics is aware of the IPI services, and is very satisfied with them. Prionics uses the patent search services regularly. No suggestions for improving the IPI services were mentioned at this time.

5.1.5 SI Group

Table 5 SI Group Company Overview

Name	SI Group-Switzerland
Industry	Chemical industry
Size	140 employees in Pratteln (BL), 2300 worldwide
Markets	Worldwide
IP	Patents, trademarks
Mission	*"To create value by offering to customers the best chemical intermediates in the world."*
Founded	1906
Responsible	ETH Zurich

Company profile

Table 5 shows the company overview. The SI Group was established in 1906 in the USA, under the name Schenectady International. Nowadays the group possesses 20 facilities in 13 countries, comprising a Swiss site located in Pratteln, near Basel. A total of 2300 employees are working for SI Group worldwide, the Swiss site accounting for 140 of them. The SI Group is a chemical company embedded in an intermediary position within the chemical industry. Using raw material from its suppliers, it produces intermediate chemical compounds for other chemical companies that will manufacture end products.

Graph 15 shows the competitive environment of the SI Group. Due to the wide variety of compounds the company produces, it also has numerous suppliers of chemical raw materials. For every type of raw material the company has at least two suppliers and in some cases three to four, their supplier power is therefore reduced. However, even though it would be possible to substitute a supplier if it was necessary, the firm has long-term contracts with its suppliers.

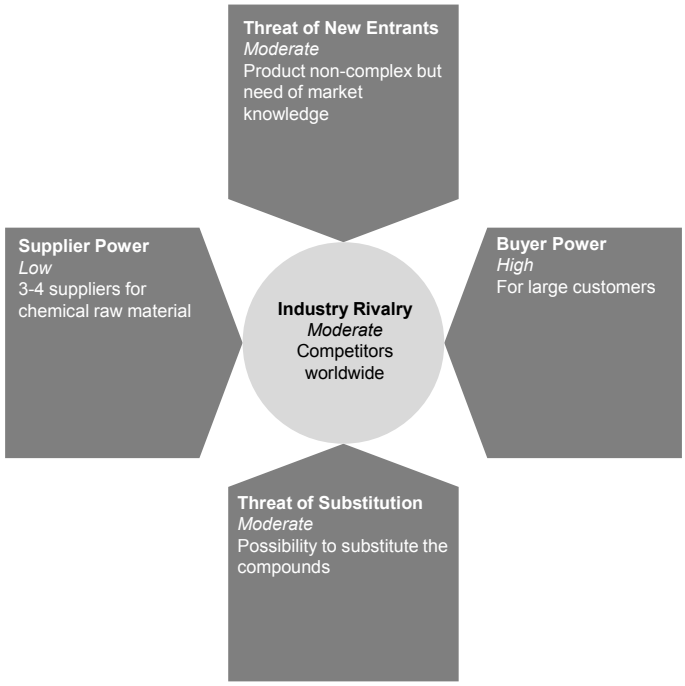
The SI Group has many customers in several industries (Chemical, pharma, oil…), yet it is trying to grow and attract new clients. Nevertheless, these big customers do not possess a high buyer power because contracts in effect are on the long term and despite the fact that it is naturally harder to negotiate with such big clients. The SI Group still has control over its prices and can, for instance, adjust them upon a raw material costs increase. From a chemistry standpoint the area of activites of the company is quite limited.

A new entrant into this intermediate field would, nonetheless, have to face significant barriers of entry: he would notably have to ensure a constant high level of quality and

would also have to develop an extensive knowledge of the market. No significant threat of substitution seems to jeopardize the company's products.

For the SI Group substitution risk is residual and inherent to a chemical company since ongoing research can always provide a better, more effective chemical, or a chemical can suddenly get banned due to new environmental regulations. The number of the company's competitors depends on the geographical area and the market segment concerned.

Graph 15 SI Group Competitive Environment



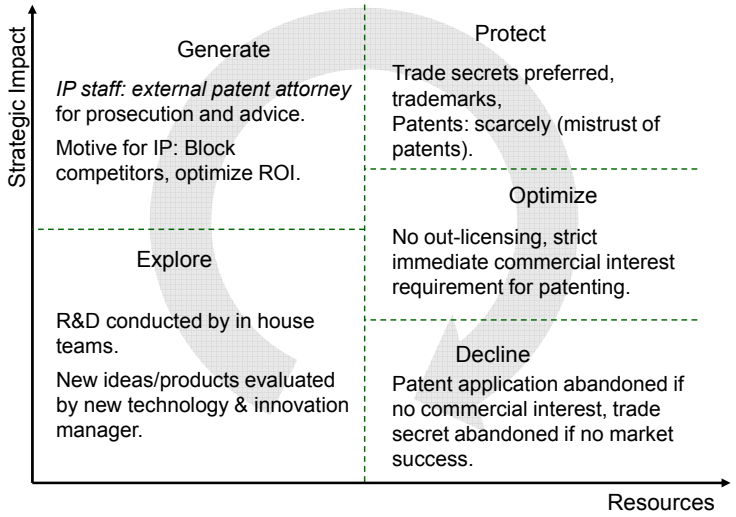
For the chemicals produced in Pratteln, the firm acknowledges to have three major competitors. More generally, for several molecules there are several competitors, located worldwide. SI Group is, however, able to lessen the competitive rivalry by offering a higher standard of quality of its products together with more competitive prices.

R&D and IP strategy

Graph 16 shows the IP portfolio of the SI Group. The firm represents an interesting case for this study. The SI Group does not see IP as a useful tool to protect its innovations but as a threat for its competitive advantage, giving away precious information on its R&D to competitors and, after the expiration of patent protection, providing them free access to technologies that have been made public. Nevertheless, the company is presently trying to overcome this prejudice and has developed a new, more friendly approach towards intellectual property.

SI Group's technology manager is in charge of evaluating new technologies and trends in the chemical field. In order to search for new compounds and study their potential interest, he is closely working with the in-house Swiss R&D team. An important part of that research work is also conducted in partnership with universities all over Europe. This co-development work with the academia is based on an analysis of what the actual needs of the company are. For the time being, the focus of the company is process intensification. For particular fields, the technology manager will then attend seminars and conferences on the subject to identify the best possible specialist, who is often an academic. After an evaluation of his/her publications, a proposition is made to conduct research for SI Group.

Graph 16 SI Group IP Portfolio



Moreover, IP rejection concerns only patents. Indeed, SI Group uses trademarks extensively and has been successful with that ever since. Besides the trademark "SI Group" the company has also applied for many product names that have been trademark registered in most markets. The reasons for the registration of these trademarks are to place different products of the same category under one mark. Under a unique name, easily identifiable and memorisable by customers, SI Group is able to use the mark's reputation associated with the original product and extent it to the whole product category. More pragmatically, it simplifies the presentation of product lines while protecting the names from a possible free riding of competitors.

IP experiences

SI Group has a sophisticated new technology and innovation management structure. It involves patent databases and publication searches, attending conferences and seminars in order to detect new trends in the chemical field. The technology manager then evaluates the potential interest of the new technology for the company and makes a proposal to the management. Upon this proposal, the R&D team gives an input. The business development department will then perform market studies and gives feedback

as to the marketability of the new product/process. The upper management takes the final decision during a meeting of the global strategy committee.

Patent protection as a prejudice for the company

As a part of a worldwide group, SI Group-Switzerland is depending on the US parent company. This is notably the case with intellectual property: the final decision to patent or not is taken at the headquarters and external patent attorneys will also write patent claims in the USA, upon submission to patent by the R&D head.

Nevertheless, SI Group has a special relationship with IP protection for historical reasons. The firm management does not see IP protection as a positive tool to protect its innovations but, on the contrary, as a threat. This mistrust of IP protection is due to the fact that in its early years, the firm was very active to patent its new products and processes. However, it encountered severe deception and difficulties at the expiration of the patents. This was a downside the company did not fully acknowledge when it started to patent. Increased competition caused losses to the company, leading to a radical change of approach towards IP protection. According to what had become a negative cost-benefit ratio, the firm decided not to apply for patents anymore but to exclusively use trade secrets.

Consequently, if a patent application on a chemical compound was to be filed and made public, this would provide information to competitors about compounds that SI Group is working on. For the firm's management the risk of giving away that confidential and strategic information about the current R&D activity outweighs the advantage of enjoying 20 years of exclusivity for this chemical compound. According to this conception, SI Group almost exclusively relies upon trade secrets for the protection of its knowledge and innovations. However, these trade secrets are carefully protected by a strict confidentiality policy.

Overcoming mistrust of patents

The SI Group's rejection of patent protection has, however, already caused problems to the firm. For instance, it has been discovered that a process the firm was using for years had been patented by a foreign company.

Despite its mistrust of the patent system, the company possesses a limited (compared to the firm's size) patent portfolio. It also has a few patent applications being prosecuted. However, these patents and applications remain exceptional. Most of the time, trade secrets will be preferred in order to avoid the publication issue that would occur with a patent application. This limited patenting strategy is influenced by the original mistrust of intellectual property, but also by what could be described as the American corporate culture: quick return of investment is expected. That is why only chemicals or processes of immediate commercial interest are considered as being worth a patent application, otherwise trade secret protection will be used. When

patents are used, the main motive thereof is to optimize the ROI and to block competitors.

In this case, corporate culture favors lead time advantage and secrecy over patent protection. Nevertheless, this negative vision of intellectual property is not absolute, as seen with the firm's small patent portfolio. Paradoxically, the firm sometimes uses the public character of patents for its own profit; the very same element that it criticizes in the patent system.

Ideas for improving the IP management in SMEs

SI Group is aware of the IPI services; the company has used the patent databases for search of patent applications for a particular chemical family. Concerning the services of the IPI, SI Group does not have particular demands for service improvements.

5.1.6 IROC

Table 6 IROC Company Overview

Name	IROC AG
Industry	Clinical: Opthalmic eye care
Size	25 employees
Markets	International with focus on Germany, Switzerland and USA
IP	Patents, trademark, industrial design
Mission	*"Combining medicine, science and technology to enhance the level of eye care."*
Founded	2002
Responsible	ETH Zurich

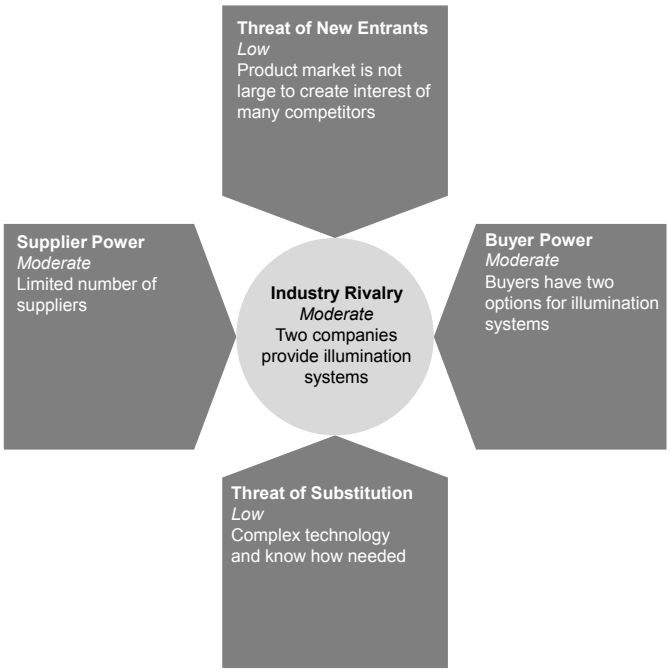
Company profile

Table 6 shows the overview of IROC AG. The company was incorporated in Zurich, Switzerland in August 2002. IROC AG's business model is different from other private ophthalmic clinics because it combines patient services (clinical setting) with a R&D division. The R&D Division is called IROC Medical. Since its incorporation the company has grown to 25 employees: three clinicians with different research interests and a fully equipped R&D division. IROC Medical develops and manufactures products for corneal collagen cross-linking. The company is best known for the development of an illumination system for corneal collagen cross-linking.

Graph 17 shows the competitive environment analysis of IROC Medical. The company offers services and products, for both of which competitors exist in the ophthalmic market. Specifically for the illumination system, a competitor offers the same type of product but in a more elaborate packaging.

The supplier power is moderate; the company depends on a limited number of suppliers for its illumination system. The buyer power is considered moderate for the device. Threat of new entry is low since the technology and skills needed for the development of an illumination system is very sophisticated. This also explains why the threat of substitution is low. The entry into the ophthalmology market is difficult for a traditional company, strong know-how is needed. This explains why the threat of new entry is considered low.

Graph 17 IROC's Competitive Environment

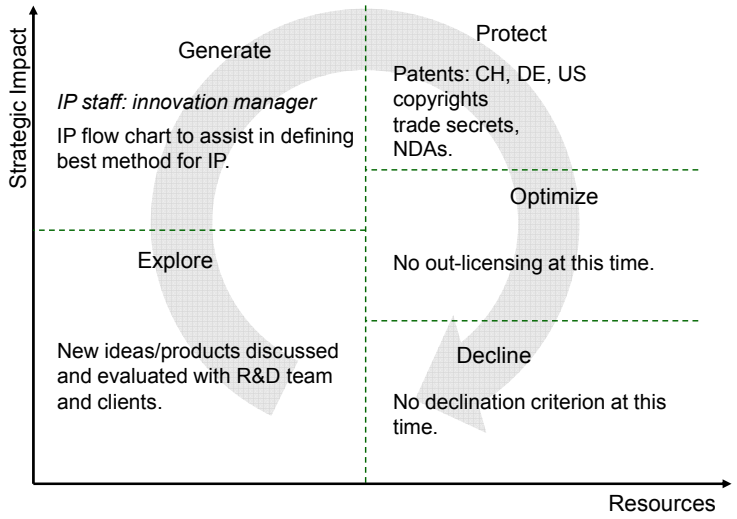


R&D and IP strategy

Graph 18 shows the IP portfolio of IROC. The company does have a formal structure to identify and evaluate new ideas and technologies. The current process is as follows: once an idea has been created or presented to the R&D division, it is informally discussed among the R&D manager and two engineers utilizing the expertise of each of the team members. The motivation for seeking IP protection is to increase the interest value of IROC Medical's patent portfolio that will directly increase the value of IROC AG. An intellectual property flow chart exists to assist in the management of intellectual property relating to the company's innovations and ideas.

IROC Medical has decided that they would only file patent applications as the filing and maintenance of patents is expensive and requires a lot of effort. Other than the use of IROC Medical's intellectual property flow chart, there is no fixed criterion to determine the method of protection of its intellectual property. IROC AG strategy is to use trade secrets as the preferred method of protection as well as non-disclosure agreements (NDAs) with any potential collaborators. Specifically, copyright is used to protect their manuals and marketing materials, trademark protection is used for their logo. Due to the initial demand of the product and the existing network of the IROC partners, IROC Medical sought patent protection primarily in three geographical markets: Switzerland, Germany and the United States of America.

Graph 18 IROC's IP Portfolio



The costs for applying and maintaining the patents are allocated to IROC Medical, and therefore, any licensing revenues or royalties would credit to IROC Medical as opposed to IROC's general budget. The IROC Medical management team has not determined factors that would be used to discontinue formal IP protection. IROC Medical has not sold any of its intellectual property, and therefore, it does not have a formal criterion for determining the advantages of selling the intellectual property when compared to licensing only.

Ideas for improving the IP management in SMEs

Although IROC Medical has filed and maintained patents with the European Patent Office and the United States Patent and Trademark Office, the IP management staff member has not had any experience working with the IPI. When asked what services would be valuable and useful for the growth of IROC Medical, the request for several instructional courses were provided. These courses included the following: "What should a patent be used for", "What are the advantages for filing" - tailored for engineers, "Claim Drafting 101" and "Services provided by the IPI".

IROC Medical management would like to be better informed about courses and instructional workshops relating to SMEs and IP management. Additionally, they also would like to know more about the European Patent Office and how Swiss intellectual property law differs in terms of protection compared to European law.

5.1.7 peka systems

Table 7 peka systems Company Overview

Name	peka systems AG
Industry	Kitchen and Furniture
Size	170 employees
Markets	Switzerland and International
IP	Patents, trademarks
Mission	*"Innovation is part of our tradition."*
Founded	1964
Responsible	ETH Zurich

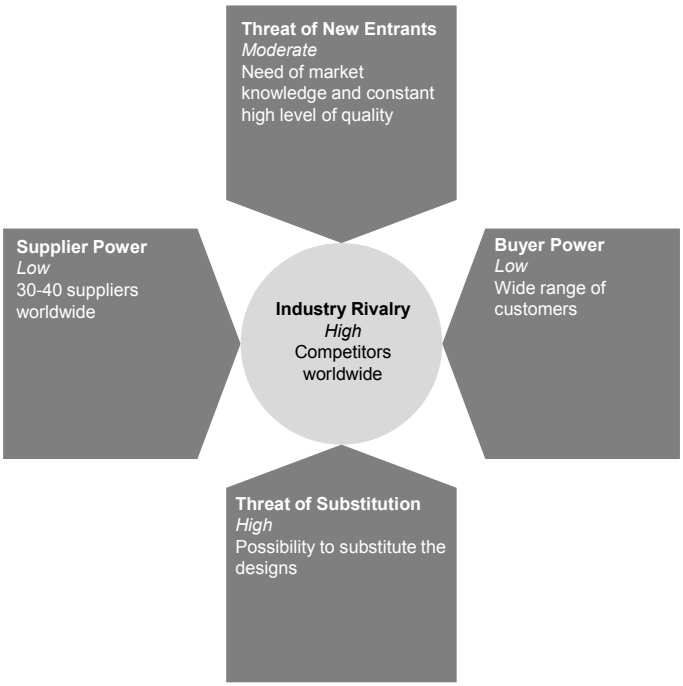
Company profile

Table 7 shows the overview of peka systems. The company was founded in 1964 as a family owned business located in Mosen, in the Luzern region of Switzerland. peka is a manufacturing and trading company with in-depth knowledge of pull-out systems and complete solutions for the kitchen and furniture industry market with 170 employees. The product line of this SME is a wide range of pull-out systems such as baskets, shelves, base corners and wall units as well as fittings and accessories for the kitchen, bathroom and living areas. peka uses the IP system effectively with 50 patents on its products and several trademarks. The company follows the open innovation process successfully with its customers, suppliers and business partners.

Graph 19 shows the competitive environment of peka. The company's vision is to be one of the most innovative and creative firms in the furniture pull-out systems market in Switzerland and Europe. peka's supplier power is considered moderate to low; the company has about 30-40 main suppliers worldwide. The buyer power is considered low to moderate.

peka belongs to a mass market; this leads to high threats of substitutions, and is one of the reasons why peka decided to have a well established IP management system. The threat for new entry is moderate; the company has positioned itself nationally and in some countries abroad. The competitive rivalry is considered high with about six main competitors.

Graph 19 peka systems' Competitive Environment



R&D and IP strategy

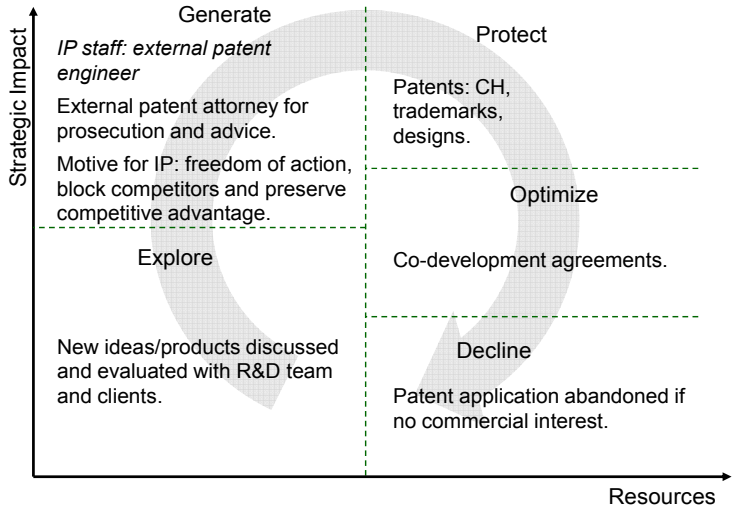
peka has a well defined IP strategy. The company has 50 patents, and about 15 trademarks. peka works close with an external patent engineer, who is an expert in the company's industry field. The IP strategy is defined together with the patent engineer, who ensures the alignment of the IP process with the overall marketing and R&D strategy of the company. The patent engineer is also the coordinator between the R&D team and the patent attorney. Moreover, he is responsible for teaching the peka team with basics about the patent application process.

The overall IP awareness of the R&D personnel at peka is high. Most of the engineers are well informed about the IP system, they decide together with the patent engineer and an IP attorney, which product should be IP protected. However, the final decision about the protection method and the IP budget is decided by the CEO and his management team.

The company has given the IP and innovation processes a high rank in its strategy. The management team regularly plans internal innovation workshops to generate creative and innovative design ideas, which could eventually be patented or protected by another protection method. These workshops are held with employees from the R&D, marketing and manufacturing departments. peka strongly believes in the open innovation process. The company holds specific workshops with the lead customers as well as with its closest business partners and suppliers. In these workshops the different teams together generate the next generation of peka's products. Beside the innovation

workshops the marketing and engineering departments are regularly scanning the market for new technologies and applications.

Graph 20 peka systems' IP Portfolio



The IP and innovation processes are optimized frequently by the R&D project leaders and the patent engineer. At present the process has no structured criterion or methods of when and why to decline a patent. The commercial success of peka's product is the only criterion, which drives the decision on whether formal IP protection will be abandoned or continued.

peka has had several infringement cases for its leading product family. The infringers were competing companies in Europe. These infringements were identified at trade fairs and through hints by customers and suppliers.

peka owns one patent family, which is considered as the key "main" patent for the company. This patent is about a corner furniture so called the "magic corner"; this patent family is crucial for the SME, as it protects a key element of its pull-out systems. This patent has helped to foster the firm's business and to preserve the company's competitive advantage.

peka is an interesting case for this study, because the company has a high overall IP awareness in relation to its size and industry sector. Considering the SME's size (about 10 R&D project leaders and 170 employees) and the fact that it is acting in a low tech sector (furniture industry), the company has a large IP portfolio with 50 patents and 15 trademarks. In addition, the company has a designated patent engineer, who is responsible of all the IP issues.

Ideas for improving the IP management in SMEs

peka knows the IPI very well, but is not familiar with all the services of the IPI. The company has contacted the IPI in order to gather some information about specific patents regarding pull out system designs. For now the company is not interested in IP workshops by the IPI or any seminars related to patent application filing, since these are provided by the in-house patent engineer together with an external IP attorney. peka has expressed interest in being better informed about the IPI services through an E-mailing list or event flyers.

5.1.8 Cross-case Analysis - Multiple Users

In this section a cross-case analysis of the SMEs in the multiple users cluster is presented. The analysis is based on the Porter's five forces model, R&D and IP strategy, and ideas for improving the IP management in SMEs.

Table 8 shows the seven companies, which are assigned to the multiple users cluster: cuboro, a producer of toys; Infochroma, a company from the glass industry; IROC, a Medtech company; peka systems, a producer of roll systems for furniture; Prionics, a Biotech company; SI Group, a chemical compound company; and Zumbach, a company in the electronics industry. The companies mainly act in global markets.

Table 8 Multiple Users - Overview

	cuboro	Infochroma	IROC
Size	5	10	20
Industry	Toys	Chemical	Medtech
Market	Worldwide	Europe	Worldwide
Founded	1985	1967	2002

	peka systems	Prionics	SI Group	Zumbach
Size	170	100	140	250
Industry	Furniture industry	Biotech	Chemical industry	Electronics
Market	Worldwide	Worldwide	Worldwide	Worldwide
Founded	1964	1997	1906	1957

Table 9 (Market Analysis) summarizes the analysis of Porter's five forces model. It shows the companies' competitive environment, the stage of their markets and whether it is a class market or a mass market. The competitive environment is different for all companies. Most of the companies act in niche markets. The threat of new entry is low for cuboro, Infochroma, IROC, Prionics, and Zumbach. Furthermore, five of the seven companies, cuboro, Infochroma, IROC, Prionics, SI Group and Zumbach, are acting on a class market, i.e. they produce high quality products.

Only peka systems has a mass product and gains competitive advantage through price competition as well as lead time advantage.

Table 9 Multiple Users - Market Analysis

	cuboro	Infochroma	IROC
Product Type	Wooden Toys	Sampling Bottles	Ophthalmic
Mass/Class Market	Class Market	Class Market	Class Market
Supplier Power	Moderate	High	Moderate
Buyer Power	Low	Low	Moderate
Threat of Substitution	High	Low	Low
Threat of New Entrants	Low	Low	Low
Industry Rivalry	Moderate	Moderate	Moderate
Market Maturity	Mature	Mature	Growing

	peka systems	Prionics	SI Group	Zumbach
Product Type	Pull-out systems	Diagnostics	Chemical Compounds	Measuring Systems
Mass/Class Market	Mass Market	Class Market	Class Market	Class Market
Supplier Power	Low	Moderate	Low	Moderate
Buyer Power	Low	Moderate	High	Moderate
Threat of Substitution	High	Moderate	Moderate	Low
Threat of New Entrants	Moderate	Low	Moderate	Low
Industry Rivalry	High	Moderate	Moderate	Moderate
Market Maturity	Mature	Growing	Mature	Mature

Table 10 (Intellectual Property Analysis) gives an overview of the companies' IP activities. The results reveal that the overall IP activity is high. The case studies have shown that most of the SMEs in this cluster have a "formal" IP management structure and strategy. The IP management of the SMEs is also formal in the sense that the decision to patent is taken according to a structured path, comprising precise criterion, and considering if an invention seems innovative enough to be protected or not. Most of the companies in this cluster have a defined IP strategy and defined protection criteria, except for cuboro. The fact that the SMEs do have a precise IP management is symbolized by their allocation of a person dedicated to IP management. In most SME cases, the function of IP responsible person is added to the strategy team. Another aspect, which was defined is the industry-wide use of intellectual property. Five of the seven companies act in high tech markets with strong IP awareness. Regarding the open innovation process, the companies are mainly open to cooperate with other institutions, e.g. universities, or with their suppliers in order to improve their products.

Table 10 Multiple Users - Intellectual Property Analysis

	cuboro	Infochroma	IROC
Defined IP Strategy	Yes	Yes	Yes
Defined Protection Criteria	No	Yes	Yes
IP Awareness of Responsible Person	High	Moderate	High
IP Awareness Overall	Low	Moderate	High
Industry-wide IP Usage	High	Moderate	High
Open Innovation Process	Yes	Yes	Yes

	peka systems	Prionics	SI Group	Zumbach
Defined IP Strategy	Yes	Yes	Yes	Yes
Defined Protection Criteria	Yes	Yes	Yes	Yes
IP Awareness of Responsible Person	High	High	High	High
IP Awareness Overall	High	High	High	Moderate
Industry-wide IP Usage	High	High	High	Moderate
Open Innovation Process	Yes	Yes	Yes	No

In table 11 (Patents, Trademarks and Industrial Design Analysis), criteria related to the use of patents, trademarks and industrial designs are presented. Six of the seven companies have patents, all seven companies have registered trademarks, and only cuboro and peka systems have registered designs. The companies use an external attorney to give them advice on issues related to intellectual property and patent application filing. All the companies have applied for international protection. When asked if the firms have changed their IP strategy in the last five years, all of them answered with yes. This is an indication of their high awareness towards intellectual property. For most of the firms the motive to protect their intellectual property is to allow them freedom of operation and to block the competitors advantage.

Table 11 Multiple Users - Patents, Trademarks and Industrial Design Analysis

	cuboro	Infochroma	IROC
Number of Patents	None	3	2
Number of Trademarks	4	2	2
Number of Industrial Designs	6	-	-
External Attorney/Agency	No	Yes	Yes
International Protection	Yes	Yes	Yes
Strategy Change in the last five years	No	No	Yes
Main Motive to Use IP	Freedom of action	Freedom of action, Block competitors	Avoid abuse, preserve competitive advantage

	peka systems	Prionics	SI Group	Zumbach
Number of Patents	50	20	2	10 main patents
Number of Trademarks	10	23	4	8
Number of Industrial Designs	10	-	-	-
External Attorney/Agency	Yes	Yes	Yes	Yes
International Protection	Yes	Yes	Yes	Yes
Strategy Change in the last five years	Yes	Yes	Yes	Yes
Main Motive to Use IP	Avoid abuse, freedom of action, block competitors	Freedom of action, block competitors, preserve competitive advantage	Freedom of action, block competitors advantage	Freedom to operate

Table 12 (Infringements) shows the experiences of the SMEs with IP infringement cases. The analysis shows that none of the SMEs have been accused by other companies for abusing their intellectual property. Nevertheless, six of the seven companies have been copied by another company. The companies have identified these infringements throughout performing market monitoring of their own products or simply through trade shows, however, in most of the cases the infringements where identified through hints from their clients and suppliers. cuboro, Prionics, SI Group and Zumbach have used informal agreements for the settlement. The other companies did not take legal action against the imitators.

Table 12 Multiple Users - Infringements

	cuboro	Infochroma	IROC
Accused by Other Company	No	No	No
Copied by Other Company	Yes	Yes	No
Used Settlement	Informal agreement	-	-
Identification of Infringement	Internet, customer hints	-	-

	peka systems	Prionics	SI Group	Zumbach
Accused by Other Company	No	No	No	No
Copied by Other Company	Yes	Yes	Yes	Yes
Used Settlement	-	Informal agreement	Informal agreement	Informal agreement, litigation
Identification of Infringement	Customer hints/Market monitoring	Customer hints	Market monitoring	Market monitoring

Table 13 (Improving Ideas) provides information about the companies' experience with the IPI and their ideas to improve the IP services. The results show that the IPI services are known to nearly all companies. However, not all of them make use of the IPI services. Prionics is an active user of the IPI services, as the company uses the patent serach service regularly before filing a specific patent application. cuboro uses

different IP databases depending on the information it needs, as there are different databases for patents, trademarks and industrial designs.

cuboro suggested complementing the online services of the IPI with a brief overview of "How to register a trademark?". It must be mentioned that the IPI already provides detailed information about trademarks and its application process. There is, for example, the tool "e-trademark", which guides the user through the application process step-by-step. Furthermore, the IPI provides documents explaining how to fill in the registration forms. Despite the very comprehensive IPI services, which cuboro uses, too, the company would consider a one-sided document on "How to register a trademark?" for download to be helpful, especially for newcomers.

All companies stated that there is a general need to raise the IP awareness, and that the IPI should increase its publicity. One channel, which has been proposed repeatedly is to profit from industry organizations and their journals. Also sending out flyers and using the Internet is considered helpful.

Table 13 Multiple Users - Improving Ideas

	cuboro	Infochroma	IROC
IPI Services Known	Yes	Yes	No
IPI Services Used	Yes	No	No
Preferred Method for Awareness Raising for SMEs	Internet IPI, WIPO	IPI website	Internet IPI, EPO
Company's Main Interest in IP services	International trademark and design protection	-	IP courses for engineers, Courses on claim drafting, Info about EPO

	peka systems	Prionics	SI Group	Zumbach
IPI Services Known	Yes	Yes	Yes	Yes
IPI Services Used	No	Yes	Yes	No
Preferred Method forAwareness Raising for SMEs	Internet IPI, flyers	Internet IPI, flyers	Internet IPI, flyers	Workshops on IP data-bases through IPI
Company's Main Interest in IP services	IP management courses	IP workshops industry-specific	IP management seminars	IP database workshop for employees/ engineers

In conclusion, one can state that the SMEs in the multiple users cluster actively use patents, trademarks and industrial designs. Most of these SMEs know the comprehensive information and services provided by the IPI, even though not all companies use those services. The studies have shown that non-biotech or pharma SMEs are in general less likely to use the IP system to protect their innovations. The aim of the SMEs in this cluster and in the patentee cluster (see 5.2) is to protect the key products through patenting or through registering trademarks. Their markets are both, national and international, and so are their customers and suppliers. The IP awareness for the multiple user companies is considered the highest when compared to the SMEs in other clusters. It has indeed been found that the SMEs of the cases have experienced IP infringement and litigation. All of the companies in this cluster are aware of the IPI services and most of them also make use of them.

5.2 Patentees

This cluster consists of companies which focus on patents. The firms are well informed regarding the use of patents and trademarks but they focus their IP protection on patents. Firms in the patentees cluster chose patents as their preferred protection method agains competitors and couterfeiters. Furthermore, patents were used to promote brands and technologies.

The following companies will be presented in the cluster of "patentees":

- Küschall (HSG) In-depth case study
- TelorMedix (ETHZ) In-depth case study
- Krämer (ETHZ)
- Abatek (HSG)
- The Powder Company (ETHZ)
- Cerbios-Pharma (ETHZ)

5.2.1 Küschall

Table 14 Küschall Company Overview

Name	Küschall AG
Industry	Medical equipment (wheelchairs)
Size	70 employees
Markets	Worldwide
IP	Patents, industrial designs, trademarks
Mission	*"There is no limit to innovation when it comes to finding ways of increasing the quality of life of wheelchair users around the world."*
Founded	1978
Responsible	University of St.Gallen

Company profile

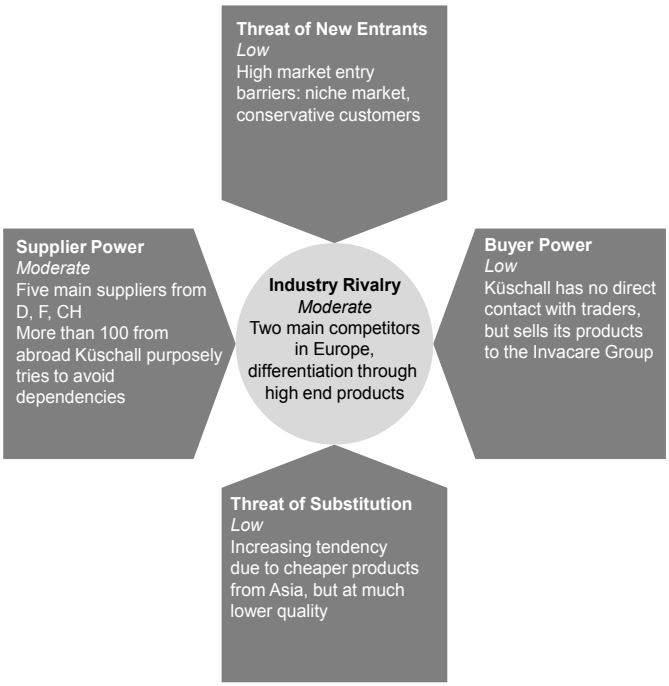
The Küschall AG (table 14) is an SME with 70 employees located in the canton of Solothurn. The company manufactures high end wheelchairs and wheelchair equipment for the global market. Küschall was founded in 1978 by Rainer Küschall who, after an accident, discovered the wheelchair as a new chance of mobility. Rainer Küschall passed his own motivation on to the Küschall company with the vision:

"There is no limit to innovation when it comes to finding ways of increasing the quality of life of wheelchair users around the world."

Since 1995, Küschall belongs to the Invacare Group, the world leading manufacturer and distributer of medical equipment. In 2001, the company's name was changed into Invacare AG. This brand change was, though, not accepted by the customers, and the company resumed the original name Küschall. Küschall is an independent company, that, however, profits from the Invacare Group, for example regarding IP management as described below. Furthermore, Invacare is Küschall's key customer, as Küschall sells most of its products to Invacare, which then further distributes them to traders.

Traders are indirect customers for Küschall, and the company rarely has direct contact with these. Regarding Küschall's competitive environment (see graph 21), the absence of direct contact with traders means that Küschall is hardly directly faced with the buyer power of the traders, i.e., the bargaining power of the traders does not attack Küschall. The same is true for Küschall's direct customer Invacare, as they have a fixed price agreement.

Graph 21 Küschall's Competitive Environment



Regarding the other segments of the competitive environment, Küschall acts independently from Invacare. Küschall purchases wheelchair components from suppliers and assembles these components. Küschall has more than 100 suppliers worldwide, however, the five main suppliers come from Küschall's regional periphery, i.e., Switzerland, Germany and France.

The suppliers' bargaining power is moderate as Küschall tries not to depend entirely on one supplier and purposely spreads the risks. However, there are cases in which a specific technology is only provided by one supplier where Küschall then depends on this single supplier. The competitive rivalry in the wheelchair industry segment is moderate. Küschall has two main competitors in Europe, and the rivalry between all three companies has been moderate so far. Each company has its national main markets, which is Switzerland in the case of Küschall, and the competitors act in an unaggressive coexistence. However, this situation is changing. The companies increasingly try to gain market shares and therefore increase competitive rivalry. Küschall's main competitive advantage are its high end products. The competition in the high quality segment is still relatively low, only one of its two main competitors also manufactures high end wheelchairs while the other focuses on the medium quality segment.

Furthermore, Küschall increasingly emphasizes its direct contact with traders in order to establish a better relation and to reach customer loyalty.

The threat of new entry and the threat of substitution are low. The market entry barriers are high as Küschall operates in a niche market with a relatively low number of

customers (the wheelchair users). Customers tend to rely on manufacturers they already know, and thus traders hardly switch the company they purchase the products from. However, the threat of substitution through products at a lower price increases. Particularly the Asian market seems to move although Asian products have a much lower quality than Küschall's products.

R&D and IP strategy

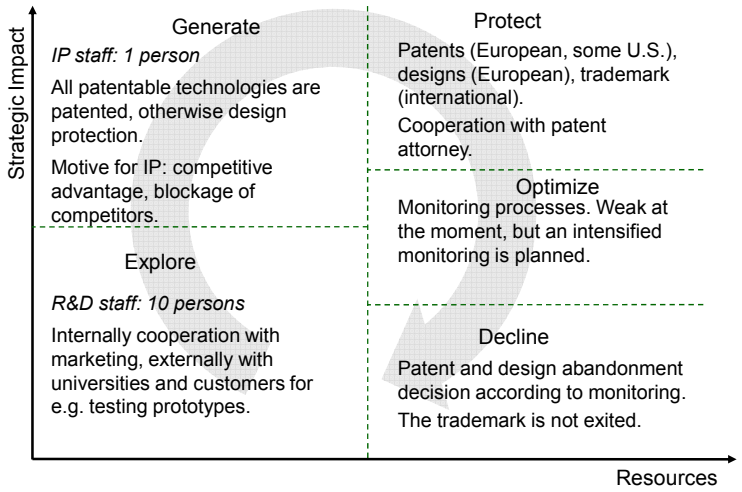
Küschall's IP and R&D strategy is summarized in graph 22. Küschall has 10 employees (eight full-time, two part-time) who work in the research and development of new products (this also includes documentation and manufacturing engineering). Küschall follows an open R&D strategy including the integration of internal and external expertise within its R&D processes (Explore). Internally, the R&D staff is characterized by high specific know-how. Furthermore, Rainer Küschall, the founder and general manager of the company, provides his team with his own experience. In addition, the R&D department closely cooperates with the marketing department that conducts market analyses and customer feedback surveys. Besides the internal processes, Küschall also cooperates with universities and customers, e.g. customers test the prototype wheelchairs. The entire R&D process is oriented to the aspects of quality, design and mobility characteristics of the wheelchair.

As to Küschall's IP management, the company is supported by Invacare. However, the Invacare Group does not dictate the IP strategy to Küschall, which is fully responsible for its IP management. At Küschall, the head of the R&D department is also responsible for the IP management. For this he works together with the IP department of the Invacare group and with a patent attorney. For all IPRs registered before the year 2005, Küschall has an own IP budget. Since 2005, the expenses for IPRs are covered by Invacare. Thus, the cost aspect is not a hurdle regarding Küschall's IP strategy. The company would not file more IPRs if they had more money.

Neither is the application process a hurdle. Though the time span from filing the patent application until it is granted lasts at least 18 months, this is no disadvantage to Küschall since other testing processes, e.g., quality tests, are conducted in parallel to the patent application, which also requires this amount of time.

Küschall's IP strategy is to protect every new developed technology as early as possible (Generate). The higher the certainty that the invention is worth patenting the earlier the patent is filed. In case of uncertainty, the invention is kept secret until the decision about a legal protection is made.

Graph 22 Küschall's IP Portfolio



If possible, the invention is patented, and if a patent application filing is not possible, the design of the product is protected. In order to find out if the technology exists already in form of a patent, Küschall conducts patent database searches. In this way, the company also profits from patent information with regard to its own technologies. Regarding licensing strategies, Küschall considers the possibility of licensing or cross-licensing in case that the technology is relevant for Küschall's products and the company cannot realize it itself. However, Küschall is not yet involved in licensing agreements, mainly because the company has not found a patented technology that really fits in Küschall's concept.

Küschall's motive to engage in IP protection is to gain competitive advantages through the blockage of competitors. Patents give Küschall a certain advantage over its competitors. Furthermore, Küschall states that patents make the company more present on the market. In addition, the company also considers financial aspects of IP protection. The risk of losing high sums due to imitation or due to being blocked through patents of competitors is too high to ignore IP protection.

The most important means of IP protection for Küschall are patents. The company aims at protecting all inventions through patents and files two patents per year on average (Protect). In all cases the patents are effective in Europe, and in some cases also in the U.S. and other countries.

The second important IPR is the design as an alternative to patents. Küschall secures its products with European design protection.

Furthermore, the name Küschall is a registered trademark since the very beginnings of the company in order to avoid misuse of the name.

Though Küschall has a wide-ranged patent and industrial design portfolio, the company sees the need to improve its IP strategy (Optimize). The main argument is that both Küschall's patents and industrial designs tend to be too broad to avoid reliably imitation of the wheelchairs.

The design protection, for example, mostly refers to the entire wheelchair. This gives imitators the chance – by changing only marginal things – to sell the "copied" wheelchair legally. This is also true for patents that protect broadly the entire product. Instead, Küschall considers it better to protect single parts of the wheelchair.

Furthermore, Küschall considers enforcing its monitoring processes, which are currently neglected. The goal is to implement an improved monitoring system providing a list with all its patents and industrial designs and their efficiency, with the objective to support the decision about the continuation of the IP protection or not (Decline). The trademark registration of the name, however, is never abandoned.

IP experiences

Küschall has wide experience regarding the use of formal IP measures. Firstly, the company protects its name, which stands for high quality and reliability, through an international trademark registration. The importance of the name Küschall especially showed up when the company name was changed in the course of the integration of the company into the Invacare Group. This change was not accepted by the customers who identified the brand Küschall with high quality and innovative wheelchairs and equipment. Secondly, patents play a major role in Küschall's IP strategy. The company files international patents for nearly all its new technologies. Besides the aspect of protecting its products, the blockage of competitors and the reputation gained through a large patent portfolio are important motives for Küschall to engage in patents. Thirdly, in Europe, Küschall uses design protection to cover product parts, which cannot be protected through a patent.

Küschall's proactive IP strategy results in a large IP portfolio. This is a challenge for the company, that does not have an IP department or a fulltime IP responsible person. Küschall manages this challenge by profiting from the cooperation with the patent attorney of the Invacare Group. The patent attorney comes from an external law firm, and Küschall is very satisfied with the service he provides. According to the company, the cooperation is uncomplicated and helpful. One example for the support of the attorney is the IP database search. Küschall uses patent databases for two reasons. One reason is to directly get the detailed patent information of Küschall's own patents. The other reason is to seek general information about existing patented technologies. In order to conduct a professional database search, Küschall cooperates with the attorney to find the relevant information. Küschall uses the patent database "esp@cenet"[8] provided by the EPO for its search. Furthermore, the company conducts

[8] http://ep.espacenet.com/

design searches. For this purpose, Küschall uses the OHIM[9] database of the "Trademarks and Designs Registration Office of the European Union". Additionally, Küschall also uses further information on the Internet, e.g., on the web page of the EU "www.epoline.org" and the German web page "www.ip-links.de", the latter providing helpful links regarding IP, for example, the links to national patent offices.

Another source of IP information for Küschall is the cooperation with other European companies of the Invacare Group. In Europe, the Invacare Group has one central headquarter, which is situated in Switzerland, where the management of the group and its sister companies is coordinated. However, there is no general IP strategy for the entire group. Rather, each company, such as Küschall, develops its own IP strategy. The companies of the group regularly exchange IP experiences and IP strategies among each other. This cooperation is regarded to be very interesting and helpful in order to improve Küschall's own IP strategy. However, the exchange is limited to companies belonging to the Invacare Group. An exchange of IP issues with external companies does not take place due to the sensitivity of the IP topic.

Infringement involvement

In its industry segment Küschall is known as a high end wheelchairs manufacturer and the incentive to copy their products is high. In fact, Küschall's wheelchairs are often copied, and due to the insufficient patent or design protection the imitator profits from this so that Küschall cannot take legal steps. Though Küschall's wide range of patents and industrial designs, the protection had some weak points.

One example for such a case are the brakes of the wheelchair. The patents of the wheelchair did not cover the technology of the brakes in detail, with the consequence that this technology for the brakes is often imitated. It is now too late to a patent application on the brakes as the technology is already public.

Another example is the imitation of the design of a wheelchair or parts of the wheelchair with slight changes to the original Küschall design.

The company identifies the imitations mainly through exhibitions, sometimes Küschall is informed by a hint of a trader. In all these cases, however, Küschall was powerless against the imitations, and the only thing the company could do was to improve its new IP protection.

In case of a real infringement of an IPR, Küschall would defend this right in court. Due to the cooperation with Invacare, litigation costs would not directly touch Küschall and are not a hurdle for the enforcement of its IPRs.

9 http://oami.europa.eu/

Ideas for improving the IP management in SMEs

Küschall knows the IPI, but it hardly knows its services, and thus sees the need to make these services more present. The company proposes sending out flyers to the companies that describe the IPI's services and current workshops.

There is also the idea of a stronger cooperation between the IPI and patent attorney offices (e.g., for workshops), because patent attorneys are closer to the companies than the IPI is.

Küschall considers workshops dealing with IP issues as a good method to learn about the IP system. Furthermore, there should be both general or introductory workshops and more specific workshops dealing with a certain type of technology. This offering would meet the demands of newcomers as well as experienced companies.

5.2.2 TelorMedix

Table 15 TelorMedix Company Overview

Name	TelorMedix
Industry	Biopharmaceutical sector; Immuno-selective drugs
Size	6 employees
Markets	Worldwide
IP	Patents
Mission	"*We will initially focus on drugs that have been previously tested in humans and have favorable safety profile. This approach willallow us to rapidly develop drugs designed to be concomitantly very selective and well tolerated."*
Founded	2008
Responsible	ETH Zurich

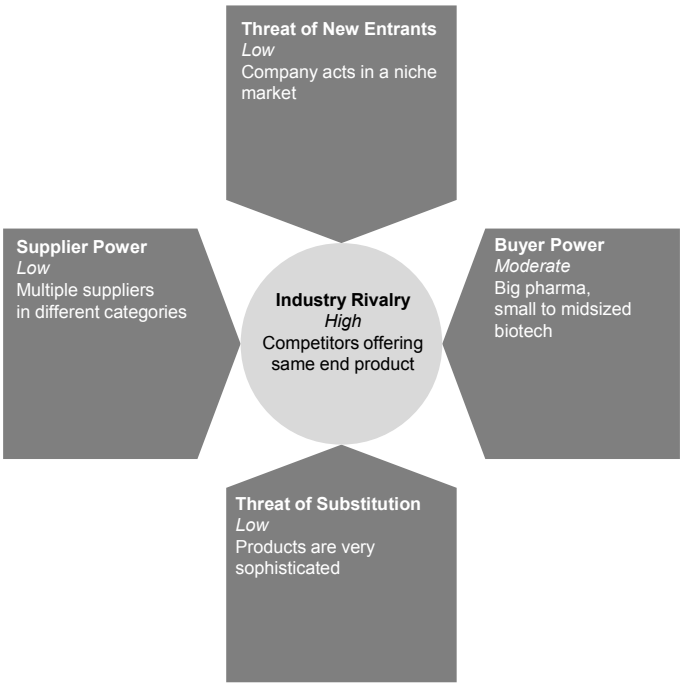
Company profile

Table 15 shows the overview of TelorMedix. The company is a young Swiss biopharmaceutical start-up company funded in 2008, based in Lugano, Ticino. The company currently has 6 employees. TelorMedix's business model is that of a virtual company. TelorMedix will have its administrative headquarter in Lugano and will coordinate the global activities from there. R&D and Market approval tests will be outsourced to external collaboration centers or service providers located all over the world.

The core technology used to launch the company has been licensed from the University of California in San Diego (UCSD), where the CEO and founder has spent about 10 years. The company focuses on immuno-selective drugs. The lead product of Telormedix is a targeted molecule for the treatment of superficial bladder cancer.

Graph 23 shows the competitive environment of TelorMedix. The company's mission is to develop the most innovative solutions for cancer treatment and other diseases. To carry out its R&D, TelorMedix exploits an extended network of collaborations and service providers located all over the world. Academic collaborations are ongoing in Italy, the Netherlands and USA. The outsourced activities include: production of the active ingredients, production of the drug product, toxicological and pharmacological experiments in animal models, and clinical research.

Graph 23 TelorMedix' Competitive Environment



The threat of new entry is low; because the company will be acting in a niche market, which is not easy to be entered. TelorMedix has explicitly chosen innovative therapies for bladder cancer because the market is not saturated yet.

The company has multiple suppliers worldwide for different categories. However, the two main suppliers are one in Spain for the actual molecule and one located in the UK, which is responsible for packaging the product. In general the supplier power is considers low, the company usually has a back up supplier for each case.

TelorMedix's customers range from big pharmaceutical companies, who plan to expand their product pipeline with new projects to the small and midsized biotech companies. Depending on the buyer's geographical region and size the buyer power can be rated from low to moderate.

TelorMedix plans to keep a competitive advantage in the market due to the regulatory market exclusivity in Europe and in the US. Because the company will be entering a niche market with its product, the threat of substitution will be rather low at this time. The competitive rivalry in this field is high; however, it can be reduced by strategically selecting the markets in which the company wants to develop its innovative solutions.

R&D and IP strategy

Graph 24 shows the IP portfolio of TelorMedix. The company has a well established IP strategy, which was carefully designed when the company was launched. The development of an IP management system is, however, still in its early phases.

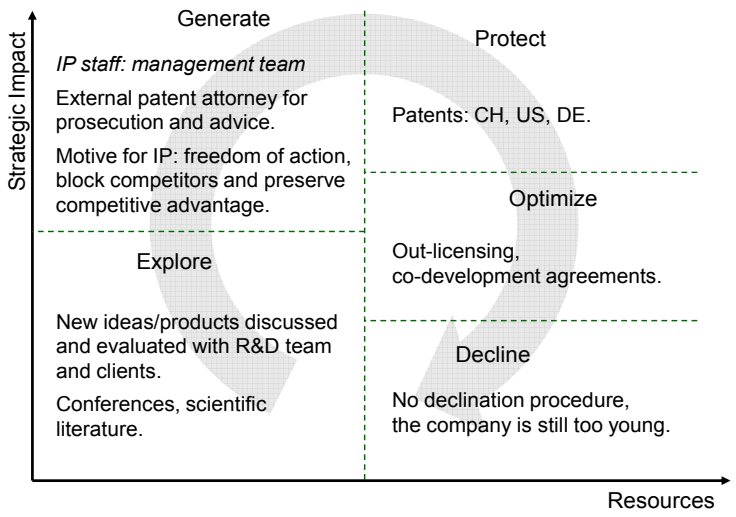
The company works together with two key outside consultants, who work on different aspects and plan to expand the patent portfolio strategically. For what concerns the licensing agreements with the UCSD, there are several milestones, which allow both sides to periodically assess the progresses made on the development of the technology. If some objectives cannot be reached due to some intrinsic properties of the licensed technology, TelorMedix still has the possibility to drop out of the licensing agreement and return the intellectual property back to the University.

TelorMedix continuously monitors the competitive landscape, both in terms of technology and in terms of clinical indications. This is done in house together with external attorneys based in Munich and in the US.

New technological ventures are identified through internal discussions with the scientific advisory board of the company. The scientific advisory board is composed of senior level experts in basic science, drug discovery and pharmaceutical development. The initial focus of specialization of the company will be drugs for the treatments of superficial tumors, a market in which TelorMedix has an established network. The research team regularly attends scientific conferences and trade fairs to be up to date about the latest scientific technologies and developments for TelorMedix's field of expertise.

Once a new innovation/idea has been identified, the internal R&D team will define the technologies necessary to be implemented at TelorMedix. The competitive landscape of the market touched by the new projects will be carefully analyzed. Beside the information gained through TelorMedix's network, the company makes use of several commercial and public databases to track the competitors and to determine the future trends. "Datamonitor" is one of such commercial databases, "clinicaltrials.gov" and "pubmed.gov" are public databases extremely useful to track scientific and clinical developments. Moreover, the company makes strong use of patent databases to monitor potential competitors in a given technological field.

Graph 24 TelorMedix' IP Portfolio



Clinical studies are accompanied with huge investments. For this reason it is important that TelorMedix secures its projects as soon as possible. Intellectual property and regulatory protections are essential for TelorMedix. Patent applications are usually filed via the PCT system. This allows a gain of time for the definition of the IP protection. Generally, the application contains results which are preliminary at the filing date, however, the improvements made by TelorMedix's R&D during the pending application process, can be (under certain circumstances) implemented into the application and amend the previous results before the application gets into the national phase.

The first patent application usually claims the molecular entity. As R&D progresses, divisional applications or new applications claiming the formulation or new indications for the previously claimed molecular entity are filed. In such a way, TelorMedix builds up a cluster of patents around a common core technology and broadens its spectra of protection. Today TelorMedix has 5 patent families under prosecution.

Once the drug candidate is optimized, TelorMedix is seeking for potential partners to sell, out-license or enter in co-development agreements to carry out the expensive late clinical phase trials.

TelorMedix is too young to have experienced the decline of one of its technology or patents, however, the company plans to implement defined criterion for this scenario in the future. The company has never been involved in an infringement, the only adverse measure that has been taken once, was an interface by third parties at the EPO for a patent application, which was marginally touching one of TelorMedix's technologies.

IP experiences

Creating IP value through out-licensing

Intellectual property plays an important role for TelorMedix's daily business. The company works in close collaboration with UCSD, co-owner of the patents covering the company's product. TelorMedix has entered into a worldwide exclusive licensing agreement with the UCSD for the exploitation of this technology, included in a series of patents currently in prosecution. In the future, TelorMedix may leverage the privileged relationship with the UCSD to exploit other technologies under favorable licensing conditions.

The lead product of TelorMedix is a drug whose active ingredients are already known but have never been tested for the treatment of superficial bladder cancer, a "forgotten" indication with large market potential. The drug candidate will be optimized in its formulation for the new indication and will be brought to late clinical phase trials (late phase II, early phase III).

The developed asset will be then sold or out-licensed to big pharmaceutical companies for the completion of the clinical trials and for the later sales and marketing. TelorMedix wishes to apply the same strategy to other promising drug candidates after expanding the indications to other diseases such as superficial cancers and skin cancer.

Ideas for improving the IP management in SMEs

TelorMedix has never contacted the IPI. The company is aware of the services provided by the national IP office. Today the whole IP business is carried out by the German and American external consultants; however, the CEO does not mind to delegate some of the business tasks, for example technology searches, to the IPI. The company has suggested several improved services for the IPI, such as an IP workshop for startup biotech companies, who have to deal with global IP issues from the early stages, as well as regular IP workshops tailored to the scientist's needs.

5.2.3 Krämer

Table 16 Krämer Company Overview

Name	Krämer AG
Industry	Peripherical pharmaceutical industry
Size	45 employees
Markets	Worldwide
IP	Trademarks, patents, trade secrets
Mission	*"To become one of the technological leaders in the peripherical pharmaceutical industry."*
Founded	1927
Responsible	ETH Zurich

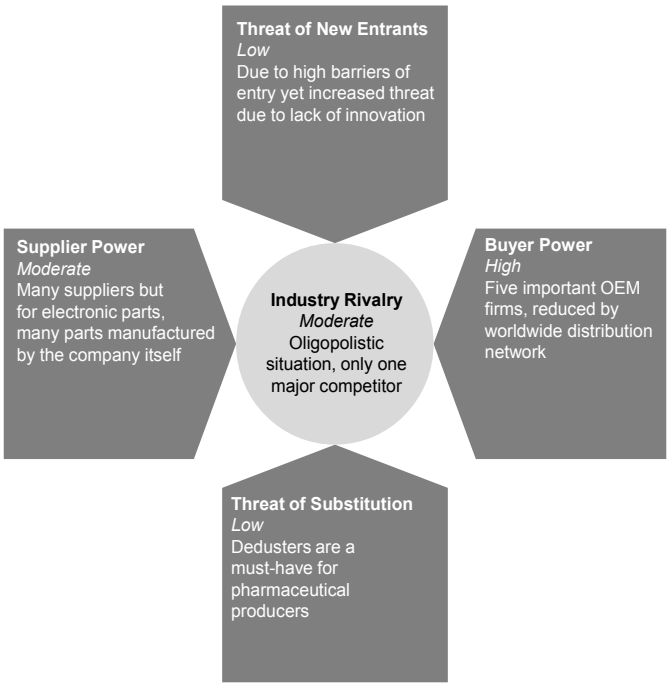
Company profile

Table 16 shows the overview of Krämer. The company was founded as a metal shop in Zürich in 1927. The firm expanded through the years, producing several kinds of devices such as belt buckles or potato peeling machines. Krämer has 45 employees. The company produces mainly conveying and de-dusting systems for the pharmaceutical industry. These de-dusters are used in production chains of tablets and pills containing active compounds. When a substance is pressed into a tablet or pill form, some dust adheres to it. Besides these de-dusters that are Krämer's core products, the SME also produces other mechanical apparatuses used to manufacture pharmaceutical pills and tablets, such as product diverters and electronic controllers.

Graph 25 shows the competitive rivalry of Krämer. The company has a low to moderate supplier power. Indeed, Krämer has around 30 suppliers, an important number that reduces their power as sellers of materials to the SME. Krämer's market is worldwide. The firm has mainly five major customers (called OEM for Original Equipment Manufacturer) that are active in the field of pharmaceutical tablets and pills in most European countries but also in Africa, Asia, the Middle East and America. The company considers the OEM's buyer power to be quite significant, as they are able to negotiate price reductions on their orders. This is a consequence of their size, most of them having more than one thousand employees and/or belonging to bigger industrial groups. The threat of new entry is estimated low. Until very recently, Krämer was in an almost monopolistic position on the de-dusters market. However, a lack of innovation from the company weakened its competitiveness and led to the entrance of new competitors, especially a Belgian firm. Nevertheless, the market is a niche and remains rather limited, which reduces the potential interest of other companies to enter it. For the time being there is no possible substitution of the tablets de-dusters for the pharmaceutical industry. Moreover, tables and pills represent considerable segments

of this industry production, due to their numerous advantages: they are cheap, easy to produce and dosage is convenient.

Graph 25 Krämer's Competitive Environment



After the entry of the new Belgian competitor, that has now become the only major competitor, Krämer is in an oligopolistic position together with this company. Competitive rivalry is therefore reduced to this other firm, even though there are also smaller competitors in South Korea or in low-cost countries like China or India.

R&D and IP strategy

Graph 26 shows the IP portfolio of Krämer. The company's R&D department is consequent for a small enterprise: the in-house R&D team is constituted of 4 persons, dedicated to the creation of new products. R&D activities are also involving the company's clients, who provide an input regarding their needs and in this manner orientate the direction R&D is going in. This method is indeed at the beginning of Krämer's activities in the de-dusters field, as the SME started to produce tablets de-dusters upon request of its clients, who required machines to improve the quality of their tablets production.

Like many SMEs, Krämer does not have a formal, step-wise innovation and technology management with fixed evaluation measures. An "idea box" is used, where any interesting ideas are proposed, then the most promising ones are chosen for further development and are allocated a budget. The evaluation of new ideas involves the R&D team, some of the board members and external experts in the field. R&D is also

oriented by patent searches in order to identify what is actually being developed by other companies and could be interesting for Krämer to work on.

After these several first steps, the final decision to move forward with a new project is taken during a shareholder meeting and/or a board meeting.

Krämer decides to seek patent protection during what is called the "prototype phase". Assuming that a prototype of a new product seems promising enough, the company will then seek legal advice about the appropriate method to protect the innovation. With this approach, the SME has developed a small patent portfolio, consisting of a total of 4 patent families.

The reasons why the SME seeks formal IP protection are first of all to safeguard its competitive advantage by protecting its innovations and the investments they represent. Hence, the main goal in that case is to block competitors from manufacturing similar products. Besides this industrial aspect, Krämer also uses intellectual property in a more financial way, as a device to increase the value of the company. However, optimizing the return on investment by licensing patents does not seem to be considered, as this does not contribute to the main goal towards intellectual property, namely protecting the firm's competitive advantage. The company does not have a specific IP policy, with precise aims and objectives to achieve. Intellectual property is used occasionally and in a non-strategic way, even if it is considered an important tool to protect the firm's knowledge.

In order to detect any possible infringement of its patents, the company performs patent monitoring monthly, using the EPO Espacenet website for that purpose as well as the Swiss IPI website. By these means Krämer monitors patenting activities of all its competitors, especially the Belgian firm, as it is its biggest rival. Monitoring activities are also performed in cooperation with distributors. These activities include checking product lists and visiting trade fairs.

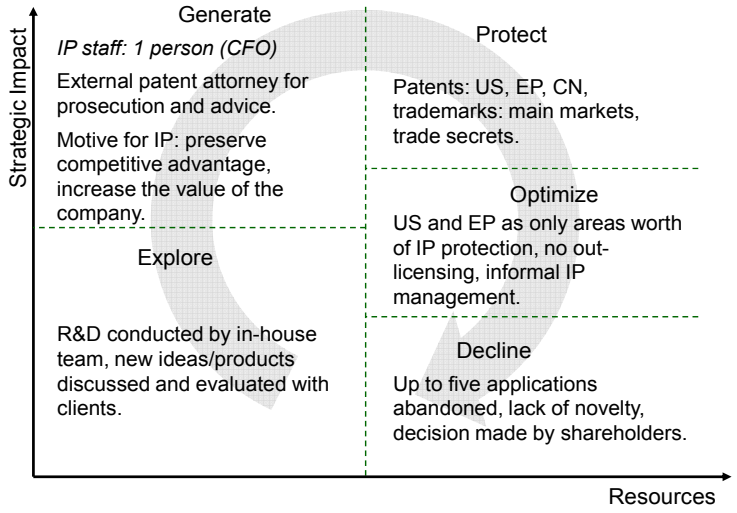
<u>One key patent, worth litigating for</u>

Krämer possesses a patent particularly important for the company, considered as the "main" patent. This patent is about a driving unit for vibration conveyors and has been granted in the US, at the EPO and in China. The patent family is crucial for the SME, as it protects a key element of its de-dusters and because of several advantages of the invention, such as a reduced mass of vibrating parts and an improved efficiency of the drive. Indeed, this patent has helped to foster the firm's business and to preserve the company's competitive advantage in the sense that it represents a significant barrier for Krämer's competitor.

The importance of this patent for the company and its determination to defend it has been underlined by the way it handled an infringement case by a competitor. This patent infringement was the only one Krämer has been involved in and took place in 2005-2006. One of the firm's OEM clients, recognizing the potential of the patented

driving unit for vibration conveyors and willing to extend its product line to de-dusters, started to produce de-dusters comprising driving units similar to the patented one. Since the patent was so important for the company, its infringement by the competitor caused damages for Krämer, resulting in a sales drop. That is the reason why in that case litigation costs did not play a deterrent role in the company's decision to litigate. The stakes were high for Krämer and the value of the patent exceeded the high litigation costs.

Graph 26 Krämer's IP Portfolio



After two years of trial, a settlement agreement was reached in 2006, according to which Krämer would replace the client's product line by its own exclusive Krämer product line, sold under the specific brand name. In this case, the patent not only successfully blocked the other company from producing same products but it also allowed Krämer to become the exclusive supplier of this company for this particular type of de-dusters.

Ideas for improving the IP management in SMEs

On a macro level Krämer's CFO has expressed a suggestion of service improvement from the IPI that could be particularly advantageous for an SME. This improvement can be a new service package offering advice about the possible methods of IP protection for a given invention, taking into account a proposed budget. The underlying idea is that the IPI could provide their expertise about possible ways to protect an invention with a budget framework, including details about costs, procedure and requirements. If such a service was to be implemented, Krämer would be ready to pay for it. For the time being, an external patent attorney, who is also involved in the prosecution process, as well as in litigation, performs this counseling work.

5.2.4 Abatek

Table 17 Abatek Company Overview

Name	Abatek International AG
Industry	Silicone/rubber key pads
Size	17
Markets	Worldwide
IP	Patents, trademarks, industrial designs
Mission	*"Creating Input Solutions"* *or* *"A TOUCH BETTER at providing input and output products and the supporting services worldwide."*
Founded	2006 former Daetwyler i/o devices
Responsible	University of St.Gallen

Company profile

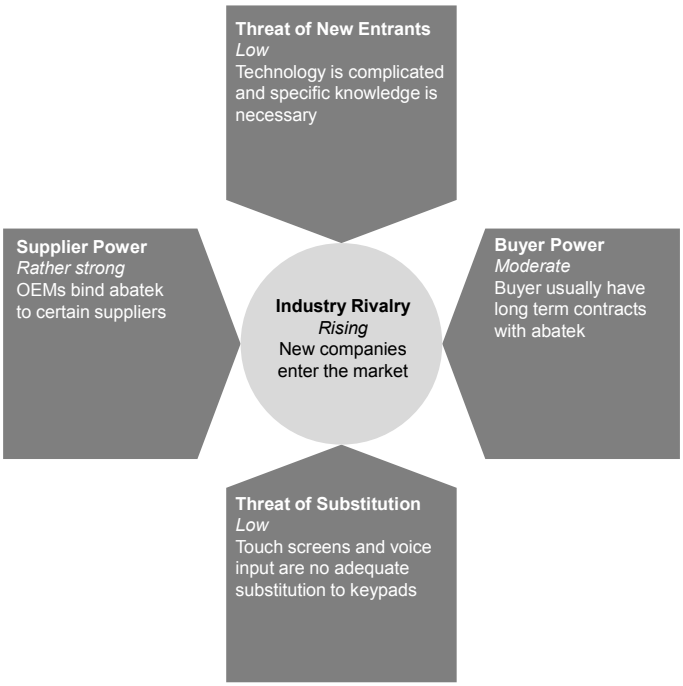
The Abatek International AG (table 17) has 17 employees in Switzerland and is situated in the canton of Zurich. The company is active in the input/output device market and mainly produces keypads.

Abatek's main market is the automotive industry. Approximately 80% of the company's revenues stem from this particular industry. In the automotive industry Abatek is a 2nd tier supplier selling its goods to 1st tier suppliers and directly to OEMs.

Being a 2nd tier automotive supplier Abatek is facing significant supplier power (see graph 27). OEMs bind their suppliers to use certain materials for the lifespan of a car generation (usually 5 to 10 years). Therefore, Abatek is forced to stick with certain suppliers for that time span. Suppliers are aware of this situation and therefore try to take advantage.

At the same time, being a 2nd tier supplier, Abatek is facing a similar situation with its buyers. The buyers are usually tied to the company for the lifespan of a car generation. Being aware of this the initial contract negotiations are much tougher than in other industries, where buyers can more easily opt out of a contract.

Graph 27 Abatek's Competitive Environment



The threat of new entry is moderate. From time to time new companies try to enter the market but usually fade out of it within their first business year. The reason for that is twofold. On the one hand side specific knowledge is needed in order to produce keypads at an automotive quality level. On the other hand, the company cooperates with Asian enterprises where such keypads are produced, which is a complex task for many companies. The interaction with Asian suppliers requires specific experience most newly founded companies lack. Aside from new companies the automotive input device market is facing new competition from a different industry sector. Mobile phones have a quite similar input device structure. At the same time the mobile phone market is facing a paradigm shift from keypad to touch screens. Companies producing keypads for mobile phones therefore try to find new markets such as input devices for cars.

The threat of substitution is quite low. Touch screens as well as voice input do not seem to be adequate substitutions for keypads in cars (example: electric window lifts).

The competitive rivalry is currently getting more intense having the mobile phone suppliers trying to enter the market. At the moment Abatek is facing four main competitors in the automobile industry and many in the other small industries Abatek is serving.

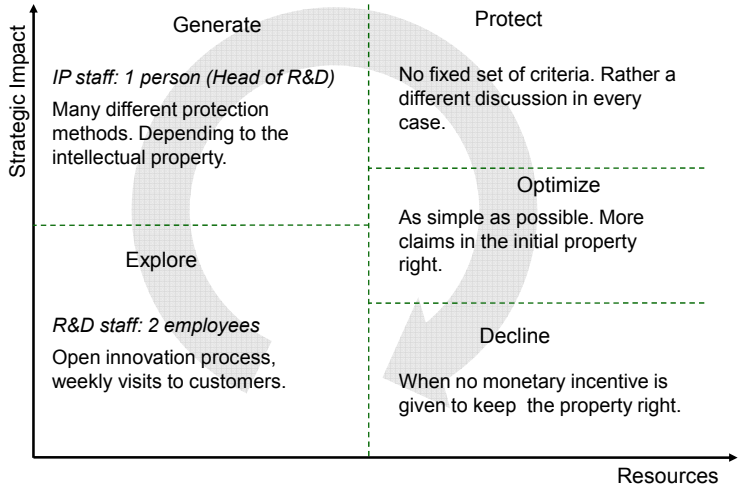
R&D and IP strategy

Abatek currently has two employees in its R&D department. One of them is also responsible for the company's IP management. Abatek is using a quite open innovation model in order to explore new technologies (see graph 28). The R&D department meets with customers on a weekly basis. Therefore, the company's customers are Abatek's main source in order to identify new technologies. The company claims: "We are always open to develop new applications and solutions together with customers and partners and thus welcome you to contact us anytime." on the company's website. Aside from its customers Abatek is frequently using patent databases to monitor the technological state of the art. Furthermore, trade fairs are frequently visited. In cooperation with the company's CEO Abatek's R&D employees decide on continuing projects.

Once Abatek decides on moving a certain project forward the company's next step is to seek an adequate protection method (Generate). The protection methods Abatek is using are manifold. Regarding the production process Abatek usually tries to work with secrecy agreements rather than process patents. In other cases certain names for new product groups were intentionally not trademarked to have other companies use the name and, therefore, create an industry standard. In order to protect circuit boards Abatek usually files designs. Patents are mainly used to block competitors. Abatek is using the temporal monopoly granted by a patent to exclusively offer certain product features.

Abatek is not following a fixed set of criteria when choosing the proper protection measure but rather discusses the issue with the company's external patent attorney. Abatek does not out-license its property rights. In a market with only a few players this is not a valid option for the company despite the fact that other companies would be very interested to in-license Abatek's technologies.

Graph 28 Abatek's IP Portfolio



In order to keep the optimization process of the company's IPR portfolio as simple as possible Abatek always tries to put many claims into the initial filing. This method worked for Abatek so far and will be carried on.

IPRs are usually declined when no monetary incentive is gives to further invest into the protection. Selling those property rights has not been considered so far but it seems unlikely that competing firms would be interested in them.

Ideas for improving the IP management in SMEs

The Abatek group is aware of the IPI services. The preferred service is the IPI's online patent search platform www.swissreg.ch. The company uses this service on a regular basis and is quite satisfied with the service itself. Besides this service, Abatek also considers IPI's website a useful tool. The website has a good structure and seeked information is easy to access, Abatek praises.

The company does not think that articles in an industry-specific journal are a proper method to inform SMEs about the management of intellectual property. Rather than that, Abatek would like to see seminars on this topic. At the same time the company admonishes seminar organizers to take the fact into consideration that SMEs have a very diverse knowledge regarding IP issues.

Abatek itself, for instance, would be interested in the costs a litigation has in different countries. Having been involved in litigations a few times, the company knows that one of the core problems of the IP system are the costs an SME has to consider in such a situation. Furthermore, the company suggests that such information could be presented on IPI's website.

5.2.5 The Powder Company

Table 18 The Powder Company's Company Overview

Name	The Powder Company
Industry	Cosmetics: chemicals, loose and solid powder products for cosmetic and pharmaceutical use
Size	25 employees
Markets	Europe and USA
IP	Patents, trade secrets
Mission	*"Our ultimate goal is to become the major player on the European talcum products market."*
Founded	1950
Responsible	ETH Zurich

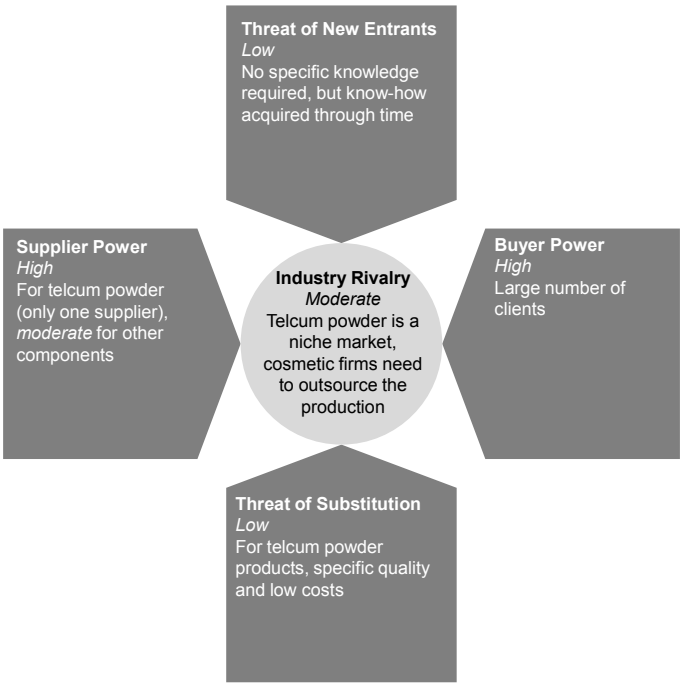
Company profile

Table 18 shows the company overview. The Powder Company was founded in 1950 in Zurich. Its field of activities is the production of cosmetics products. With 25 full-time employees (up to 50 including part-time positions) the firm can be qualified as a small enterprise. The company aims at formulating, producing and manufacturing cosmetic products, as an outsourcing partner for the cosmetic industry and as a private label manufacturer for the beauty and retail business. The Powder Company possesses a particular knowledge regarding talcum powder, what explains the overall dominance of this kind of products in its activities. The territorial markets of The Powder Company are primarily the German-speaking countries (Germany, Austria, and Switzerland), the rest of Europe and the United States. In Europe the firm is the second biggest producer of such products after the global leader, the American Johnson&Johnson.

Graph 29 shows the competitive environment of The Powder Company. The supplier power of the SME is extremely high for talcum powder, the core of the firm's business: in Europe there is only one supplier of talcum powder. The clients of the SME are mostly big players in the cosmetic industry and important retail chains such as Beiersdorf, Migros or Remington, hence they have a consequent buying power. This is why, even if they are numerous, the size of the firm's clients limits its flexibility when it comes to negotiating a contract.

A new competitor, on the condition that it would come from the cosmetic field, would not face significant barriers of entry, due to the relative generality of the knowledge involved. However, the firm has acquired important know-how regarding processing powder into a solid state.

Graph 29 The Powder Company's Competitive Environment



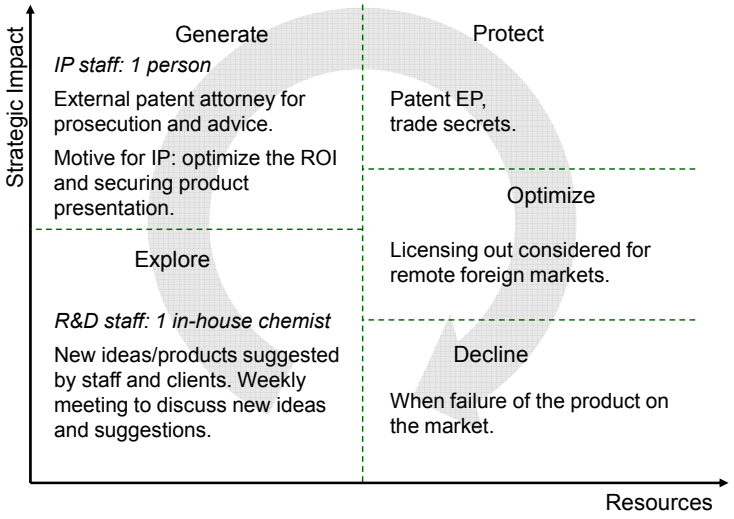
Despite all these elements of a high competitive rivalry, The Powder Company is protected by its position on a niche market. Indeed, talcum-powder products are hardly substitutable, due to their competitive price and several other advantages based on the characteristics of the raw material. Moreover, the production of such products requires different factories than for liquid cosmetics. Hence, the firm is able to mitigate the size of its competitors, as firms in the cosmetic branch do need to complete their product lines with talcum products, yet they are unable to manufacture them by themselves. This niche market position is constitutive of the company's low vulnerability to competition and is often a typical characteristic of an SME.

R&D and IP strategy

Graph 30 shows the IP portfolio of the The Powder Company. The company does not conduct "formal" R&D activities. Innovation is incremental and occurs mostly during normal production activities, most of the time. Still, the firm has an R&D budget (100 000 CHF per year) and employs a chemist to search for new products and production processes. Hence, although innovation is not at the core of the firm's activities, there are definitely attempts to innovate and develop new products that are being made. Development of new products has also already been conducted together with customers: For example, during three years The Powder Company conducted common research within a joint venture with a client, the French firm Luzenac, to develop a deodorant stick made of talcum powder. Yet a limitation has been pointed out: most of these innovations are based on basic research and most of the time the new product is not the result of R&D but of a "new business idea".

This lack of formal R&D and "systematic innovation" leads to an informal policy regarding IP protection. The SME does not have an IP budget; it does not have a precise IP policy either. The Powder Company might be representative of SMEs for which innovation is not their core business, yet it uses intellectual property in many cases. The firm possesses patents to protect its inventions. The European patent on a powder stick the firm possesses was used strategically: As the product was presented to big competitors such as L'Oreal or Beiersdorf, the SME wanted to protect it from a possible copy that could have been made after the presentation and also to be able to license it.

Graph 30 The Powder Company's IP Portfolio



Despite its few IPRs, the company does not see itself as able to really enforce them: litigating an infringement before court would be much too expensive as litigation costs are considered too high for an SME. Therefore, in most cases the firm would try to move on and develop new products that would give it lead time advantage over its competitors, which is seen as more valuable for the firm than an IPR too expensive to enforce.

Risks of using weakly protected trade secrets

Due to this lack of formal IP protection, the firm relies extensively on trade secrets to protect its knowledge. However, even though a trade secret might seem an easy and cheap method of protection, it requires strict confidentiality measures to be established. Still, like other SMEs,The Powder Company did not have a confidentiality policy, what left its trade secrets vulnerable. As a result, the firm saw some of its trade secrets being stolen. While the CEO was absent from the factory, an employee of an American client entered the premises and took pictures of the machines. He then sold these pictures to a competitor, who started to produce cheaper similar products. Due to this

trade secret breach, The Powder Company suffered heavy losses. Yet it did not start litigation due to the initial lack of protection of its trade secret and litigation costs, but most importantly it wanted to keep business relations with the US firm, as it was an important client.

The consequence of that theft was on the one hand a better confidentiality policy and, on the other hand, a diversification of the firm's products and activities.

Ideas for improving the IP management in SMEs

At the IP system level, the IPI has never directly been used by The Powder Company, advice and prosecution of intellectual property being delegated to an external patent attorney. No specific improvement is demanded to the IPI. However, there is definitely a demand for cheaper litigation: a more affordable one would considerably increase the interest of seeking a formal IPR to protect the firm's innovations and of the IP system as a whole, as litigation costs are seen as a powerful deterrent to IP protection and a limitation to the enforceability of a granted IPR. Interestingly, prosecution costs are considered as reasonable.

5.2.6 Cerbios-Pharma

Table 19 Cerbios-Pharma's Company Overview

Name	Cerbios-Pharma
Industry	Pharmaceutical chemistry/Biotech
Size	100 employees
Markets	EU, USA and Japan
IP	Patents
Mission	*"Research, development and manufacturing of high quality active ingredients for the Pharmacutical Industry."*
Founded	1994
Responsible	ETHZ

Company profile

Table 19 shows the company overview. Cerbios-Pharma SA was founded in 1994 as a merger of two small companies, Bioferment SA and Sapec SA. The company has experiences in research, development and manufacturing of high quality active ingredients for the pharmaceutical industry. Bioferment and Sapec continue to exist as divisions of Cerbios-Pharma. The Bioferment division's expertise is in probiotics and recombinant proteins, where as the Sapec division focuses on the development, registration, manufacturing of high potency API (Vit. D derivatives).

The products of Cerbios-Pharma are manufactured according to cGMP standards. Many of Cerbios-Pharma's production processes are protected by patents. Cerbios-Pharma's clients are the top-10 pharma companies and about 50 SMEs in the pharmaceutical and biopharmaceutical sectors.

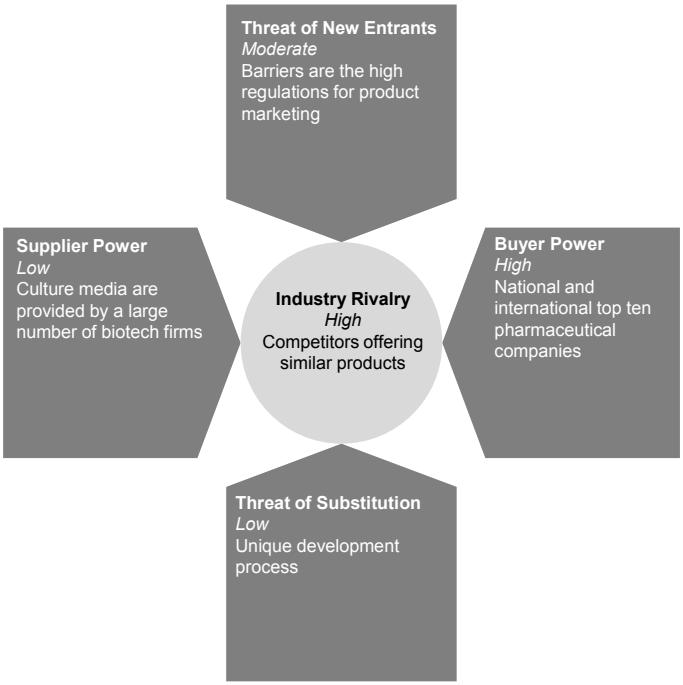
Graph 31 shows the analysis of Cerbios-Pharma's competitive environment. Depending on the type of products, there are different levels and types of competition from high, moderate to low. The supplier power is low for the production of probiotics market, since culture media are common products, which are provided by a large number of biotech companies.

The buyer power, however, is high for Cerbios-Pharma. Their customers are located worldwide. The reduced folates are mainly bought by companies developing therapeutic solutions for cancer and for the prevention and treatment of vitamin deficiencies, whereas derivatives of the vitamin D3 are bought by companies providing therapeutic solutions for various bone diseases and other pathologies.

The threat of new entries is moderate to low, due to the specific knowledge needed to enter the market. However, the highest barriers for new entrances are the required

regulations to market the products. The threat of substitutions is fairly low for Sapec, because of its unique developed reduced folates, which is one of the best coadjuvants of a cytostatic cancer treatment currently on the market, whereas for Bioferment the threat of substitution is moderate to high.

Graph 31 Cerbios-Pharma's Competitive Environment



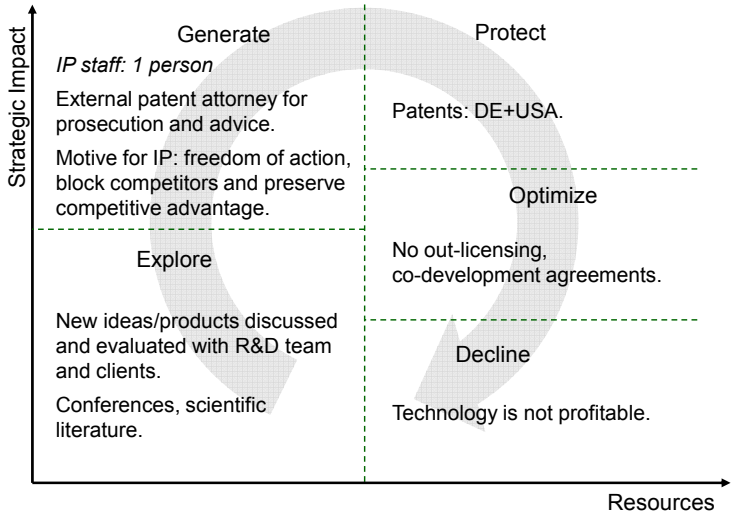
R&D and IP strategy

Graph 32 shows Cerbios-Pharma's IP portfolio. The company has no formal IP management process; however, the company is patenting actively in the pharmacology and biotechnology sectors, and has designated an R&D manager, who is responsible for the company's IP portfolio. When the company is interested in entering new markets, the R&D team will discuss the new ventures internally provided with the input of its clients and backed by a holistic patent search for the specific field, which is planned to be entered.

Cerbios-Pharma has hired an external patent attorney and a consultant to monitor the intellectual property and market activities of the company's main competitors twice a year, then an in house decision will be made on when and where to generate patents. In-licensing agreements are not considered at this time. The use of patents primarily has a defensive role. Cerbios-Pharma's customers, especially the pharmaceutical companies, often require the active ingredients produced by Cerbios-Pharma to be IP-protected.

The company files patent applications for nearly all its processes. The patents are effective in Europa and for some technological processes the company has filled patents outside of Europa. Cerbios-Pharma is defining criteria for certain geographical protection; this is usually done by defining the potential market and the potential competitors of the respective countries.

Graph 32 Cerbios-Pharma's IP Portfolio



The company has several co-development agreements with universities and other labs. However, out-licensing has never been an option for Cerbios-Pharma. The declination of a patent is depending on the revenue generated by the process technology. If the technology is not profitable anymore, formal IP protection is discontinued. This process is decided together with an external attorney.

Ideas for improving the IP management in SMEs

Cerbios-Pharma is familiar with the IPI services and had the opportunity to use it several times. The services used by Cerbios-Pharma were the assisted patent search and finding out about specific claims for a certain substance. The company was very satisfied with the service quality and cost relation. For now Cerbios-Pharma has no certain recommendations to improve the IPI services.

5.2.7 Cross-case Analysis – Patentees

In this section a cross-case analysis of the SMEs in the patentees cluster is presented. The analysis is based on the Porter's five forces model, R&D and IP strategy, and ideas for improving the IP management in SMEs.

The companies in this cluster are well informed about the use of patents. Like the multiple users, these companies are very aware of the IP system and make use of it. Six companies were assigned to the "patentees" cluster (see table 20 Overview): Abatek, active in the automotive industry; Cerbios-Pharma, a bio-pharmaceutical company; Küschall, a medtech company; Krämer, a manufacturing company; TelorMedix, a pharmaceutical company; and The Powder Company, a chemicals company. The companies mainly act in international markets.

Table 20 Patentees - Overview

	Abatek	**Cerbios-Pharma**	**Küschall**
Size	17	100	70
Industry	Automotive	Pharma	Medical
Market	Worldwide	Worldwide	Worldwide
Founded	2006	1976	1978

	Krämer	**TelorMedix**	**The Powder Company**
Size	45	6	25
Industry	Manufacturing	Pharma	Chemicals
Market	Worldwide	Worldwide	Europe and USA
Founded	1927	2008	1950

Table 21 (Market Analysis) summarizes the analysis of Porter's five forces. It shows the companies' competitive environment, the stage of their markets and whether it is a class market or a mass market. The competitive environment is different for all companies. All companies are acting on class markets, meaning they produce high quality products, with a low threat of new entries into their markets. The supplier power ranges from high to moderate depending on the industry and product the companies produce.

Table 22 (Intellectual Property Analysis) gives an overview of the companies' IP activities. Most of the SMEs in the study use intellectual property in a particularly selective way. The results reveal that the overall IP activity is high. Hence, in order to opti-

mize the use of the IP system and to maximize the benefit of an IPR, the firms perform a precise cost/benefit analysis for every considered innovation, because they cannot afford a patent-all strategy. All of the companies have a defined IP strategy and defined protection criteria, and the IP awareness of the IP responsible personel of the SMEs is high in all cases.

Table 21 Patentees - Market Analysis

	Abatek	**Cerbios-Pharma**	**Küschall**
Produkt Type	Key pads	Pharmaceuticals	Wheelchairs
Mass/Class Market	Class Market	Class Market	Class Market
Supplier Power	High	Low	Moderate
Buyer Power	Moderate	High	Low
Threat of Substitution	Low	Low	Low
Threat of New Entrants	Low	Moderate	Low
Industry Rivalry	Moderate	High	Moderate
Market Maturity	Mature	Mature	Mature

	Krämer	**TelorMedix**	**The Powder Company**
Product Type	Dedusting Systems	Orphan Drugs	Cosmetics
Mass/Class Market	Class Market	Class Market	Class Market
Supplier Power	Moderate	Low	High
Buyer Power	High	Moderate	High
Threat of Substitution	Low	Low	Low
Threat of New Entrants	Low	Low	Low
Industry Rivalry	Moderate	High	Moderate
Market Maturity	Mature	Growing	Mature

Another aspect is the industry-wide use of intellectual property. Five of the six companies act in markets with high IP awareness.

Regarding the open innovation process, all companies are open to cooperate with other institutions, e.g. universities, or with their suppliers in order to improve their products. This opening can, however, increase the risk of copying of unprotected intellectual property.

Table 22 Patentees - Intellectual Property Analysis

	Abatek	Cerbios-Pharma	Küschall
Defined IP Strategy	Yes	Yes	Yes
Defined Protection Criteria	No	Yes	No
IP Awareness of Responsible Person	High	High	High
IP Awareness Overall	Moderate	Moderate	Moderate
Industry-wide IP Usage	High	High	High
Open Innovation Process	Yes	No	Yes

	Krämer	TelorMedix	The Powder Company
Defined IP-Strategy	Yes	Yes	None
Defined Protection Criteria	Yes	Yes	Yes
IP Awareness of Responsible Person	High	High	High
IP Awareness Overall	High	High	Moderate
Industry-wide IP Usage	High	High	Moderate
Open Innovation Process	Yes	Yes	Yes

In table 23 (Patent Analysis), criteria related to the use of patents are presented. Küschall is the company with the highest number of 50 patents. The companies all use an external attorney to give them advice on issues related to intellectual property and patent application filings in general. All the companies have filed for international protection. When asked if the firms have changed their IP strategy in the last five years, four out of six answered yes. This is an indication of their high awareness towards intellectual property. For most of the firms the motive to protect IP is to allow them freedom of operation and to block the competitors' advantages.

Table 23 Patentees - Patent Analysis

	Abatek	Cerbios-Pharma	Küschall
Number of Patents	ca. 5	ca. 20	ca. 50
External Attorney/Agency	Yes	Yes	Yes
International Protection	Yes	Yes	Yes
Strategy Change in the last five years	No	Yes	No
Main Motive to Use Patents	Freedom to operate	Avoid abuse, blockage of competitor, preserve competitive advantage	Blockage of competitors, company reputation

	Krämer	TelorMedix	The Powder Company
Number of Patents	4	5	2
External Attorney/Agency	Yes	Yes	Yes
International Protection	Yes	Yes	Yes
Strategy Change in the last five years	Yes	No	Yes
Main Motive to Use Patents	Avoid abuse	Avoid abuse, preserve competitive advantage	Optimize ROI, freedom to operate

Table 24 (Infringements) shows the involvement of the companies in IP infringement cases. None of the companies have been accused by other companies of abusing their intellectual property. However, four out of the six companies have been copied by another company so far. The companies have identified the infringements through market monitoring, just through trade shows or, in most of the cases, by hints from their clients. Krämer has used a settlement agreement and Abatek used an informal agreement.

Table 24 Patentees - Infringements

	Abatek	Cerbios-Pharma	Küschall
Accused by Other Company	No	No	No
Copied by Other Company	Yes	Yes	Yes
Used Settlement	Informal agreement	-	No legal action possible
Identification of Infringement	Market monitoring	Conferences, Biotech fair	Exhibitions, trader hint

	Krämer	TelorMedix	The Powder Company
Accused by Other Company	No	No	No
Copied by Other Company	Yes	No	Yes
Used Settlement	Settlement agreement	-	-
Identification of Infringement	Yes	-	Customer hint

Table 25 (Improving Ideas) provides information about the companies' experience with the IPI and their ideas to improve the IP services. The results show that the IPI's services are known to nearly all companies except for Küschall. However, not all companies make use of these services.

All companies stated that there is a general need to raise the IP awareness, and that the IPI should increase its publicity. One channel, which has been proposed multiple times, is to profit from industry organizations and their journals. Also sending out flyers and using the Internet is regarded to be helpful.

Table 25 Patentees - Improving Ideas

	Abatek	Cerbios-Pharma	Küschall
IPI Services Known	Yes	Yes	No
IPI Services Used	Yes	Yes	No
Preferred Method for Awareness Raising for SMEs	IPI website	Internet IPI	Sending out IPI flyers
Company's Main Interest in IP Services	Litigation seminars, cost scenario	IP seminars	Optimize patent and design protection

	Krämer	TelorMedix	The Powder Company
IPI Services Known	Yes	No	No
IPI Services Used	No	No	No
Preferred Method of Awareness Raising for SMEs	Internet IPI, flyers	Internet IPI, flyers	Flyers, Internet IPI
Company's Main Interest in IP Services	IP Protection methods	IP Workshop for Biotech start up	Courses on how to get inexpensive litigation

In conclusion, a common finding from the cross-case analysis is that SMEs in general patent less than large firms. In general, the SMEs in the patentees cluster have a high IP awareness and are well informed about IP protection. Another finding demonstrated that a clear correlation exists between the size of the company and the use of intellectual property, together with a significant dependency of IP activity and industry sector. Indeed, in some industrial sectors the SMEs are considerably more active as regards to patenting than in others. Biotechnology companies as well as pharmaceutical firms use IP tools much more intensively than SMEs from other industry sectors because the former are those sectors, in which R&D is lengthiest and the most expensive hence extremely valuable and worth protecting. The markets in which the SMEs are acting in are both, national and international, and so are their customers and suppliers. Most of the companies in this cluster are aware of the IPI services and most of them make use of them. Regarding the companies' interest in IP services, the results show that the patentees are more interested in specific workshops, e.g., about litigation or cost scenarios, than of getting further general information.

5.3 Trademarks

The cluster comprises firms which focus mainly on trademarks, a legal tool they know well. These firms, in general, do not or only rarely patent, for this IP measure is not applicable to protect their innovations, because their inventions are not patentable (e.g., software in Europe) or because the patent system is considered too complex and somehow too expensive. This category of IPR users seems to be the only one concerned by EPO's efforts to reduce patenting cost.

The following companies will be presented in the cluster of "trademarks":

- Scobalit (HSG) In-depth case study
- XY Zwirn (anonymized) (HSG) In-depth case study
- Von Hoff (ETHZ)
- Rieder (HSG)

5.3.1 Scobalit

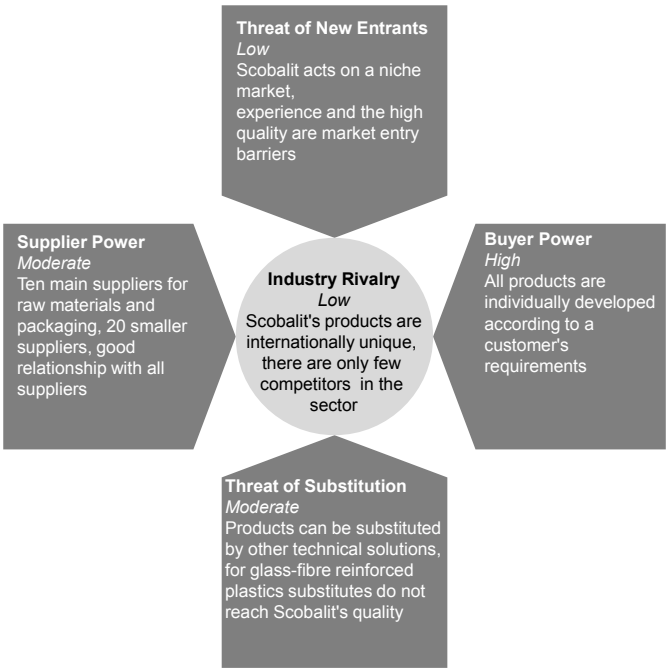
Table 26 Scobalit Company Overview

Name	Scobalit AG
Industry	Plastics (glass-fibre reinforced plastics)
Size	15 employees
Markets	Europe
IP	Patents, trademarks
Mission	*"To be the leading provider of translucent, reinforced plastic elements for the building sector in the German-speaking area."*
Founded	1950
Responsible	University of St.Gallen

Company profile

The Scobalit AG (table 26) is a fifteen-employee-strong SME situated in the canton of Zurich that produces high quality glass-fibre reinforced plastics. Founded in 1950, the company has extensive experience and mainly produces for the building industry on the European market. Scobalit's vision is "to be the leading provider of translucent, reinforced plastic elements for the building sector in the German-speaking area."

Graph 33 Scobalit's Competitive Environment



Scobalit's business model is based on individual projects with customers in order to develop innovative and unique products. The industrial rivalry in Scobalit's competitive environment (see graph 33) is low, only few competitors provide similar products and services. This is also true for the threat of new entry. Scobalit's field of business is a niche market with restricted demand. The incentive for new competitors to enter this market is quite low, additionally they are facing market entry barriers regarding the quality and the experience of the established companies such as Scobalit. The threat of substitution seems to be more important than the threat of new entry. Firstly, the threat of substitution arises through competitors producing elements similar to Scobalit's but on a lower quality level, and thus on a lower price level. Secondly, Scobalit's products might be substituted through other technical solutions, e.g. regarding a building, the architect does not necessarily depend on the integration of plastics to realize the building. Instead, he might find solutions using other materials, e.g. glass, metal etc. This possibility of substitution is also one reason for the relatively high buyer power of Scobalit's customers. Scobalit's activities are mainly based on individual and unique projects in cooperation with its customers, hence Scobalit's dependence on each customer is important. The bargaining power of Scobalit's suppliers is moderate. The company has ten main suppliers for the raw material and packaging, i.e. glass, resin and foam. Additionally, Scobalit has about twenty smaller suppliers. The relation between Scobalit and the suppliers is very good, and Scobalit emphasizes this trustful cooperation. However, in case of insurmountable inconveniences with a supplier, Scobalit can switch to another supplier.

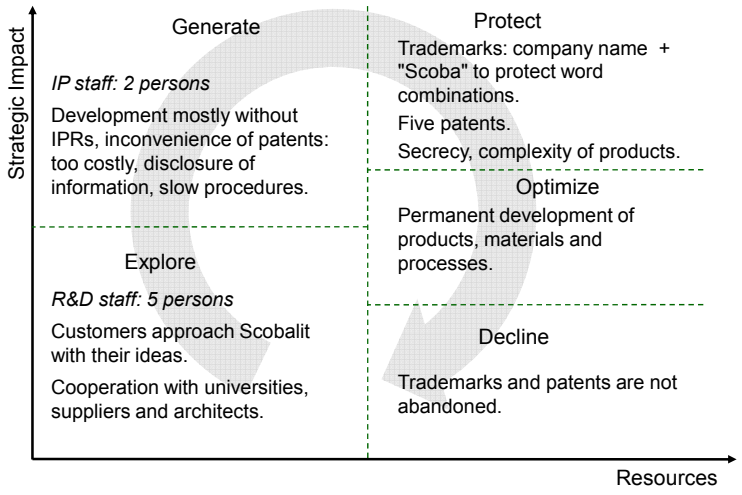
R&D and IP strategy

Scobalit's key success factors are its innovative, flexible and fast-responsive development processes. Five employees are working on the development of new products, two of them are also responsible for the IP management (see graph 34). In general, the customers approach Scobalit with a problem or an idea, and Scobalit develops - in cooperation with the customer - specific solutions (Explore). In addition to the strong cooperation with the customers, Scobalit works together with several universities and with its suppliers. Furthermore, the company works in close cooperation with an architect for realizing the projects. During the development and the realization of the new products, formal IP protection plays a secondary role (Generate). Patents do not fit into Scobalit's flexible and fast moving business model because the application process is too slow and the costs exceed the company's capacities. Additionally, the disclosure of information of a patented product or process is a barrier for Scobalit to use patents. On the other hand, protection of imitation is an important motive for Scobalit to engage in patenting. Therefore, really important technologies are patented (Protect). At the moment, the company holds five international patents on innovative products and processes.

The most important IPR for Scobalit is the trademark protection. Firstly, the company name Scobalit is a registered trademark. Secondly, as a special strategy, the company has not only registered the entire name "Scobalit" as a trademark, but also only the first

part "Scoba". In this way, Scobalit also protects word combinations that begin with "Scoba", e.g. "Scobatech" and "Scobalight".

Graph 34 Scobalit's IP portfolio



All trademarks are internationally protected. In addition to the trademark and patent protection, the company uses factual protection methods to avoid imitation. The company pays attention to keep important developments secret. Furthermore, Scobalit profits from its experience and the complexity of its products. Scobalit does not have a defined optimization strategy for its products or its intellectual property (Optimize). Rather, the company's entire business strategy implicates the permanent development and improvement of its products and processes in order to meet the high quality requirements of the customers. This also influences the abandonment of a product (Decline). If a product does no longer meet the quality requirements, if it can be replaced by an improved product or is lacking demand, it is abandoned. On the contrary, being Scobalit's keyIPR, the trademark protection is not abandoned.

IP experiences

Scobalit has two trademarks and five patents. All these IPRs are internationally protected. Scobalit cooperates with an attorney who manages all existent IPRs, and who evaluates, together with Scobalit's IP managers, new innovations and the necessity of a new IP protection. Scobalit has already been working with this attorney for years and relies on this cooperation. Scobalit and the attorney developed together the strategy to register the prefix "Scoba" in order to protect all word combinations with Scoba. In this way, the company can differentiate its different products directly through the name, but without losing the identification via the company name Scobalit (Examples: Scobatech, Scobalight, Scobatherm). Furthermore, Scobalit appreciates that the attorney manages all periodical payments for the trademarks and the patents of the company.

New products are given a name containing "Scoba" and thus are protected as an international trademark as explained above. With regards to patents, Scobalit is more reserved. Creating a good patent, i.e. a patent on a key technology that amortizes the development costs of the technology, requires a lot of effort. Additionally, the process until the patent is filed often takes too much time for the fast-moving market of Scobalit. Furthermore, defending a patent in a litigation is an important aspect for the company when considering patent protection. The litigation costs are considered to be too high for the small company. This is why Scobalit closely analyses possible patents and only files patent applications for key technologies.

Infringement involvement

Scobalit experienced two cases of infringement. In one case, a competitor promoted in a prospect its products by using pictures of Scobalit´s products. Scobalit contacted the company, but the competitor did not react. In a next step, Scobalit discussed together with its attorney the options and chances regarding a litigation. The result of this analysis showed that the litigation costs exceed Scobalit's budget, and the company decided not to take legal actions. Instead, Scobalit reinforced its supplier and customer network in order to block the imitator, and could avoid losses.

In a second case, a competitor imitated Scobalit´s products and offered a similar product at a much lower price but also on a much lower quality level than Scobalit. In this case, Scobalit could not take legal action against the imitator as there was no formal IP protection. However, the customer who first cooperated with the imitator finally came to Scobalit because the quality of the cheaper product did not meet the customer's requirement.

Ideas for improving the IP management in SMEs

Scobalit does not know the services of the IPI and has no experience with the IPI as the firm relies on its patent and trademark attorney. According to Scobalit, many SMEs rarely know the IPI, and the company therefore sees a need to increase the awareness of both the IPI and the IP topic. In order to do so Scobalit proposes to use the platform "KMU next"[10], the Swiss association for promoting SMEs. This association regularly organizes meetings and discussions, where the SMEs can share business experiences. Intellectual property could be an interesting topic for these meetings.

Furthermore, the company sees especially workshops with the IPI as a good form to transfer information. Scobalit itself is also interested in such workshops. Although the company cooperates with an attorney and trusts his know-how and experience, the IP managers of Scobalit themselves would like to know more about IP management. Scobalit is thus interested in general information about IP management, but also in specific information regarding trademark and design protection.

[10] www.kmunext.ch

Furthermore, Scobalit says that subsidies for SMEs could be an incentive for small firms to engage in formal IPRs. Scobalit would appreciate any financial help and probably use more IPRs as costs are a high barrier against patents for the company.

5.3.2 XY Zwirn

Table 27 XY Zwirn Company Overview

Name	XY Zwirn (Company name anonymized)[11]
Industry	Textile
Size	24 employees
Markets	Europe
IP	Trademarks
Mission	*"Sustaining the market position in the field of high end yarns for the hosiery industry."*
Founded	1970
Responsible	University of St.Gallen

Company profile

This company (table 27) is a producer of fine and finest double covered yarns for the hosiery industry. The company is situated in the canton of St. Gallen and has 24 employees. The company is a subsidiary of another firm, a 200 employee strong former competitor. The company's CEO is responsible for sales, the administration as well as the intellectual property - the CEO is the only employee responsible for the company's intellectual property.

"Sustaining the market position in the field of high end yarns for the hosiery industry." is the company's credo. The vision already shows that high end yarns for the hosiery industry is not a market where significant growth is expectable. On the contrary, women today wear hosiery far less than women did 30 years ago. Preferring to wear pants instead of skirts, women's demand for hosiery has gone back in recent decades.

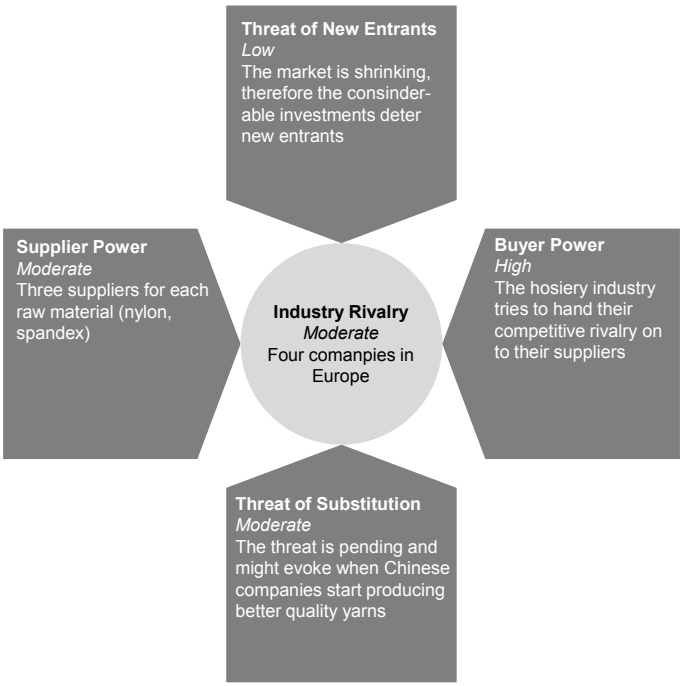
Graph 35 depicts the company's competitive environment. The firm has six suppliers: three deliver nylon, the other three spandex to the company, whose products are based on these two raw materials. Since the company focuses on producing a product with a higher quality standard, the final products depend on the quality of these raw materials. With this in mind, the firm purposely has three suppliers for each material to avoid risks or problems with any one supplier. Thus, the bargaining power of each supplier is moderate.

Today, the company has 35 customers, the main one accords for approximately 20% of the turnover. The company depicts the buyer power as quite strong. Having multiple

[11] On request of the company, the companies' name was anonymised for this publication. "XY Zwirn" is freely invented.

suppliers for each raw material, the SME is able to pass on parts of the pricing pressure the company experiences to the six companies in the lower value creation level.

Graph 35 XY Zwirn's Competitive Environment



Operating within a shrinking market, the company does not face the threat of new market entries - at least not in Europe. Additionally, the required investments for adequate machines are very high and deter new competitors from entering the market. On the other hand, in Asia the threat of new market entries is minacious. Today, China's yarn manufacturers produce yarns of a far lesser quality than the company does. However, comparing the Chinese yarns of today with those the Chinese produced five years ago, the difference in quality has decreased. Therefore, it seems to be only a matter of time until the Chinese companies will be able to produce yarns that the SME's customers might regard as an adequate substitution.

The competitive rivalry for high end yarns is considered moderate. The company has three competitors which sell yarns of this quality in Europe. The companies are direct rivals but do not aggressively try to take customers away from one another, preserving the moderate competitive rivalry.

R&D and IP strategy

The R&D management is divided between the company itself and its parent company. The company has one employee who works besides his job as quality manager on the development of the products (Explore) (graph 36). This research and development

targets at customer specific adaptations and marginal developments of the products. The strategic R&D including innovation processes is conducted by the parent company.

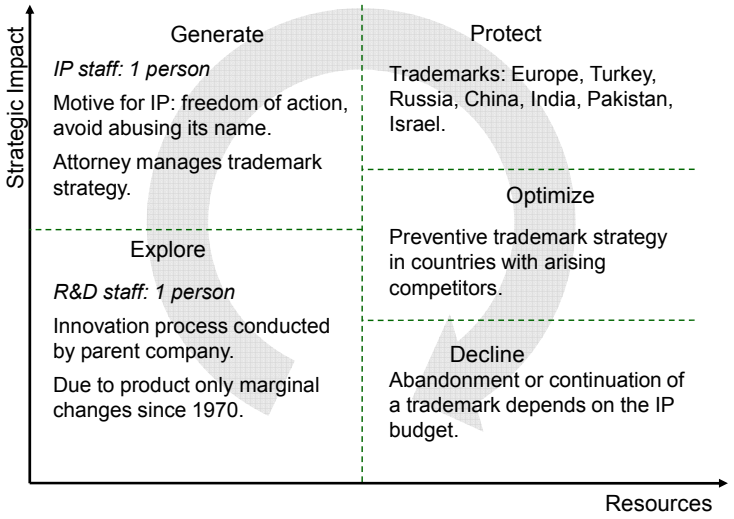
This separation of the R&D is a result of the objective to gain synergy effects when the two companies merged. The parent company has already been well equipped for R&D so that it also covers the main part of the SME's R&D.

Contrary to the R&D management, the company is entirely responsible for its IP management. The parent company itself does not manage the IP portfolio and only provides the subsidiary a relatively small IP budget. The SME works closely together with a trademark attorney who manages the company's trademark strategy (Generate). The firm has registered its name as a trademark. This protection exists since the foundation of the SME (Protect). The protection is on the one hand valid for Europe where the company sells its products. On the other hand, it is also valid in Turkey, Russia, India, Pakistan and China. Although the SME does not have customers there, many yarn producers come from those countries and the company wants to prevent competitors to use its name. The company is a market leader in the high quality synthetic goods class, and its brand is well known. In case that another company uses the SME's name for its own products, it is very likely that those have a significant lower quality level than the SME's products. Thus, competitors using the company's name for lower quality products impair its image and reliability. Therefore, the SME regards its IP protection as a kind of insurance for the company. Another motive for the company to use trademark protection is to guarantee its freedom of action.

In order to improve the IP protection, the SME recently decided to change its trademark strategy. The combined mark was changed into a word trademark to ensure that the name was protected. The costs for the change come to 15 000 CHF.

The company's IP decisions are independent from activities of competitors, they rather emphasize its own strategy. The company would not use intellectual property more extensively if it had more money. The company has one IPR - the trademark for its name - and does not see any potential for more.

Graph 36 XY Zwirn's IP Portfolio



When the company was formed in 1970, the original manufacturing process was patented. Today those patents are expired. Although the new manufacturing process is hardly comparable to the original one, the technological knowledge is state of the art. Hence, the new manufacturing process is not patentable.

In order to optimize its trademark protection, the company follows a preventive trademark registration strategy (Optimize). The company observes countries where potential competitors arise, which are in particular Asian countries. The next step is to register the trademark in this country. In this way, the firm extents its protection and minimizes the risk of an abuse of its name.

The decision to abandon an IPR depends on the IP budget provided to the SME by its parent company (Decline). As long as the budget covers the cost for the trademark protection including the trademark attorney costs, the company maintains its IPRs.

IP experiences

The company's core IPR is the registration of its name as an international trademark. This protection exists since the firm's foundation, and there is no plan to abandon the protection.

The SME regards its trademark protection as a kind of insurance for the company, because the name stands for high quality, and serves the customers to identify its product among other products.

The importance of the company's high quality products especially became obvisous in a competitive situation. In this case, the firm's main customer tried to get a price for the products much lower than what the SME could accept to maintain the quality level.

Although this customer was the main customer, the company decided not to lower its price, despite the risk of losing its key customer. In fact, the customer switched to a low-cost supplier. Finally, after four months, the customer came back to the SME because the lower quality of the low-cost yarns had caused so many machine breakdowns that the costs of these problems outweighed the price for the high end yarn.

The company recently changed its trademark protection strategy. The former registered trademark was a combined mark. This kind of mark has the disadvantage that it only protects the specific combination of the word/ logo. Hence, the company now protects its name through a word trademark that protects the text irrespective of the specific design.

For the entire management of the trademark protection, the company has been working closely together with a trademark attorney for years and appreciates the cooperation. The SME decided to be supported by an expert because, in this way, the company can be sure that their intellectual property is protected properly. Furthermore, the attorney regularly conducts a trademark monitoring in order to identify infringements. The company relies on the attorney regarding its IP knowledge and experience. Furthermore, the SME does not need to provide its own resources, i.e., staff or time, for trademark searches, legal questions etc.

Infringement experience

Although the company has a good trademark protection and cooperates with a trademark attorney for improving the protection, infringements cannot be excluded. A registered trademark does not necessarily protect against trademark infringement. The SME has been involved in one infringement case so far. The infringement was identified through the monitoring which is conducted on a regular basis by the trademark attorney. In this infringement case a competitor used a name and logo very similar to those of the company. Finally, both parties could find a decision outside court. If necessary, however, the company would defend its IPRs in court.

Ideas for improving the IP management in SMEs

As mentioned before, the company commissioned a trademark attorney for its IP management. The company has no experiences with the IPI. Furthermore, the IPI and its services are not know to the firm. Hence, the company recommends to increase the visibility of IPI services for Swiss SMEs. The firm proposes Swiss journals aiming at SMEs like "KMU" and "Der Unternehmer" as means to communicate the IPI services and the IP topic in general. The Internet is not judged as a useful platform to improve the visibility of the IPI services.

5.3.3 Von Hoff

Table 28 Von Hoff Company Overview

Name	Von Hoff AG
Industry	Optics: fashion, medical devices, and generic pharmaceutical medicine
Size	40 employees
Markets	Mainly Switzerland
IP	Trademark, industrial designs
Mission	*"Innovation by Motivation - 1st class service as a strong link in your value chain."*
Founded	1969
Responsible	ETH Zurich

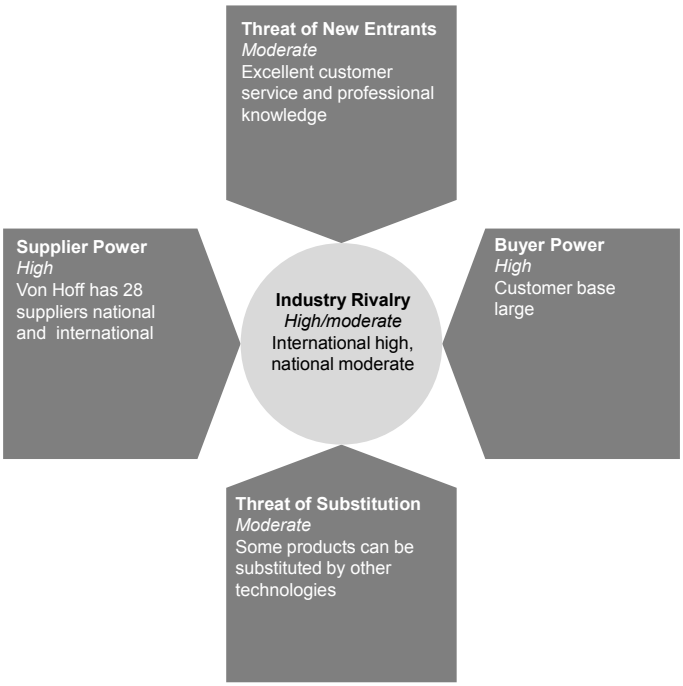
Company profile

Table 28 shows the overview of Von Hoff. In 1950, Mr. Ernst von Hoff founded an optics wholesale company in Zurich. Later in 1979, the company became an AG (Aktiengesellschaft - corporation) and then moved locations to Schlieren in the canton of Zurich where Von Hoff AG remains today. The company specializes in fashion eye glasses, diagnostic devices, outlet and optical workshop equipment as well as special lenses. Von Hoff AG does not produce its own products but rather acts as a distributor for its customer base.

Graph 37 shows the analysis of Von Hoff's competitive environment. Depending on the type of product, there are different levels and types of competition from high to moderate. For fashion eye glasses, Italy is the country with the international market dominance since two of the three most profitable suppliers of fashion eye glasses reside in this country. Although Von Hoff is one of the market leaders in Switzerland, on an international basis, it cannot compete with price negotiations with other larger distributing houses. As a distributor, Von Hoff is naturally dependent on its suppliers, therefore the supplier power is considered high. Currently, Von Hoff AG has 28 suppliers: some of the famous names are Adidas, Chopard, Escada, Esprit, Hugo Boss, Lacoste, NavyBoot, Jean Paul Gaultier, Givenchy and Puma.

The buyer power is considered high for Von Hoff. Acting as a distributor, Von Hoff is dependent on its customer base to determine what products to carry/distribute. Von Hoff has strong relationships with ophthalmologists and opticians in both private and public institutions.

Graph 37 Von Hoff's Competitive Environment



The threat of new entry is moderate because the ophthalmic field is a small sector. Von Hoff provides specific customer service and professional know-how for the optic products. The threat of substitution is moderate since some of the products can be substituted by other technologies.

R&D and IP strategy

Graph 38 shows Von Hoff's IP portfolio. The company is not a typical R&D company, it is a service provider. The company does not have a structured IP management process. However, it is considered a user of the IP system, by using trademarks agreements. Von Hoff uses trademark protection for the company's name.

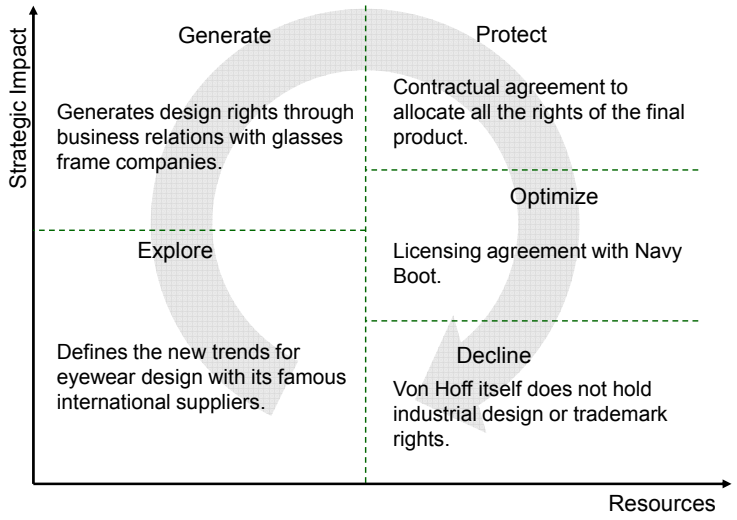
Von Hoff has a strong relationship with its suppliers. Occasionally, the company defines the new trends for eyewear together with its international suppliers. The company does not possess a formal IP structure. For instance, when an external consultant is called upon to design sunglass frames (design and color), IPRs are not enforced to protect these products because, in the fashion industry, the market moves too quickly to need this formal type of protection. Additionally, once the product is formally protected, the risk of being copied is much higher. Von Hoff does have a contractual agreement in place with the consultant, who approves the design of the sunglasses. This agreement allocates all the rights of the final product to Von Hoff.

The first licensing agreement with NavyBoot was a milestone for Von Hoff. This licensing agreement entailed a complete transfer of the brand and product licensed to Von Hoff AG in an exclusive contract. Although NavyBoot was exclusively known for

shoes, both companies decided to venture on a new product - eyeglass frames. Von Hoff AG acts as the distributor of the NavyBoot eyewear and has the exclusive right to use the name in connection with the eyeglass frames.

Von Hoff does not hold industrial designs or trademark rights.

Graph 38 Von Hoff's IP portfolio



Von Hoff always tries to establish an exclusive license with a supplier at the beginning of their negotiations. Therefore, if a competing company would be supplying products to another distributor, the supplier would encounter legal problems such as a violation of contract law.

Von Hoff AG currently has exclusive license agreements with NavyBoot, Adidas and Hugo Boss for sunglasses, with Oculus for diagnostics products, and with Ophthonix for wave-front guided lenses.

Ideas for improving the IP management in SMEs

Von Hoff has not yet contacted the IPI for any services. Although the IPI is known to Von Hoff, their services are not. In particular, the company does not associate the IPI with SME related services.

Von Hoff's management has three recommendations for the IPI: The first improvement that is recommended is to have simple explanations of what exactly is intellectual property and how the SME can benefit from exercising its rights in formal protection.

The second improvement would be to offer, in the form of business strategies, ways of increasing value and profit for the company using intellectual property, especially in the field of international protection. And lastly, Von Hoff expressed interest in knowing ways to implement a formal IPmanagement structure that complies with both national and European legal requirements.

5.3.4 Rieder

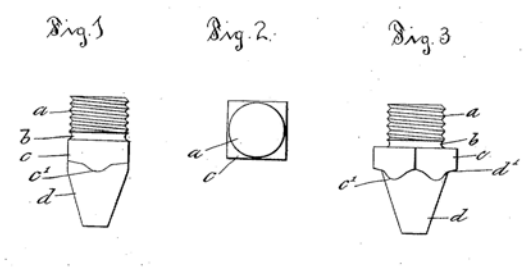
Table 29 Rieder Company Overview

Name	Rieder & Co. AG
Industry	Metal
Size	10 employees
Markets	Mainly Switzerland
IP	Trademark
Vision	*"Being the Swiss Market Leader."*
Founded	1931
Responsible	University of St.Gallen

Company profile

The company Rieder & Co. (table 29) is situated in Rothenfluh in the canton of Basel-Land. Currently 10 employees work for the company, two of them work part-time. Rieder & Co. was founded in 1931, initially producing calks (or studs) for horse shoes. Twice during the company's existence, new products were added to the lineup. Since 1955, Rieder & Co. offers a second product in addition to the calks for horse shoes: pen mesh floorings/gratings. Another 20 years later, in 1975, Rieder & Co. extended their product range again. Since that time the company offers scribers. Currently, all three products are sold. Scribers account for roughly half of the company's earnings while pen mesh floorings account for 40%, the calks for horse shoes for the remaining 10%.

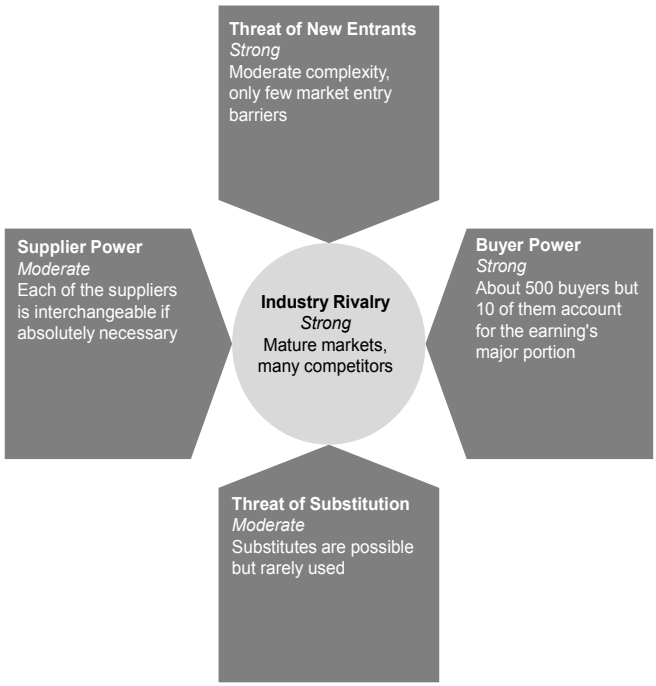
Graph 39 Horse Shoe Calk (Source: US Design No. 26,587 (1897))



The company has about 25 suppliers and does not depend on a particular one. Therefore, the supplier power is considered moderate (see graph 40). Each of the suppliers can be interchanged.

The buyer power is not as moderate as the supplier power. Rieder & Co. has about 500 buyers but 10 of them account for the earning's major portion. Therefore, these buyers have a considerable power.

Graph 40 Rieder's Competitive Environment



The threat of new entry is rather strong, too. The only real barrier competitors face are existing IPRs.

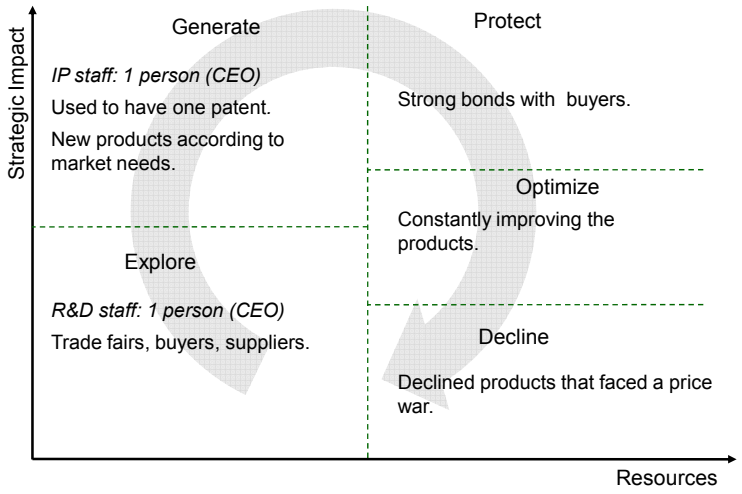
The threat of substitution is moderate in all three business fields. While any kind of nail may be used as a scriber, there is practically no substitute for horse shoe calks and for pen mesh floorings except an architectural work around.

The competitive rivalry is quite strong in all three business fields. All products are technologically state-of-the-art and thus many companies offer these mature products.

R&D and IP strategy

The company's CEO is responsible for Rieder's research and development as well as its IP management (see graph 41). Rieder & Co. used to have one single patent on its scriber. The patent was filed in the mid-1970's and discontinued in the early 90ies. At the same time in the 1970's did Rieder & Co. apply for a trademark. The company's scriber is trademarked as "Ricomarker". Today the trademark still exists.

Graph 41 Rieder's IP Portfolio



In order to explore new technologies, trade fairs are visited and ideas of suppliers and buyers are taken into account. Rieder & Co. does not seek additional external help. The company's CEO decides whether or not a project is moved forward. Currently, Rieder & Co. sees its main innovation potential in automation techniques regarding the production.

Just now Rieder & Co. has started a new line of calks for horse shoes (generate). These special calks are equipped with a winding. One of Rieder's customers suggested this new model of calks and explored the IP situation for Rieder. When developing a new product line, Rieder & Co. talks to a patent attorney about possible protection methods.

In order to protect its market from competitors, the company prefers close ties to its buyers over legal protection methods.

In order to optimise its technologies, Rieder constantly works on its products and its production techniques and takes recommendations of buyers/suppliers into account.

Rieder is producing high quality goods and does not engage in price wars. In the past the company offered a low-budget scriber but discontinued this product (decline), mainly because the company was facing a price war it was not willing to get into.

Infringement cases

Rieder was involved in an infringement cas. The company's scriber was counterfeited and sold over the Internet. The company did not take legal action. Rieder rather relied on its strong relationship with its customers and chose to inform them about the infringement. Till today, the company's trademark "Ricomarker" has not been infringed.

Ideas for improving the IP management in SMEs

The company has not used any of the IPI's services yet. Rieder & Co. has a patent attorney to whom the company turns for specific IP-related questions. On the other hand, intellectual property in general is not considered an important topic. The company stated its belief that the IPI's services - especially for SMEs - are hardly heard of. In order to change this, Rieder & Co. suggested publishing articles or announcements on the IP topic in industry-specific journals such as "Der Huf"[12] for the horse shoe industry.

[12] http://www.farriersjournal.com/

5.3.5 Cross-case Analysis - Trademarks

In this section a cross-case analysis of the SMEs in the trademark cluster is presented. The analysis is based on the Porter's five forces model, R&D, IP strategy, and ideas for improving the IP management in SMEs.

The cluster consists of four companies. Table 30 gives a brief overview of these companies. XY Zwirn, situated in the canton of St. Gallen, is a producer of high-end yarns for the hosiery industry. Scobalit produces glass-fibre reinforced plastics for the building industry and is situated in the canton of Zurich. Von Hoff, also in the canton of Zurich, is a distributer for medical and fashion eye glasses as well as optical equipment. Finally, there is Rieder & Co., a producer of metal horse calks, mesh floorings and scribers located in the canton of Basel-Land.

Table 30 Trademarks - Overview

	XY Zwirn	Scobalit	Von Hoff	Rieder & Co.
Size	24	15	40	10
Industry	Textile	Plastics	Optics	Metal
Market	Switzerland	Europe	Worldwide	Mainly Switzerland
Founded	1970	1950	1965	1931

Table 31 presents an overview of the companies' competitive environment. All firms offer high quality products and mainly act on class markets. The competitive environment of the firms differs a lot. It can be stated that all companies are facing high buyer power. An explanation for this can be that the customers are demanding concerning the quality and only accept products that meet these requirements. Regarding the market maturity, only Scobalit is in a growing market stage. Scobalit produces very specific products for special buildings or art constructions. The company is positioned in a niche market which is steadily growing.

Table 31 Trademarks - Market Analysis

	XY Zwirn	Scobalit	Von Hoff	Rieder & Co.
Product Type	Yarns	Glass fiber reinforced plastics for the building industry	Medical glasses	Horse calks, pen mesh floorings, scribers
Mass/Class Market	Class Market	Class Market	Mass Market	Class Market
Supplier Power	Moderate	Moderate	High	Moderate
Buyer Power	High	High	High	High

Threat of Substitution	Moderate	Moderate	Moderate	Moderate
Threat of New Entrants	Low	Low	Moderate	High
Industry Rivalry	Moderate	Low	High	High
Market Maturity	Mature	Growing	Mature	Mature

Table 32 reveals that none of the companies has a defined IP strategy or defined protection criteria. The IP awareness of the responsible person in each company is high or moderate, while the overall IP awareness in all companies is low.The use of IPRs is also lwo in the industry fields in which the companies are active. Regarding the open innovation process, two of the firms, Scobalit and Von Hoff, are active in opening their innovation processes to external institutions and consultants.

Table 32 Trademarks - Intellectual Property Analysis

	XY Zwirn	**Scobalit**	**Von Hoff**	**Rieder & Co.**
Defined IP Strategy	No	No	No	No
Defined Protection Criteria	No	No	No	No
IP Awareness of Responsible Person	High	High	Moderate	Moderate
IP Awareness Overall	Low	Low	Low	Low
Industry-wide IP Usage	Low	Low	Low	Low
Open Innovation Process	No	Yes	Yes	No

Table 33 shows the results of the trademark analysis. Companies owning registered IPRs (XY Zwirn, Scobalit and Rieder) have either one or two trademarks each. These are mostly the registered company names. Scobalit has a further trademark protection for the prefix "Scoba" in order to protect word combinations with scoba describing Scobalit's different products (Scobalight, Scobaglas etc.). Von Hoff does not have own registered IPRs, but profits from licensing agreements with the firms whose products Von Hoff distributes. The trademark protection of the firms is mostly international.

XY Zwirn, which is active on a national market, has an internationally protected trademark of its company name. Furthermore, XY Zwirn recently changed its trademark strategy. In 2008, the company replaced its former figurative mark through a word trademark in order to obtain a more efficient protection. All firms stated that the main motive to use trademark protection is to avoid the abuse of the company's name.

Additionally, all firms cooperate with a trademark attorney to have their trademark issues managed.

Table 33 Trademark analysis

	XY Zwirn	Scobalit	Von Hoff	Rieder & Co.
Number of Trademarks	1	2	only indirectly through licensing agreements	1
External Attorney/Agency	Yes	Yes	Yes	Yes
International Protection	Yes	Yes	Yes	No
Strategy Change in the last five years	Yes	No	Yes	No
Main Motive to Use Trademark	Avoid abuse	Avoid abuse	Avoid abuse	Avoid abuse

Table 34 summarizes the companies' experience with infringement cases. None of the companies has been accused by another company so far. In contrast, except for Von Hoff, the companies have been infringed by others. The companies had different ways to identify these infringements. In XY Zwirn's case, the trademark attorney of the company discovered the infringement during his regular monitoring. Scobalit identified the misuse of its products in a flyer of a competitor, and Rieder found a copy of its product on the Internet. Despite these infringements, the companies did not take legal action against the imitators. The fear of high litigation costs played an important role for the SMEs, and they achieved to find an informal agreement. Scobalit and Rieder additionally rely on their customer and supplier network to block the imitators.

Table 34 Trademarks - Infringements

	XY Zwirn	Scobalit	Von Hoff	Rieder & Co. AG
Accused by Other Company	No	No	No	No
Copied by Other Company	Yes	Yes	No	Yes
Used Settlement	Informal agreement	None, blockage of imitator through strong customer network	-	None, company informed customers
Identification of Infringement	Attorney, via trademark monitoring	Flyer of competitor	-	Internet

Table 35 shows the companies' experience with the IPI and their ideas to improve the IP services. Although the companies have formal IPRs, they do not know and have not used the services of the IPI. This could be explained by the fact that all companies cooperate with a trademark attorney for the management of their intellectual property, and they rely on this cooperation without spending additional effort for own patent/trademark searches.

However, there is a tendency that the companies wish to be better informed about intellectual property. All companies are interested in general IP information as well as industry-related IP information. In order to raise the general awareness of IP issues among SMEs, the companies propose to use industry associations and their journals as communication channels. Furthermore, they would appreciate workshops and personal discussions to exchange experiences about IP management.

Table 35 Trademarks - Improving ideas

	XY Zwirn	Scobalit	Von Hoff	Rieder & Co. AG
IPI Services Known	No	No	No	No
IPI Services Used	No	No	No	No
Preferred Method for Awareness Raising for SMEs	Industry-specific journals	Workshops, discussions	IPI webpage, flyers	Industry-specific journals
Company's Main Interest in IP Services	General information	Workshop on IP basics, workshops on trademark and design protection	IP workshops for service industry	General information specific for the industry

In conclusion, it can be stated that the SMEs in the trademark cluster only slightly use IPRs. Their most important aim is to protect the company's name and, closely related, the associated products. These firms are mainly active on national markets, most of the customers and suppliers come from the companies' regional environment. The registration of the company's name as a trademark is important for these SMEs because the company name stands for the high product quality, and an abuse could have severe consequences.

The companies in the cluster “Trademarks” are inadequately informed about intellectual property. Hence, the services these SMEs are interested in should focus on IP basics rather than on specific IP information.

5.4 Intuitive Non-users

While the previous case studies present companies which use the IPR system, the following describe companies that do not use registrable IPRs. These case studies are clustered into two groups. The first group represents so-called intuitive non-users, i.e., companies that stand for the majority of the Swiss SMEs. They intuitively do not use registrable IPR. Aside from these non-users is a second group: non-users on purpose, i.e., companies that are well aware of the IP system but decided not to use registrable IPRs.

In the following section, those case studies are presented that deal with intuitive non-users. These companies, which are not or rarely informed about IP management and do not use formal IP protection, are compared in a cross-case analysis. Five companies are assigned to the intuitive non-user cluster: Bächli, a producer of transformers and further mechanical engineering components in the canton of Lucerne; Nickal, a producer of door knobs and hinges in the canton of Vaud; EPha.ch, a software producer for the pharmaceutical industry in the canton of Zurich; Tembi, a producer of window and wall protection systems in the canton of St. Gallen; and Bamatec, a producer of coiling machines in the canton of St. Gallen.

The companies from the cluster "intuitive non-users" will be presented in the following order:

- Bächli (HSG) In-depth case
- Nickal (HSG)
- EPha.ch (ETHZ)
- Tembi (HSG)
- Bamatec (HSG)

5.4.1 Bächli

Table 36 Bächli Company Overview

Name	Bächli AG
Industry	Mechanical engineering, electronic components
Size	45 employees
Markets	Mainly Switzerland
IP	None
Mission	*"Our vision is to be your best supplier with innovative, cost-efficient and high qualitative products and services."*
Founded	1950
Responsible	University of St.Gallen

Company profile

The Bächli AG (table 36) is an SME with 45 employees and produces electronic devices. The company was founded in 1950 by Mr. Bächli senior and is located in the canton of Lucerne. The family tradition has been kept alive until today. Mr. Bächli junior is general manager of the Bächli AG and all company shares are held by the family.

The company's key products are one-phase and three-phase transformers, but they also manufacture chokes, toroidal and print transformers and other mechanical engineering components. The Bächli AG is unique in that it offers both products and services. In addition to standard products, the company focuses on developing customer specified products and services. The company's vision is formulated as follows:

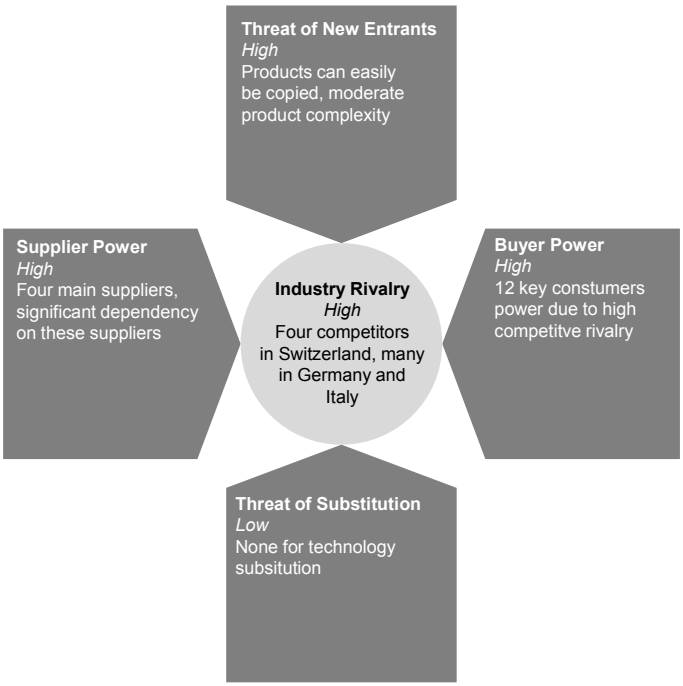
"Our vision is to be your best supplier with innovative, cost-efficient and high qualitative products and services."

The analysis of Bächli's competitive environment (see graph 42) shows that the most significant characteristic is the considerably competitive rivalry within the market. Since the required technical know-how for standard products is not complex, the number of providers for such products is very high. Bächli faces four competitors in Switzerland, numerous competitors in Germany, and several competitors in Italy.

Along with this, it is easy for new competitors to imitate these standard products and to enter the market. The threat of new entry is therefore very high. However, the threat of substitution by completely different products is non-existent. The reason for this is that the physical aspects of the product set strict limits in regards to the technical possibilities. The range of materials is also limited. Bächli's four main suppliers are

material suppliers. There is one supplier for copper, one for metal sheets, and two for spools. In addition to these, there are two suppliers for isolation paper and about 40 more for additional material.

Graph 42 Bächli's Competitive Environment



The company's dependency on the four main suppliers is significant. As a consequence, the suppliers have a significant bargaining power regarding prices. As soon as the price for raw material increases, e.g. for copper, the suppliers pass this higher price on to Bächli.

The situation regarding the buyer power is comparable to the supplier power. The buyer power is quite high due to the enormous number of competitors in Bächli's field of business. Bächli has 12 key customers, who account for the largest part of the turnover.

Bächli has good relations with all its main customers. However, the competition is high and the customers could easily substitute Bächli with another company. As mentioned in the supplier power section, Bächli has hardly another option but to accept the price as it is offered by its suppliers. As a result, Bächli passes on this increased prices from its suppliers to its product prices and thus to its customers. To keep customer loyalty and to stay competitive, the company's strategy is to be responsive to customer preferences, for example through short lead times and just-in-time delivery. Market development over the past few years has revealed that the role of standard products is becoming less important. Therefore, Bächli focuses on developing specific products

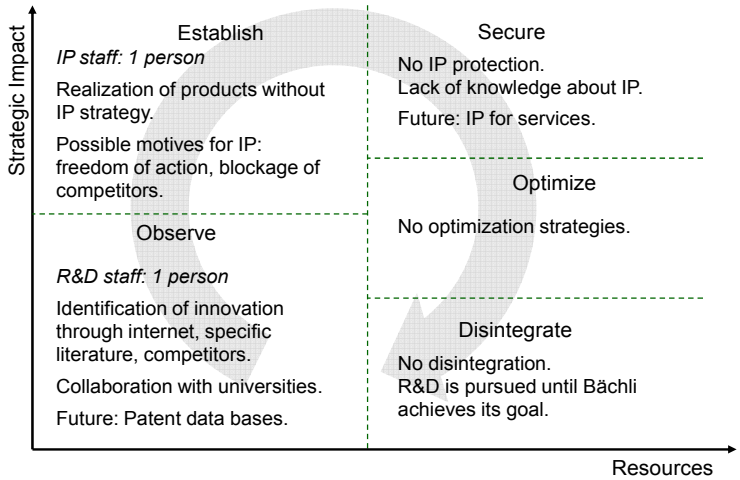
and services around the product instead of increasing the number of standard products. Bächli's experience in recent years shows that most customers first come to Bächli and ask for a standard product. This opportunity is then seized, and long-term cooperation is established through the development of customer specified products in close collaboration with the customer. As a result, about 90% of Bächli's products and services are customer specific goods.

R&D and IP strategy

Four of Bächli's 45 employees work in the R&D of technology and services. The R&D budget is not fixed and depends on the yearly requirements. There is no IP budget since Bächli does not make use of IPRs. However, as the company is increasingly aware of intellectual property and considers to use IPRs in future, Bächli has one employee who is responsible for the IP management in addition to his function as a project manager for company development. This person directly reports to the general manager.

As for the exploration of new ideas and technologies, Bächli has an open-minded knowledge transfer strategy (see graph 43) (Observe). Bächli faces many competitors, many of which are much larger than Bächli and have more R&D resources. Therefore, the company is open to collaborations with universities as well as competitors in order to acquire external knowledge. In such situations, Bächli offers to share parts of its own specific knowledge in exchange for complementary knowledge from the cooperating partner. This strategy proves to be fruitful even if the knowledge transfer between both partners sometimes reaches its limits that must then be accepted.

Graph 43 Bächli's IP Portfolio



In order to complement the cooperation with external sources, the company uses the Internet and specific literature, such as scientific journals, as sources of information. Bächli considers to use patent databases in future.

The entire process of Bächli's products and services is done without considering IP protection (Establish). In general, IP protection is not common practice in the concerned industry field. This industry-wide non-use can be explained by the features of the products. As transformer technology has remained essentially the same since these patent registrations at the end of the 19th and beginning of the 20th century, it is difficult to meet the novelty requirement for patents. In regards to trademarks and industrial designs, Bächli is unaware of their potential benefits. Correspondingly, the company has never considered using trademarks or industrial designs.

However, Bächli is aware of the potential for IP protection of the technology that goes into their special products which complement the standard technology (Secure). The motivation for Bächli to protect this innovation through formal IP means would be to obtain competitive advantages. Having a general lack of knowledge concerning intellectual property, the company is now starting to gather information on possible IP options. Therefore, they are now working together with a university expert and will use the IPI services as a source of information. Costs, however, are an important consideration for Bächli's IP activities. The company therefore considers patent or licensing collaborations with other firms in order to share the cost and effort.

Bächli has no defined optimization or exit strategy (Optimize, Disintegrate) for its products and services. Instead, the philosophy to "continue to reach the vision" is followed once a challenge is faced. For example, a current research project involves the improvement of the energy efficiency within a transformer. Energy efficiency is one of the rare technical aspects where transformers still have potential for improvement. Bächli has already been working on this aspect for two years and expects results soon.

IP experiences

Neither has Bächli gathered any IP experience yet, nor has the company encountered any IP infringement. The products are easy to manufacture since the technological knowledge and the required machinery are freely available. Hence, IP infringement has never been a topic for Bächli, which is why they are neither informed about the possible consequences nor the defense strategies.

In Bächli's industry field, the use of IPRs is not common and the company itself has not had the need to use IPRs in the past. However, this situation is changing. The competition in the transformer industry is growing, more and more competitors enter the market and introduce low-cost products. Therefore, Bächli is looking for ways to better differentiate itself from the competitors. One solution for this differentiation is the offering of customer specific services. As another way to strengthen and extend the company's market position, Bächli recently started to establish an IP management, and

it considers to engage in formal IP means. Bächli's first step was to acquire information about the IP system. In this context, Bächli went to the IPI and was given an introduction to the IP system. The introduction focused on the efficient search of patent data, and how to profit from the gained information. Search criteria were defined in order to find relevant information, and Bächli could identify those patents that seemed to be useful for the company's development.

Bächli appreciated the information half-day with the IPI and could gain a lot of important findings. Furthermore, Bächli is aware of the importance to know the state-of-the-art and the development of technology, and recognizes patent databases as a helpful means to get such information. Additionally, Bächli considers the IPI as an extension of the company's network. As an SME, Bächli emphasizes the importance of networking to strengthen and develop its market position.

Overall, Bächli realized the risk of missing information about IP management, which is why they took actions to overcome this lack. Although still in the beginning, these actions already revealed some interesting possibilities for Bächli, and the company is eager to proceed with this new strategy. Bächli sees IP management as the chance to achieve competitive advantages and to extend its network. In a first step, Bächli analyzes the chances of IP management on the entrepreneurial level. Afterwards, the technological feasibility is analyzed. In order to conduct these analyses, Bächli intends to cooperate with an external consultant, with whom both the engagement in patents and the engagement in licensing agreements are analyzed.

Ideas for improving the IP management in SMEs

Before the recent contact with the IPI, Bächli had never contacted the IPI for any services. Although the IPI was known to Bächli, their services were not. In particular, the company did not associate the IPI with SME related services. Hence, Bächli believes that the IPI should make its services, especially those for SMEs, more public and present them to potential customers. One suggestion is to publish articles about IP issues and the IPI services in specific journals. In order to reach SMEs, Bächli proposes the journals "KMU"[13] , "Polyscope"[14] and "SEV Bulletin"[15]. In addition, publications in industry-specific journals might be useful, too. A second suggestion for the IPI is to present at exhibitions information on the IPI and its services. In this respect, IPI's presence at exhibitions may be an opportunity for SMEs to get in touch with IPI staff. Bächli proposes "go automation technology"[16], a technology fair for automation and electronics in Switzerland, as a good opportunity. This exhibition takes

[13] www.kmu-magazin.ch

[14] www.polyscope.ch

[15] www.bulletin-sev-vse.ch

[16] www.go-automation.ch

place every two years and provides a platform for companies from all over Switzerland and from neighboring countries, who present their innovations.

Furthermore, Bächli proposes that the IPI could be present at events such as the Swiss Award for Business Ethics by the TQM forum Switzerland[17]. According to Bächli, this event has high publicity in the economic domain and would therefore be a good opportunity for the IPI to present itself.

Finally, Bächli feels there is a need to better communicate the importance of IP protection for the knowledge-based economy in Switzerland. The company claims that the IP topic is nearly absent in the educational system. In other words, the IP topic and informatioan about the related service institutions should be integrated into education programs, e.g., at universities.

[17] TQM Forum Switzerland, competence centre for business excellence, www.tqm-forum.ch

5.4.2 Nickal

Table 37 Nickal Company Overview

Name	Nickal SA
Industry	Hardware
Size	6 employees
Markets	Europe
IP	None
Mission	*"We want to offer best prices, short delivery times and reliable service to our customers."*
Founded	1929
Responsible	University of St.Gallen

Company profile

The Nickal SA (table 37) is a micro-enterprise with six employees in the hardware industry, located in the canton Vaud in the French-speaking part of Switzerland. Nickal was founded in 1929 as a component producer for the watch and bicycle industry. Today the company's product range includes hardware components such as door, window and furniture knobs, and hinges and spring locks for professional and private use. Nickal's markets are Switzerland, Germany, France, Austria, Belgium and Slovenia. Nickals mission is to "offer best prices, short delivery times and reliable service to the customers". The company is managed by two general managers while its owner is not active in the day-to-day business.

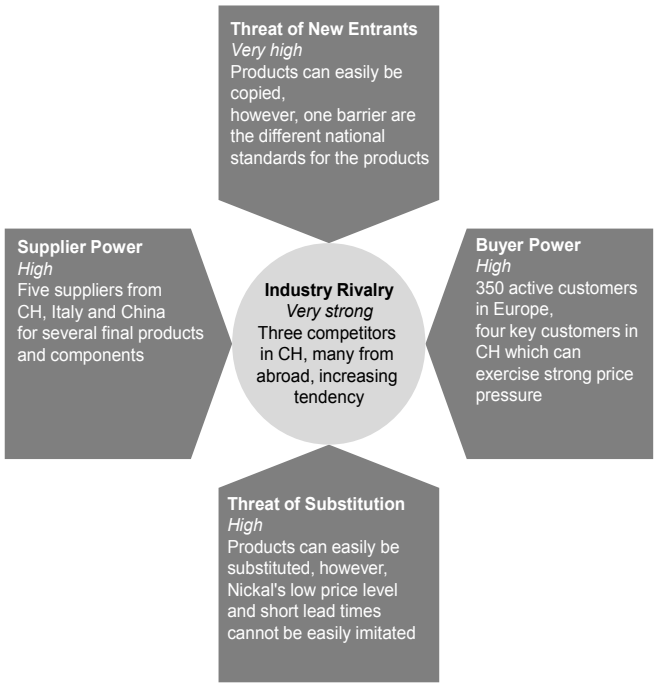
Nickal's competitive rivalry is characterized by increasingly intensive and aggressive competition (see graph 44). In Switzerland, Nickal has three competitors. The company has many more in the foreign markets, where especially the number of Asian competitors is increasing.

The threat of entry of new competitors is very high due to low market entry barriers. This is also true for the threat of substitution. The products can easily be copied, and the number of substitution products is high. However, there is a formal barrier for new market entry or the substitution of products because national standards for the dimensions of knobs differ from country to country. Meeting all national standards would require additional know-how and production efforts, which thus creates barriers for potential new competitors.

Nickal has two strategies to stay competitive. First, the company aims at offering the lowest prices. In 95% of the cases Nickal offers lower prices than its competitors. Nickal's second key competence is flexibility and short response times to customer

demands. The company has short decision ways and is able to meet short-term customer requirements.

Graph 44 Nickal's Competitive Environment



Nickal emphasizes its relation with its customers as a further success factor. The company sets the focus on reliability and honesty where honesty for example entails providing information regarding the origin of the products. For instance, Nickal emphasizes the Swiss origin for most of its product components. In order to produce with low costs, Nickal depends, however, also on Asian components that are much cheaper than European ones.

Nickal operates successfully as they enjoy a constantly increasing customer base. Nickal has currently 350 active customers in Europe. In Switzerland, which is Nickal's main market with 75% of the overall turnover, the company has four key customers. Furthermore, there are two to three important customers in Germany, Belgium, Austria, France, and Slovenia. The customers are mainly material and iron traders as well as lock and key service providers.

The customers' buyer power has been increasing over the last years due to increasing competition among the providers, and this tendency is expected to continue. The customers bargaining power is thus high, especially the key customers can exert significant price pressure on Nickal.

At the same time, the supplier power is high, too. Nickal has five suppliers in total, coming from Switzerland, Italy and China. The suppliers provide Nickal with both final products and components which the company then modifies, assembles and sells.

One of Nickal's suppliers makes 95% of its turnover with Nickal. Hence, for this case, there is an interdependency between both companies which regulates the price pressure between both.

Originally, Nickal had one supplier per product, but with increasing supplier power and the growth of competition during the last years, the company changed its strategy towards risk diversification so that the company now purchases every product from several suppliers.

R&D and IP strategy

As graph 45 shows (Observe), both general managers are responsible for product development and IP issues. In the product development phase, they are supported by a third employee. The product development consists on the one hand of improving the existing products and on the other hand on developing entirely new products, for example by integrating electronic components into the existing products. Nickal's R&D strategy entails close collaboration with its final customers such as door manufactures, and to be attentive to new technological trends. In order to learn about customer preferences, Nickal conducts regular customer surveys (three to four times per year) and an impact analysis to decide about investing in the idea or not.

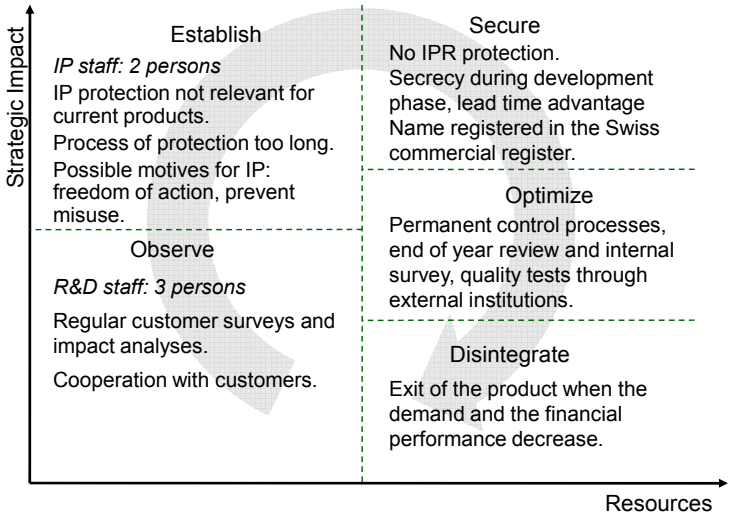
Nickal commercializes its products without legal IP protection (Establish). The current products do not meet the requirements for patent protection. Furthermore, Nickal's pioneering strategy is to bring its products to market quickly. The company wants to be one step ahead to its competitors and has to react fast. In their eyes, patent application processes take too much time and would render Nickal inflexible.

Nickal does not use any legal protection for its products (Secure). The current products are not patentable. Trademark and industrial design protection might be possible but Nickal has no strategy yet. Nickal is registered in the Swiss commercial register implicating that nobody else can register this name in Switzerland. Nickal considers this registration as a kind of protection of the company's name, and an additional legal trademark protection is, in the opinion of Nickal, not viewed to be necessary in Switzerland. However, Nickal said that a trademark registration on the international level could be useful.

Industrial design protection seems to be the most relevant legal protection method for Nickal. The company has not yet much information about the IP system and therefore does not use it. However, the company realized the importance of intellectual property and keeps an eye on possible legal protection means. Motives for legal protection could be freedom of action for a certain period of time and the prevention of misuse of own products.

Costs are not considered to be a direct hurdle for juridical IP protection. Although application costs are high from a short-term point of view, Nickal judges the long-term advantage due to the protection to be higher than the aspect of high application costs.

Graph 45 Nickal's IP Portfolio



Currently, Nickal creates competitive advantages through factual protection means. Secrecy is an important factor especially during the product development phase. Furthermore, Nickal generates lead time advantages through short delivery times.

Regarding the optimization of products and processes, Nickal has both internal and external control processes (Optimize). Internally, the company conducts end of year surveys with its employees in order to find out what and why had been suboptimal and how it can be improved. The second aspect regards quality management. Nickal's products and processes are audited by external institutions in order to optimize the company procedures.

The abandonment of a product is decided according to its financial performance (Disintegrate). When sales figures and demand decreases and the costs are too high to continue the production, production is stopped. Nickal only keeps the option to produce old products on demand. (One example are colored knobs which were popular some years ago, and are now mostly replaced by white or metallic design. Nickal produces the colored versions only on demand.)

Nickal has only little experience with the IPI. As a current IP non-user, the company has had no need to contact the IPI so far. However, Nickal was involved in one infringement case. A competitor claimed Nickal to use an inventory number for a product that is identical to the competitor's product inventory number. Thereupon Nickal looked for information via Internet and found the IPI web page (The services of the IPI had not been known before). Nickal could not find the needed information on the Internet page and finally got the information via IPI's telephone service. Nickal did not want a legal dispute with the competitor and changed its inventory number slightly so that they could avoid a legal conflict.

Even though the company got the needed information, it was difficult to find the responsible person for the issue. Furthermore, Nickal stated that they faced a language barrier. Nickal said that most of the information on IPI's website was in German, and that the consultants at the IPI were mainly German-speaking, too. In Nickal's view, the translation of the German versions into French was not equivalent.

After the first contact with the IPI, the company was interested in getting more general information about the Swiss IP system. According to Nickal, however, their impression regarding a potential language problem at IPI was strengthened when the company started to look for specific information. Hence, Nickals thinks that a counseling interview is more efficient if detailed information about possible IP protection methods is required.

Patent attorneys currently play no role for Nickal. If the company started to use legal IP protection, the general managers would take care of the IP management. Only when the needed effort and the human resources of the IP management exceeded Nickal's capacities, the company would consider to outsource this work.

Ideas for improving IP management in SMEs

Nickal stated that the IPI and its services have not been known to the company. Nickal noticed the IPI only when it looked for information in the context of the infringement claim. Thus, the visibility of the IPI must be improved, according to Nickal. In this respect, the company suggests a flyer which contains the key information regarding patent, trademark and industrial design protection, and contact persons. The flyer could serve as an advertisement at different public locations, in journals and organizations such as, for example, the Verband Schweizerische Türenbranche (VST, Engl.: Organization of Swiss Door Industry) and related exhibitions.

In addition, Nickal thinks that the language barrier has to be reduced in order to improve the IPI services. According to the company, it is almost necessary to speak German to have access to the detailed information. Thus, Nickal sees a need to enlarge the services for the French and Italian speaking population.

5.4.3 EPha.ch

Table 38 EPha.ch Company Overview

Name	EPha.ch
Industry	Information technology and information services
Size	4 students
Markets	Mainly Switzerland
IP	None
Mission	*"Providing free and easy to use services on prescribing medication safely for every practioners/clinicians"*
Founded	2008
Responsible	ETH Zurich

Company profile

Table 38 shows an overview of EPha.ch. The company is an Information Technology and information service company located in Zurich. EPha.ch's product is a free Internet service for physicians to search and prescribe drugs. The IT-Tool finds the exact drugs for patients fast and effectively.

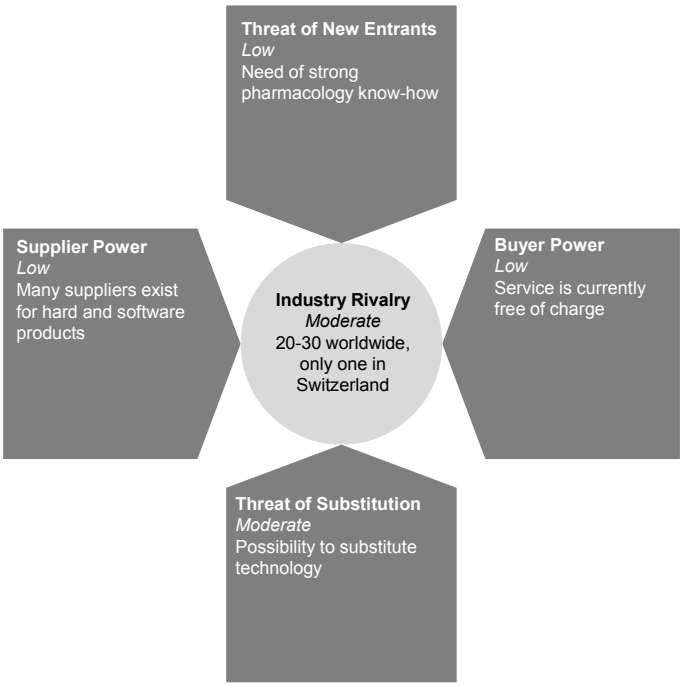
The company is in its early establishment phase, there are currently four partners and five shareholders involved in the development of the company. Each of the partners offers a specialized service to enhance the value of the company.

Graph 46 shows the analysis of EPha.ch's competitive environment. In Europe, there are approximately 20-30 companies, which compete in the pharmaceutical medicine product information market. However, only a few competitors exist in the Swiss market. These Swiss competitors are interested in entering into a friendly business relationship with EPha.ch.

Considering that EPha.ch will be initially offering two primary products, the type of suppliers would be different. The supplier power is considered low to moderate, depending on the service EPha.ch is offering and on the needed hard and software tools for it. The buyer power is low. The service which EPha.ch offers is free of charge for physicians at present.

The threat of new entry is low to moderate, depending on the product features and the associated service. The threat of substitution is high for the software tool product.

Graph 46 EPha.ch's Competitive Environment



R&D and IP strategy

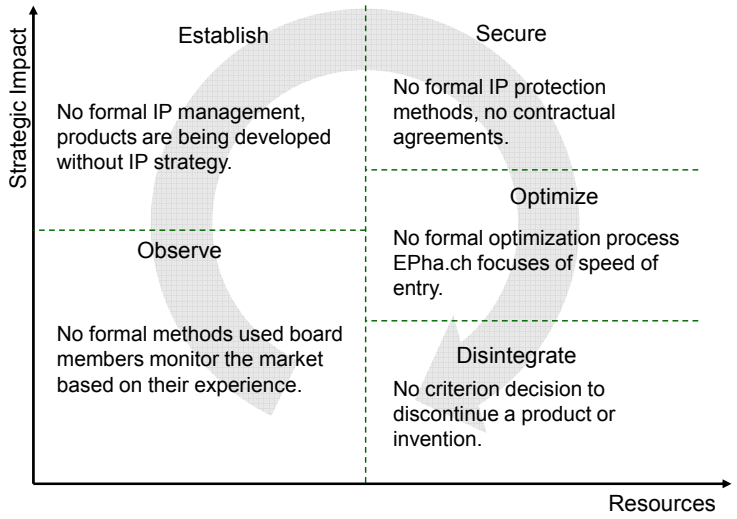
Graph 47 shows EPha.ch's IP portfolio. The company does not use formal IP means to protect their services. Since EPha.ch is in the early establishing phase, no formal methods have been established for identifying or evaluating new ideas/technologies. However, EPha.ch's board members regularly monitor the market for new technologies based on their experience.

According to EPha.ch's partners, the implementation of a formal IP management system to protect their innovation is not desired because of the extensive administrative effort involved with it.

Currently four students and six shareholders, have access to and knowledge about all the know-how regarding EPhas.ch’s valuable products/services.

EPha.ch’s partners believe that their specialized market would not benefit from a formal IP management system. Lead time advantage is the strategy that EPha.ch’s management team is taking at the current stage of their company.

Graph 47 EPha.ch's IP portfolio



EPha.ch is in the early establishing phase and still develops its product and service portfolio. All decisions are made jointly by its partners and shareholders.

Ideas for improving the IP management in SMEs

EPha.ch has limited knowledge about the IPI services. EPha.ch's partners believe that the Swiss IP office should provide free know-how/information that would assist small companies in developing their business model and IP strategy. This information should be readily available online.

5.4.4 Tembi

Table 39 Tembi Company Overview

Name	Tembi AG
Industry	Window blinds, window foils, wall protection systems
Size	9 employees (8 fulltime, 1 part time)
Markets	Mainly Switzerland
IP	None
Mission	*"Being a reliable partner for companies seeking help in Tembi's industry."*
Founded	1994
Responsible	University of St.Gallen

Company profile

The Tembi AG (table 39) is situated in the canton of St. Gallen. Tembi has nine employees, eight work fulltime while the ninth has a part time job with the company. Tembi's business is divided into three segements: window blinds, window foils and wall protection systems. In the field of "window blinds", Tembi sells all typs of window blinds except for curtains e.g. jalousies, sunblinds, roller blinds, vertical lamellaes etc. In Tembi's second business field "window foils", the company sells foils for existing windows in buildings. These foils can be used to reduce solarization, to reduce the brightness in rooms, to reduce UV radiation or to increase the isolation of the windows. Tembi's third business field are wall protection systems. These systems are for instance used by hospitals to protect the walls and the edges from moving beds. Besides hospitals, nursing homes are a regular customer.

Tembi itself does not produce anymore. Today, the company sees its business mainly as a service provider and a technical equipment installer.

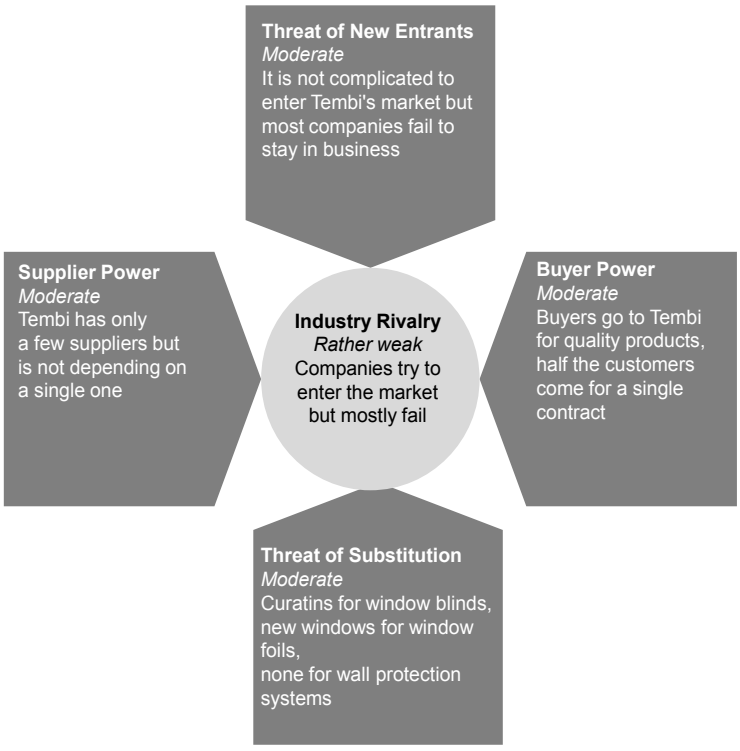
Tembi's competitive environment is shown in graph 48. The company considers the supplier power moderate. Tembi has only a few suppliers in each business field but could substitute them if necessary.

The buyer power is considered moderate as well. About half of the customers hire Tembi for a single project and turn to the company for quality rather than price reasons. The other half of Tembi's customers are repurchasers. Most of Tembi's customers are SMEs.

For Tembi's three business fields, the threat of new entry is moderate, too. While it is not complicated to enter the market, most companies fail to stay in business. Tembi sees the reason for these failures mainly in the poor professional competence most

newly established companies have. Tembi has seen several customers turning to competitors for a markdown. Most of these customers came back to Tembi later.

Graph 48 Tembi's Competitive Environment



The threat of substitution depends on the business field. For window blinds there is a well known substitution: curtains. However, most companies do not want to hang curtains in their corporate buildings. Therefore, curtains are rather a strong substitution for private households. As far as window foils are concerned, the only substitution would be to install new windows that already contain the desired features. This substitution is even recommended by Tembi if the windows are rather old. In Tembi's third business field (wall protection) there is hardly a substitution. While architects tend to neglect wall protection when designing hospitals or nursing homes, the responsible personnel usually upgrades these features quickly.

R&D and IP strategy

Tembi's R&D management is mainly done by the companies CEO (see graph 49). Tembi identifies new ideas and technologies often through customer input (Observe). Subsequently, the company came up with a better looking and more sophisticated product for their wall protection systems. Plastic elements are usually used for this purpose. Since many architects refuse to use them, Tembi developed wall protection

systems based on glass. New products are established only if standardized products are unable to fulfill the customer's needs, as seen in the case of glass wall protection systems.

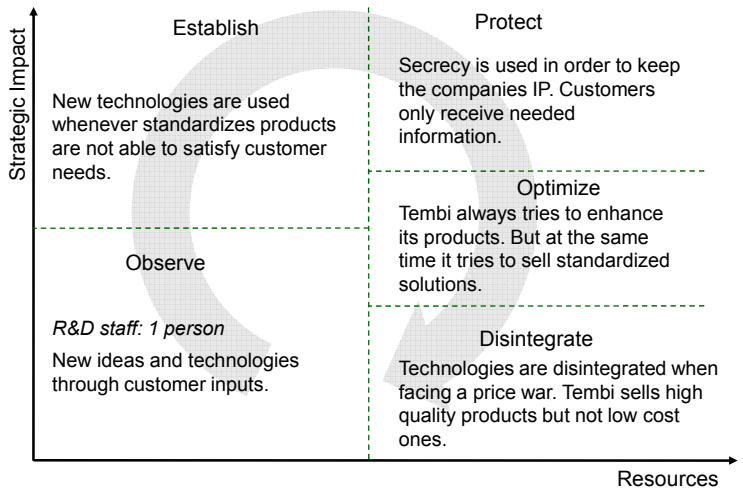
Tembi usually tries to sell standardized products in order to keep the complexity on a minimal level. Trade fairs are visited from time to time as a strategic method to identify new ventures. The company's CEO decides on pushing ahead with a new project.

The company has not applied for formal IP protection yet but might consider to register the company's name "Tembi" as a trademark. Secrecy is Tembi's main protection method. The company gives only the needed information to potential customers, which is done to avoid situations where customers take project proposals to Tembi's competitors in order to achieve a lower price there. Furthermore, Tembi is very reluctant to present information on the corporate website.

Tembi always tries to enhance their offered products (Optimize), especially those that have limited lifespans such as foils used on the outside of windows or wall protection systems. The former have a lifespan between five and seven years in central Europe.

The company phased out products in the past. This has mainly happened when other providers entered the marked and sold the product for bargain prices. Tempi for example discontinued to sell marquees due to the price competition in the product market. As Tembi sells high-quality products, the company rather phases products out that are exposed to price competition, rather than selling low-quality products at a low price.

Graph 49 Tembi's IP Portfolio



Ideas for improving the IP management in SMEs

Tembi has not been involved in any infringement case since the company was founded in 1994. Tembi has not used services of the IPI yet. The company is not aware that the IPI is a service provider.

Tembi recommends the IPI to consider a campaign in order to inform SMEs about their services. Furthermore, Tembi suggests that the IPI may directly contact SMEs or use the regularly conducted surveys for SMEs as a vehicle to inform SMEs about the IPI's services and IP protection methods in general.

5.4.5 Bamatec

Table 40 Bamatec Company Overview

Name	Bamatec AG
Industry	Mechanical Engineering
Size	66 employees
Markets	Worldwide
IP	None
Mission	*"We want to be an important provider for coiling machines worldwide."*
Founded	1997
Responsible	University of St.Gallen

Company profile

The Bamatec AG (table 40) is a producer of high end coiling machines in the canton of St. Gallen. The company has 66 employees. Since its foundation in 1997, it belongs to the Baumann Group. The Baumann Group is a traditional Swiss family-owned enterprise in the mechanical engineering industry. Bamatec's vision is "to be an important provider for coiling machines worldwide".

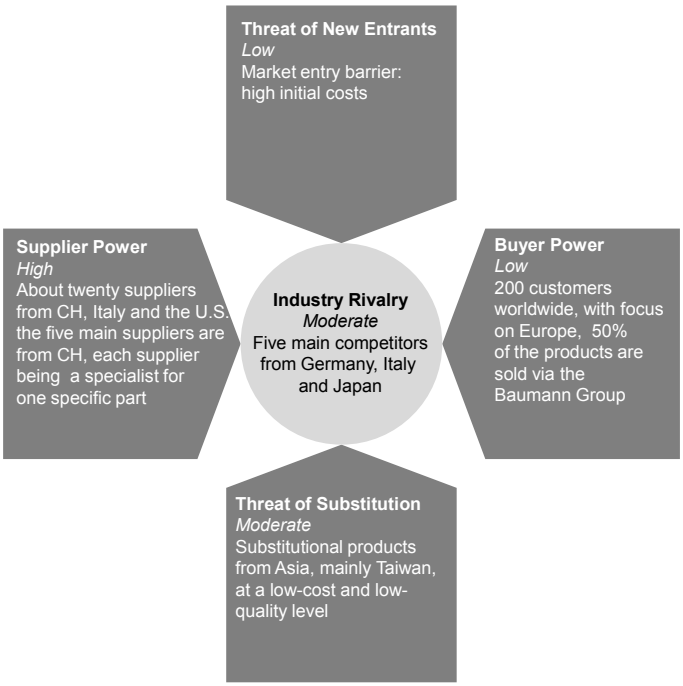
Bamatec is an independent subsidiary of the Baumann Group. However, the company profits from the corporate cooperation. Bamatec sells 50% of its products to the Baumann Group, which retails the products to about 200 customers worldwide. Furthermore, Bamatec cooperates - independently from the Baumann Group - directly with customers in Europe. The bargaining power of the buyers is low (see graph 50). Due to the cooperation with the Baumann Group, Bamatec does not necessarily depend on its direct customers. Additionally, the competitive rivalry in Bamatec's industry sector is moderate, or even low for the high-quality level. New competitors encounter high market entry barriers in the form of high initial costs for the technical equipment. Thus, the threat of new entry is low. However, there is a threat of substitution through low-quality products from Asia, mainly Taiwan and China.

In contrast to the buyer power, the supplier power is high. Bamatec has twenty suppliers from Switzerland, Italy and the U.S.. The company emphasizes the cooperation with Swiss suppliers, and the five main suppliers all are regional firms. Bamatec even aims at reducing the collaboration with the overseas suppliers in favor of regional partners because the communication effort and the lead time in long distance deals appears to be too high.

Bamatec has had only one supplier for a specific product part which increased the company's dependency on that supplier. The situation has been changed in the meantime, and Bamatec uses parts from an internationally well known supplier. The

high bargaining power of the suppliers can result in price increases which Bamatec has to pass on to the customers.

Graph 50 Bamatec's Competitive Environment

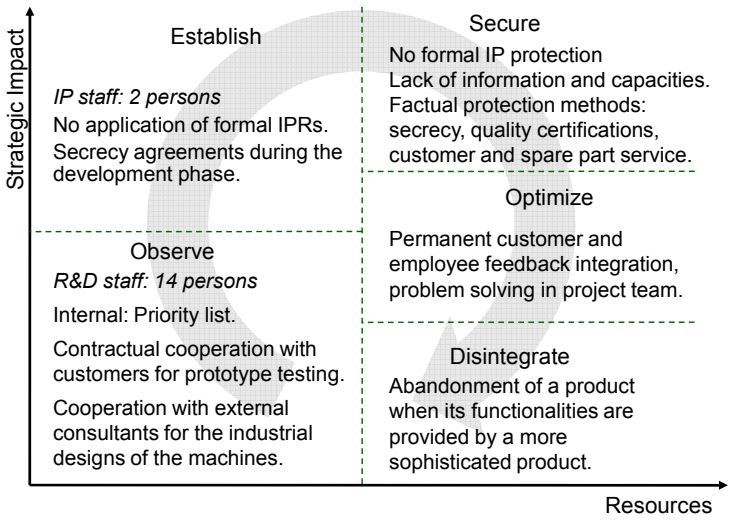


R&D and IP strategy

Bamatec has fourteen employees in the R&D department (see graph 51). The R&D department is further divided into the department of mechanical development (eight employees) and the department of software development (six employees). Regarding the IP management, there are two responsible persons, the managing director and the head of the R&D department.

Bamatec follows an open approach for new ideas and developments. The company therefore cooperates closely with several external institutions (Observe). Firstly, the company sends out questionnaires to the customers. These questionnaires are evaluated and, based on the results, Bamatec creates a priority list. This priority ranking is completed by a list which contains ideas of the employees (fitters and staff of customer service) for improvements or new developments. The ideas are mostly realized according to the ranking. Secondly, Bamatec works in close cooperation with Baumann and with another German key account. The two customers test prototypes which are developed by Bamatec. Thirdly, the company works together with an external consultant for the design of the products. Furthermore, Bamatec uses patent databases for getting information. For the patent database search, Bamatec is supported by a patent attorney.

Graph 51 Bamatec's IP Portfolio



Bamatec does not use formal IP protection (Establish, Secure). However, the company profits from several factual protection methods. During the development phase of the products, secrecy is the most important means of protection. For example, the cooperation with the customers who test the prototypes is secured through secrecy contracts. In addition to the secrecy contracts, Bamatec uses quality certifications, customer services and maintenance as factual protection methods.

Bamatec considers the cost and effort for patents as too high, and the company lacks the financial capacity for such an investment. Motives for using formal IP protection would be to avoid imitation by other companies. According to Bamatec, the most important element to be protected would be the software for the coiling machines. The software development depends entirely on the employees, and there is a risk to lose this know-how. The consequences of such a loss of knowledge would be severe for the company. However, Bamatec does not consider to engage in formal IP protection at the moment. The reason is that IP protection has not a high priority for the company. Instead, Bamatec prefers to manage other issues which are more urgent, such as risk and security management.

The optimization process of Bamatec consists, on the one hand, of the analysis and integration of customer feedback into the products (Optimize). On the other hand, Bamatec uses incidents occurring during the development or production phase in order to improve the processes. Problems are generally solved by the project team. As far as the phase-out of products is concerned, the decision is taken by the managing director and the head of R&D (Disintegrate). Bamatec replaces old with improved machines, e.g., when the features of two machines are both combined in a new machine.

Infringement involvement

Bamatec was involved in an infringement case. One of the suppliers, who also was a trade partner, copied a patented machine element from another company and integrated it in a Bamatec coiling machine for exhibition reasons. The competitor charged Bamatec of this infringement, and Bamatec passed the charge on to the supplier. The supplier finally found an informal agreement with the other company.

Ideas for improving the IP management in SMEs

According to Bamatec, the general awareness of the importance of IP protection means should be raised. The company itself lacks information about IPRs and considers IPRs not to be essential in their field of business. Furthermore, Bamatec has not yet made any experience with the IPI, and does not directly associate the IPI with IP services for SMEs. Hence, the company suggests to increase the visibility of the Institute and its services in Bamatec's industry field, e.g., via the Swissmem[18]. Especially workshops are considered a useful method to inform SMEs and to spread knowledge about IPRs.

[18] Die Schweizer Maschinen-, Elektro- und Metallindustrie, http://www.swissmem.ch/

5.4.6 Cross-case Analysis - Intuitive Non-users

In this section a cross-case analysis of the SMEs in the intuitive non-user cluster is presented. The analysis is based on the Porter's five forces model, R&D, IP strategy, and ideas for improving the IP management in SMEs.

In the following paragraph, the "intuitive non-users" are compared, i.e., those companies which are not or rarely informed about intellectual propertyand do not use formal IP protection. Five companies are assigned to the intuitive non-user cluster (see table 41): Bächli, a producer of transformers and further mechanical engineering components in the canton of Lucerne; Nickal, a producer of door knobs and hinges in the canton of Vaud; EPha.ch, a software producer for the pharmaceutical industry in the canton of Zurich; Tembi, a producer of window and wall protection systems in the canton of St. Gallen; and Bamatec, a producer of coiling machines in the canton of St. Gallen.

Table 41 Intuitive Non-users - Overview

	Bächli	Nickal	EPha.ch	Tembi	Bamatec
Size	45	6	2	9	66
Industry	Mechanical Engineering	Hardware	Software	Plastics	Mechanical Engineering
Market	Switzerland	Europe	Switzerland	Switzerland	Worldwide
Founded	1950	1929	2008	1994	1997

As we can see in the overview table 41, the intuitive non-user companies mainly act on national markets (Bächli, EPha.ch, Tembi) or European (Nickal) markets. Only Bamatec acts on an international market but the company mostly sells its products to its parent company and does not directly feel the pressure of the global market.

Table 42 (Market Analysis) summarizes the analysis of Porter's five forces. It shows the companies' competitive environment, the stage of their markets and whether it is a class market or a mass market. The competitive environment is different for all companies. Tembi and Bamatec, both acting on niche markets, feel the lowest competitive pressure whereas the other three firms mostly see high industry rivalry and a high threat of new entrants. Furthermore, the companies are, except for Nickal, in class markets. Nickal sells a mass product and gains competitive advantage through price competition as well as lead time advantage.

Table 43 (Intellectual Property Analysis) gives an overview of the companies' IP activities. The results reveal that the overall IP activity is low. None of the companies has a defined IP strategy or defined protection criteria. The IP awareness of the firms is low, too. However, in some of the intuitive non-user companies the IP awareness is

raising. Bächli, for example, recognized the risk of not being informed about IP protection, and the company recently decided to get information about the IP system. Bamatec and Nickal also see the need to get more information but have not started yet to get informed.

Table 42 Intuitive Non-users - Market Analysis

	Bächli	Nickal	EPha.ch	Tembi	Bamatec
Product Type	Transformers	Door knobs	Drug prescription, platform for physicians	Window blinds, window foils, wall protection systems	Coiling machines
Mass/Class Market	Class Market	Mass Market	Class Market	Class Market	Class Market
Supplier Power	High	High	Low	Moderate	High
Buyer Power	High	High	Low	Moderate	Low
Threat of Substitution	Low	High	Moderate	Moderate	Moderate
Threat of New Entrants	High	High	Low	Moderate	Low
Industry Rivalry	High	High	Moderate	Low	Moderate
Market Maturity	Mature	Mature	Growing	Mature	Growing

In this context, it is important to consider how often IPRs are used in the concerned industry fields.

As far as open innovation is concerned, the companies mainly are open to cooperate with other institutions, e.g. universities, or with their suppliers in order to improve their products. This attitude however, can increase the risk of abuse of unprotected intellectual property. Despite this aspect, all companies, except Bächli - which is now thinking about IP protection - do not protect their products and processes.

Table 43 Intuitive Non-users - Intellectual Property Analysis

	Bächli	Nickal	EPha.ch	Tembi	Bamatec
Defined IP-Strategy	No	No	No	No	No
Defined Protection Criteria	No	No	No	No	No
IP Awareness of Responsible Person	Moderate	Low	Moderate	Moderate	Low
IP Awareness Overall	Low	Low	Low	Low	Low
Industry-wide IP Usage	Low	Low	Moderate	Low	Low
Open Innovation Process	Yes	No	Yes	Yes	Yes

Table 44 Intuitive Non-users - Analysis

	Bächli	Nickal	EPha.ch	Tembi	Bamatec
Would you use IPRs if they were cheaper	No	No	Yes	No	No
Used IPRs before	No	No	No	No	No
Consideration to Use IPRs in Future	Yes	Maybe	Maybe	Maybe	Maybe
Factual Protection Methods	Individual customer services	Lead time	Service provided to specific community	Secrecy	Secrecy, customer services

In table 44, criteria especially related to the intuitive non-user companies are analyzed. The cost aspect does not seem to be as important as often expected. Only one of the firms says that it would use IPRs if they were cheaper, which shows that the costs are not the primary hurdle for non-user companies to engage in formal IPRs.

None of the companies has used IPRs before. However, there is a tendency in favor of IPRs since all companies, especially Bächli, think about using formal IP protection in the future.

Not using IPRs, however, does not mean that the companies do not protect their products at all. They all profit from factual protection methods, and all use a range of this informal protection. In table 44, only the firms' most important IP protection means are mentioned. Nickal, for example, especially emphasizes to bring their products on the market before its competitors and to gain lead time advantages. EPha.ch and Bächli mainly rely on customer-specific services to differentiate from competitors, whereas Tembi and Bamatec consider secrecy as the most important method.

Some non-user firms consider the registration of the company name at the Swiss commercial register to be a sufficient protection for the company. This strategy, however, is very risky because this registration is not equal to a trademark registration, even on a national level. The registration at the Swiss commercial register is firstly only valid for the industry or industries for which the name is registered. Secondly, this registration does not prevent others from using the name for a product. This aspect seems to be a misconception of intuitive IP non-user firms due to a lack of information.

Table 45 Intuitive non-users - Infringements

	Bächli	Nickal	EPha.ch	Tembi	Bamatec
Accused by Other Company	No	Yes	No	No	Yes
Copied be Other Company	No	No	No	No	No
Used Settlement	-	Informal agreement	-	-	Informal agreement
Identification of Infringement	-	-	-	-	-

Table 45 (Infringements) shows the involvement of the companies in IP infringement cases. None of the companies has been copied by another company so far. They do not have the experience of losing intellectual property unintentionally, and they are rarely aware of the consequences if an abuse would happen. Two companies, Nickal and Bamatec, were accused by other companies of abusing intellectual property. In both cases, the companies contacted each other and found an agreement without taking legal action.

Table 46 (Improving Ideas) provides information about the companies' experience with the IPI and their ideas to improve the IP services. The results show that the IPI services are unknown to nearly all companies. Nickal only knows them since its infringement case when the company actively seeked information about intellectual

property. Bächli only knows about the IPI services because of its decision to improve its IP management. Before that, Bächli was not aware of the IPI, and it did not associate the IPI with SME specific services.

The companies in the cluster are above all interested in getting general information on intellectual property because their level of information is still low. Furthermore, some of the companies already have more specific interests. EPha.ch is especially eager to get information about software protection. Bächli is more interested in patent information, patent protection and licensing.

One company claimed that the information on the IPI website was mainly in German, and that there would be a lack of information provided in French. This statement seems to be a misconception of the company as the website of the IPI is translated identically in German, French, Italian and mostly English, too. With regards to the employees, the IPI tries to cover the different languages in each department as good as possible.

All companies stated that there is a general need to raise the IP awareness, and that the IPI should increase its visibility. One channel, which was repeatedly proposed, is to profit from industry organizations and their journals. Sending out flyers and using the Internet is also considered helpful.

Table 46 Intuitive Non-users - Improving Ideas

	Bächli	Nickal	EPha.ch	Tembi	Bamatec
IPI Services Known	Yes	Not before infringement	No	No	No
IPI Services Used	Yes	Yes	No	No	No
Preferred Method for Awareness Raising for SMEs	Industry-specific journals	Flyer, via industry organizations	Flyers, Internet IPI	Direct contact	Via industry organizations
Company's Main Interest in IP Services	Patent search, patent protection, filing patent applications	General IP information	IP protection methods for software	General information on IPRs	General IP information

In conclusion, the intuitive non-user companies are characterized by four main points. Firstly, the companies sell their products mainly on national markets. They claim that they do not need formal protection means, or the application processes for formal IPRs are too slow for their business. Secondly, they use a range of factual protection methods such as secrecy, lead time advantage and, which seemed to be especially

important for national markets, a trustful relationship with their customers and suppliers. Thirdly, none of these non-user companies has ever experienced any IP infringement, and hence has not been forced by external factors to deal with the IP issue so far. Fourthly, the companies have no or very little knowledge about IP management. Therefore, the services they need from the IPI are information about the IP system in general and information on the first steps towards IP protection.

5.5 Non-users on Purpose

In the following section, those case studies are presented that deal with non-users on purpose. These companies have a profound IP knowledge but at the same time never applied for an IPR. They were motivated to use legal protection methods, but failed to find a suitable one to cover their needs.

In this section two companies are presented: Geiser Tech, a special machine building company located in the canton of Zurich, and Kaufmann, a company from the wood industry located in the canton of St. Gallen.

The companies in the cluster of "non-users on purpose" will be presented in the following order:

- Geiser Tech (HSG) In-depth case study
- Kaufmann (ETHZ) In-depth case study

5.5.1 Geiser Tech

Table 47 Geiser Tech Company Overview

Name	Geiser Tech AG
Industry	Special machine building
Size	26 employees
Markets	Worldwide
IP	None
Mission	*"Making a main contribution in the field of renewal energy."*
Founded	2000
Responsible	University of St.Gallen

Company profile

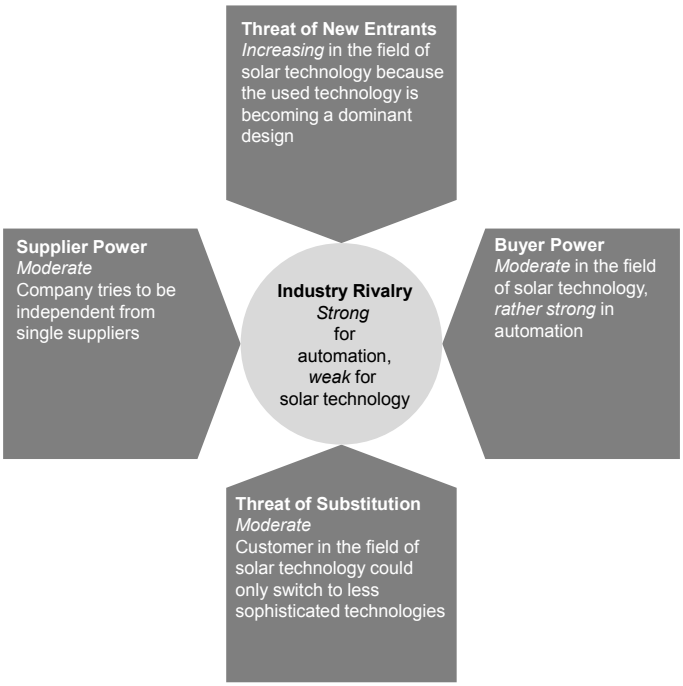
Geiser Tech (table 47) is an AG that employs a staff of 26 professionals. The company is located in the canton of Zurich and was founded in 2000. The company is active in the special machine building industry field. The main business model is based on a well known construction kit that allows Geiser Tech to build various machines. The construction kit "MiniTec" is used all over the world. In Switzerland, however, Geiser Tech has the exclusive right to use it.

The market Geiser Tech is active in can be divided into two segments: automation and solar technology. Machines for automation account for roughly 40% of the company's revenues while machines for the solar industry account for the remaining 60%. The competitive rivalry varies in respect to the segment. In the field of special machines for automation, Geiser Tech is facing quite some competitors. This is mainly due to the maturity of the market. In the field of solar technology, however, Geiser Tech has a unique selling position in that it offers machines which build solar panels by means of laser welding. To this day, laser welding is the most sophisticated technology to built solar panels. Geiser Tech is unrivaled in this segment in respect of price as well as quality.

The supplier power is rather weak (see graph 52). Geiser Tech avoids to be dependent on a single supplier and therefore always tries to maintain redundancies.

The buyer power goes along with the competitive rivalry. In the segment of automation, buyers can choose among many contractors and therefore have the ability to influence the price. Thus buyer power is rather weak in the segment of solar technology. If buyers want to build solar panels by means of the laser welding technology, they can either buy Geiser Tech's machines or go to an engineering office. However, engineering offices sell custom-made machines at a higher price.

Graph 52 Geiser Tech's Competitive Environment



Geiser Tech is facing a raising threat of new entry in the area of solar technology. Since Geiser Tech is the only company that offers standardized machines for this market, it is only a matter of time till competitors will catch up. Today, laser welding accounts for 15% of all created solar panels but will most likely become the dominant technology in the future. Therefore, competitors that sell different technologies are likely to switch to laser welding.

The threat of substitution is considered moderate. Geiser Tech's customers in the field of solar technology could turn to another technology. However, this technology would not be as sophisticated as the technology Geiser Tech offers. In the future laser welding (the technology Geiser Tech is offering) will be the dominant technology in the production of solar panels.

R&D and IP strategy

Geiser Tech has seven employees in R&D. Two of them, - the CEO and the head of R&D - are also responsible for the company's IP management (see graph 53).

In order to explore new technologies in the field of lasers, Geiser Tech works closely together with the Britain University of Warwick. Besides that, Geiser Tech gets information from customers, patent databases, as well as trade fairs. The company is constantly looking for new developments. The CEO of the company decides which projects are developed further.

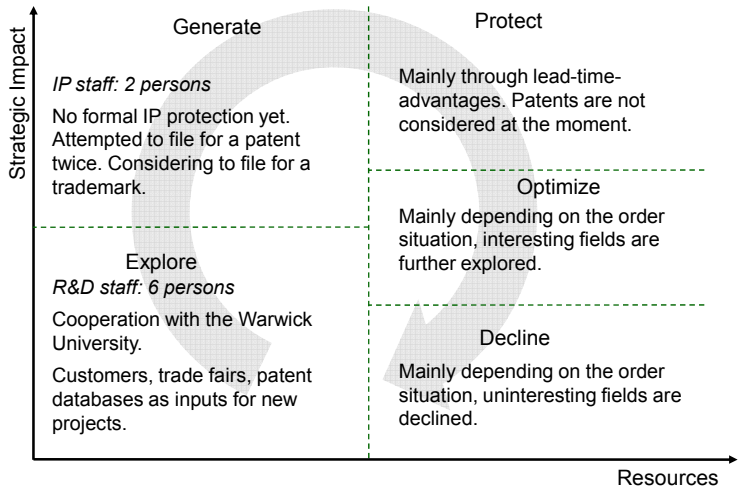
The company has not filed any application yet for formal IP protection (Generate) but has twice considered to file patent applications. In both cases, company employees visited the IPI and conducted an assisted patent search. However, in both cases no patent application was filed, mainly because the primary motivation to patent - receiving freedom to operate - was already granted (the technology was state of the art).

Nowadays, Geiser Tech protects its innovations mainly through lead time advantages. It is a costly endeavor in the machine building industry to find competitors that copy innovations and to prove it (a single machine can easily cost a million Swiss francs - these prices make it difficult for Geiser Tech to find illegal copies). Therefore, Geiser Tech intentionally chose lead time advantages as a more promising protection method after the company carefully considered the company's size as well as its market. Geiser Tech always tries to offer a new model before imitators are able to sell replicas.

Furthermore, the company sees in patents a danger for SMEs. Customers fear lock-in effects - patents on certain machine parts could trigger this fear and the machines could become less interesting for the market. Besides that, Geiser Tech is currently considering to apply for a trademark registration. The trademark would be the name for their solar technology machines.

Geiser Tech optimizes its technologies mainly depending on the order situation. That means technologies that are frequently demanded are further explored, and those which are not demanded anymore are declined. The company has not been involved in IPR infringement cases yet.

Graph 53 Geiser Tech's IP portfolio



IP experiences

Geiser Tech uses several factual protection methods to avoid a patent application, which is not primarily motivated by the patenting cost but rather by industry characteristics. The company's customers fear lock-in effects that patents of a rather small company such as Geiser Tech might have. Furthermore, Geiser Tech states that, in the case of an infringement, the burden of evidence can lead to high costs.

Geiser Tech is working closely together with a patent attorney. Whenever a new technology is developed, the company and the patent attorney sit together to decide on an appropriate protection strategy for the technology. The patent attorney is an aquintance of the company's CEO.

When the company looked for additional information about intellectual property, it used to go to meetings which were organised by the "Jung-Unternehmer-Klub" of the ETH Zurich. Today, the company is organized in the Swismem - a community for Swiss companies from the machine building, the electronic, and the metal industry[19]. IPRs are a common topic there and briskly discussed.

Ideas for improving the IP management in SMEs

Geiser Tech knows about the IPI services and has sent employees to the IPI twice to call upon its assisted patent search. The company has been very satisfied with the IPI's service and would not hesitate to make use of it again in the future. The company is furthermore quite pleased with the general accessibility of information about intellectual property.

[19] Cf. footnote 18.

5.5.2 Kaufmann Oberholzer

Table 48 Kaufmann Oberholzer Company Overview

Name	Kaufmann Oberholzer
Industry	Wood construction: furniture, interior design
Size	110 employees
Markets	Switzerland, Europe and Middle East
IP	None
Mission	*"Being the most innovative wood construction company in Switzerland."*
Founded	1971
Responsible	ETH Zurich

Company profile

Table 48 shows an overview of Kaufmann Oberholzer. The company is a leading wood construction company in the eastern part of Switzerland. The company's business is based on three pillars: wood construction for buildings, carpentering, and wood machining processes. Kaufmann Oberholzer is a family-owned business established in 1971. Kaufmann has 110 employees.

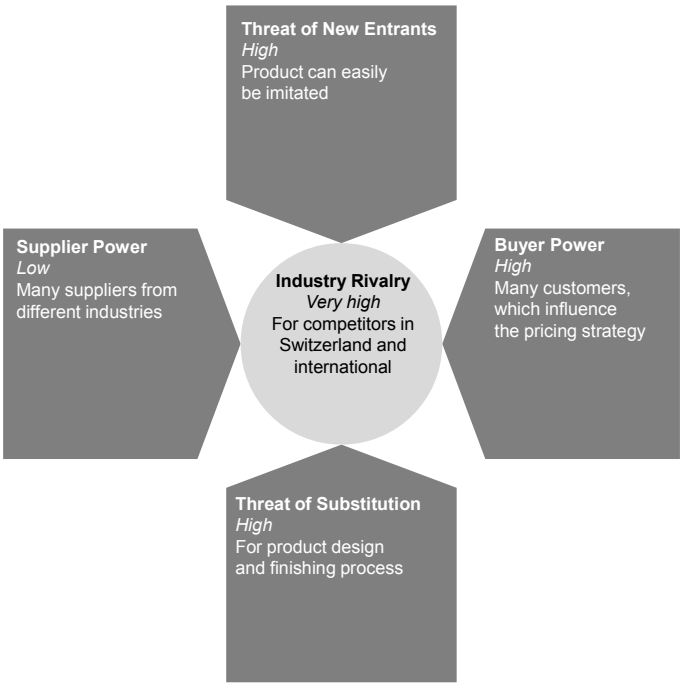
In 2008, Kaufmann Oberholzer acquired L. Oberholzer AG in order to expand its technology know-how into the field of wood construction as well as to extend the company's presence in the German speaking part of Switzerland. Another advantage of this merger is the access to the company's most promising product - the Optiholz.

Graph 54 shows Kaufmann Oberholzer's competitive environment. The analysis shows that the company is one of the dominant wood construction companies in the eastern part of Switzerland. The company’s main supplier is the wood industry from central Europe. The supplier power in the wood industry is considered low. However, the buyer power is rated high, as the customer is able to negotiate price reductions, which Kaufmann Oberholzer has to follow sometimes depending on the customer's loyalty.

The company’s customers are very diverse. They range from business to home owners and to train manufacturer, who are located in Switzerland, central Europe or the Middle East. The threat of new entry into the wood construction market place is estimated very high because the entry barriers are considered low. A quite high threat of substitution endangers the company's products because of the easiness to get access to the wood material and the finishing process.

The wood industry rivalry is considered very high; The company has a large number of competitors in Switzerland and abroad. Kaufmann Oberholzer tries to position itself in the market by providing unique solutions to its customers.

Graph 54 Kaufmann Oberholzer's Competitive Environment



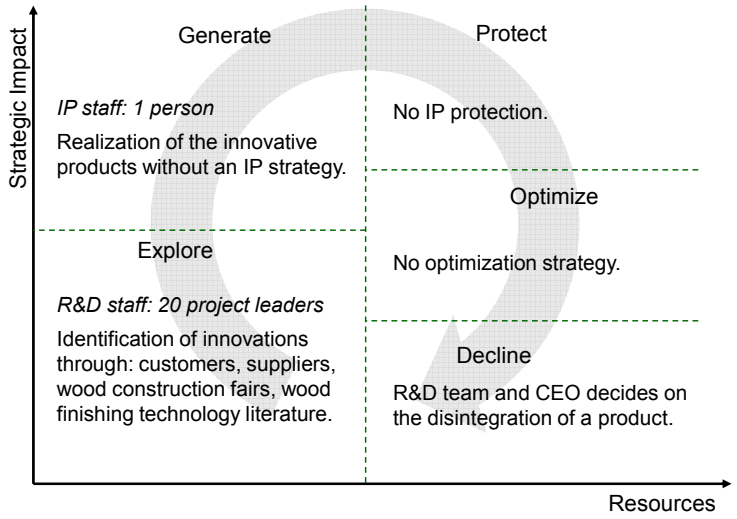
R&D and IP strategy

Graph 55 shows the IP portfolio strategy of Kaufmann Oberholzer. About 20 of the company's employees work as R&D project leaders who are responsible to take customer orders and run the projects from the first drafting phase until the finishing and implementation phase. Most of these project leaders were trained as carpenters or wood construction technologists.

Kaufmann Oberholzer is considered an intentional non-user of the IP system. The company has refrained from a "formal" IP management structure and strategy due to the time effort, the administrative load and the costs associated with the implementation of an IP management system. The company is quite open with its innovation process, for most of its innovations are created together with the company's customers and suppliers.

Kaufmann Oberholzer does not have an innovation process. The company gathers new innovations through the Internet, field specific trade fairs or magazines about wood construction. The created ideas are communicated openly within the R&D team. The team then decides together with the CEO whether or not the ideas will be realized, and whether the company has the ressources to do so.

Graph 55 Kaufmann Oberholzer's IP Portfolio



Once the decision is made, the realization phase should be very short, since the company depends on a lead time advantage strategy to secure its innovations without using the IP system. Kaufmann Oberholzer's innovations have been copied many times, but the company did not take legal actions due to cost issues related to this process. The company does not have any optimization strategy since there is no specific innovation process in place, and most of the innovations were accidently created.

The R&D team at Kaufmann Oberholzer decides together with the marketing team to continue of phase out a product. The decision is based on the cost, the customer needs and the revenue generated with the product.

IP experiences

Innovations through lead time advantage

Kaufmann Oberholzer believes in innovation through lead time advantages instead of using an IP system because of the growing imitation and copy threats the company is facing.

The company's strategy is to be the pioneer of an invention instead of being the follower. When innovative ideas are created, the company accelerates the designing and manufacturing process in order to bring the product earlier to the market than the competitors.

Kaufmann Oberholzer's motif for the acquisition of Oberholzer was to get access to its product Optiholz; this is a solid wood wall and ceiling covering. The product is hold together without wood glue. Instead, the wall or ceiling covering is hold together through an innovative mechanism design which keeps the individual wood pieces together.

The company has established formal contract agreements with its suppliers about the Optiholz mechanism design, which is to be sold all over Switzerland. This innovation has already been copied by a competitor.

Ideas for improving the IP management in SMEs

The CEO of Kaufmann Oberholzer has heard of the IPI and knows its services. However, the company never made use of it and is not planning to do so in the future. There are two reasons for that: firstly, the company claims that applying for IPRs is too expensive for a company like Kaufmann Oberholzer. The company does not believe in an IP strategy at present, and is not planning to change its process soon. Kaufmann Oberholzer would be interested in attending seminars and courses related to intellectual property

5.5.3 Cross-case Analysis - Non-users on Purpose

In this section a cross-case analysis of the SMEs in the non-users on purpose cluster is presented. The analysis is based on the Porter's five forces model, R&D, IP strategy, and ideas for improving the IP management in SMEs.

Only two of the 24 present case studies fall into this category: Geiser Tech, a company for special machines, located in the canton of Zurich, and Kaufmann Oberholzer, a company which is active in the wood industry, based in the canton of St. Gallen. The companies have 26 and 110 employees respectively. Both are active on worldwide markets (see table 49).

Table 49 Non-users on Purpose - Overview

	Geiser Tech	Kaufmann Oberholzer
Size	26	110
Industry	Special machine building	Wood
Market	Worldwide	Worldwide
Founded	2000	1971

The companies are active on rather different markets (table 50). Kaufmann Oberholzer is facing a stronger competitive environment. Both companies sell high class products.

Table 50 Non-user on Purpose - Market Analysis

	Geiser Tech	Kaufmann Oberholzer
Product Type	Machines for solar panels, special machines	Furniture, interior design for buildings and trains
Mass/Class Market	Class Market	Class Market
Supplier Power	Moderate	Low
Buyer Power	Moderate	High
Threat of Substitution	Moderate	High
Threat of New Entrants	Increasing (Technology becomes dominant)	High
Industry Rivalry	Strong for automation, weak for solar technology	High
Market Maturity	Growing	Mature

Both firms do not have a defined IP strategy (table 51). However, the responsible person in both firms is very well aware of IP issues and informs himself on a regular basis about the IPR system. The companies do follow an open innovation process and

regularly meet with other firms or institutions, which helps both firms to keep their level of information high. In both industry fields, IPRs are not widely used. Correspondingly, the companies' decision to refrain from IPRs is customary in the concerned industry fields.

Table 51 Non-user on Purpose - Intellectual Property Analysis

	Geiser Tech	Kaufmann Oberholzer
Defined IP Strategy	No	No
Defined Protection Criteria	No	No
IP Awareness of Responsible Person	High	High
IP Awareness Overall	Moderate	Moderate
Industry-wide IP Usage	Low	Moderate
Open Innovation Process	Yes	Yes

Table 52 presents an overview of the experience and attitude of the two companies towards intellectual property. Both companies have a high level of information regarding intellectual property and are up to date regarding the IPR system. Geiser Tech is working together with an external patent attorney who helps the company decide whether or not to use a certain type of IP protection. Kaufmann Oberholzer does not consult an external attorney to support the company's decsion making. Both companies strongly rely on lead time advantages. This protection method is chosen because innovations are frequently introduced into the market. In this context, it is important for the companies to be the first on the market.

Table 52 Non-user on Purpose Analysis

	Geiser Tech	Kaufmann Oberholzer
Information Level	High	High
External Attorney/Agency	Yes	No
Prior Attempt to Apply for juridical protected IPRs	Yes	No
Negative Effect of juridical protected IPRs	Yes	No
Factual Protection Methods	Lead time advantage, secrecy, customer retention	

Table 53 deals with infringement cases. Both firms have never been accused by another company. Geiser Tech has not had a problem yet with other firms copying its products. Kaufmann Oberholzer, however, has such experiences.

Table 53 Non-user on Purpose - Infringements

	Geiser Tech	Kaufmann Oberholzer
Accused by Other Company	No	No
Copied by Other Company	No	Yes
Used Settlement	-	None - No IP
Identification of Infringement	-	Market Research

Table 54 shows the companies' ideas to improve the IPI's services for Swiss SMEs. Both companies, as stated earlier, are well aware of the IPR system and, therefore, know the IPI services. Both firms used the IPI services in the past. Both companies know the IPI's website and visit it regularly in order to get information. Both companies think that the IPI's website would be a good location to place information and raise awareness regarding certain issues in the IPR system.

Table 54 Non-user on Purpose - Improving Ideas

	Geiser Tech	Kaufmann Oberholzer
IPI Services Known	Yes	Yes
IPI Services Used	Yes	Yes
Preferred Method for Awareness Raising for SMEs	IPI website	Flyers, IPI website
Company's Main Interest in IP Services	Exchange of information	IP workshop basics

To sum up, the presented cases which deal with non-users on purpose have some noticeable similarities. Firstly, both companies act on international markets. Furthermore, both companies have dedicated personel in charge of , which is willing to invest time and effort to learn and to understand the IP system. Both companies sell products with rather short life cycles. Correspondingly, new innovations are created in rapid succession.. Therefore, both companies rely rather on lead time advantages than on patents.

6 Case Studies - Common Findings

This chapter presents the common findings of the case studies. The purpose is to compare the conducted case studies with each other in order to identify similarities and differences among them. The chapter is divided into three sections. The first two sections are covering the common findings for SMEs in the user clusters and the non-user clusters. In the third section the best practice models for IP management are presented.

6.1 Common Findings for SMEs in the User Clusters

Intellectual property analysis:

IP management

The case studies have shown that most of the SMEs in the user clusters have a "formal" IP management structure and strategy. This means the respective companies follow an IP policy in which the strategy is to allocate a specific role to intellectual property. Unlike large companies, no fixed objectives or milestones are assigned to intellectual property, such as focusing on out-licensing or building a strong patent portfolio. The firms in this cluster handle their intellectual property according to business opportunities. As a result, there is a reduction in generated intellectual property, which is also restricted to a small patent portfolio.

The IP management of the SMEs is also formal in the sense that the decision to patent is taken through a structured path, following precise criteria. The decision to apply for patent protection is taken if an invention seems innovative enough and possesses a significant commercial potential.

The allocation of a dedicated person to IP management demonstrates that SMEs do have precise IP management. In most of these SME cases, the IP responsible person was added to the strategy team. Moreover, the advice about patenting and IP strategy, including IPR prosecution, is typically outsourced to an external patent attorney, although it could be an important part of an in-house IP management.

Selective use of IP

The majority of SMEs in the study use their intellectual property in a particularly selective manner. Like many SMEs, the companies have only limited resources to allocate to intellectual property protection. Therefore, in order to optimize the use of the IP system and to maximize the benefit of any IPR, the firms perform a precise cost/benefit analysis for every considered innovation since they cannot afford a patent-all strategy. The companies are selective regarding the type of IPR chosen. Depending on the commercial interest and development forecasts, a patent, trademark, industrial design

or a trade secret will be used to protect the innovation. In order to be fully efficient, such a use must also be selective in a territorial sense. IP protection applications should only be made in the countries that make up the companies' main markets. This selective approach also serves to protect the SME's freedom of action and to block the competitors.

Reduced patenting activity

Another common finding from the cross-case analysis is that SMEs generally patent less often than large firms. For the same amount of money spent in R&D, an SME will apply for fewer patents than a large firm. Moreover, their territorial scope of protection is reduced, as the SMEs more often apply only for national patents, as opposed to foreign ones. Based on the study of Keupp, Lhuillery et al., it has also been discovered that patenting activities increase together with the company size: the larger the company, the higher the patenting intensity (2009).

Another finding demonstrated that a clear relationship exists between the size of the company and the use of intellectual property, together with a significant dependency of IP activity and industry sector. Indeed, in some industrial sectors the SMEs are patenting considerably more than in others. Biotechnology companies, as well as pharmaceutical firms, use IP tools much more intensively than SMEs from other industry sectors. R&D is the lengthiest and the most expensive, hence extremely valuable and worthy of protection in these sectors. They are also more aware of IP issues and opportunities, and most of the time they have implemented an IP management system with a precise strategy.

Experience of IP infringement and litigation

The SMEs of the case studies in the user clusters have experience of IP infringement and litigation in common. According to this study, most of the questioned companies had experienced some form of alleged patent infringement, yet they did not sue the infringer because they did not have sufficient financial means. Litigation continues to be a solution in some of the cases, in spite of the fact that litigation costs remain high for SMEs and still represent a deterrent against the IP system, as most SMEs integrate prohibitively high litigation costs to their decisions on whether or not to patent an invention.

6.2 Common Findings for SMEs in the Non-user Clusters

Intellectual property analysis:

IP management

The case studies have shown that the SMEs in the non-user clusters have no "formal" IP management structure and strategy. It does not mean that those companies do not have interest in IPR policy, but instead it means that IPR is not allocated a precise role

in their strategy. Moreover, in the cluster “non-users on purpose”, the study shows that the R&D responsible person is well aware of IP issues and informs himself on the possibilities of the IPR system on a regular basis. Not using IPRs, however, does not mean that the companies do not protect their products, instead they profit from factual protection methods such as lead time advantage, secrecy and customer service.

Preference for informal protection methods

Most SMEs lack sufficient resources and knowledge to protect their innovation; they tend to prefer informal IP methods such as secrecy and lead time advantage rather than formal IP methods.

Besides secrecy, many SMEs rely on lead time advantage rather than on patents. Firms prefer to be the first one to fully develop a new product, which allows them to put it on the market earlier than the competition, as opposed to dealing with the costs and time required to patent an invention. Before competitors manage to develop and market similar products, the SMEs enjoy a period of exclusivity, resulting in a higher return on investment due to the temporary absence of competition. Since lead time advantage does not involve legal formalities and additional costs other than a consequent R&D investment and management, this factual method of protection is particularly popular among SMEs.

Experience of IP infringement and litigation

The SMEs in the non-users cluster have less experience in IP infringement and litigation. The companies had experienced some form of alleged infringement. Most of the companies have not been copied by another company so far. They do not have the experience of losing intellectual property unintentionally, and they are rarely aware of the consequences if an abuse occurs. Moreover, they did not have the possibility to sue the infringer because they did not have sufficient financial means.

Weakly protected trade secrets

Trade secrets are used by the SMEs, which want to keep specific know-how and complex product design secret. However, a trade secret does not only need to have a certain value but it also has to be protected properly. Unfortunately, most of the interviewed SMEs have not implemented a confidentiality policy to secure these secrets. Such a policy would include a limited access to premises or confidentiality agreements with employees, suppliers and client contracts. The SMEs seem to rely on a trust relationship instead, which is entirely understandable and efficient, but remains legally unpredictable. Nevertheless, no company seems to have suffered from this lack of trade secret protection yet.

6.3 Best Practice Models for IP Management

Protection conferred by a niche market position

Another common finding of the SME cases is that most of them are positioned in a niche market, which by definition is a small market, reduced in terms of size and turnover. This niche market position is an efficient method to protect against potential competition, and has been seen as a business opportunity with a lower need of IP protection.

Less competition signifies less need to preserve freedom of action or to block competitors. In the context of a niche market, the importance of IP protection as a passive or active tool against competitors is greatly reduced since there are few competitors and the rivalry remains low.

However, this situation does not erase the potential interest of intellectual property for an SME: out-licensing an IPR can be a non-negligible source of revenue for a company, revenue that can then be used to increase R&D, generate more intellectual property and further increase the company's competitive advantage. Besides, such a licensing strategy would allow an SME to spread its technology beyond their traditional field of activity.

Focusing on a key patent

Another IP management strategy that could be considered as a best practice model is to focus on one "main" patent that is going to be the core IPR of the company. This approach corresponds to the previously described model for selective use of intellectual property. Rather than scattering limited resources on several patents of less importance, the SMEs choose to allocate a significant part of its IP budget to only one patent.

For this particular patent, not only will national protection be sought, but international patent applications are also required. The territorial scope of protection is then wider. Moreover, the importance of the patent is also strengthened by the fact that the company will be ready to enforce the patent more actively. Since the main patent is more important than others, the resources allocated to its enforcement are also increased.

Having a key patent with several foreign counterparts is also an asset in terms of business strategy: It opens doors to business expansion since the patent can be licensed to more competitors. This could increase competition, but also spread the technology on the market or to firms in other fields, allowing the company to generate income outside its traditional sphere of activities. However, building such a key patent strategy demands consequent R&D since an invention with many advantages and great commercial interest might require significant time for development.

R&D and IP partnership

As previously shown, generating R&D and IP are often burdensome for SMEs, which lack sufficient resources to invest into intensive R&D and IP protection. Nevertheless, an interesting R&D and IP partnership model shows how to overcome these obstacles and increase the innovative power as well as the protection through IPRs. For example, a small-sized SME that could not invest enough into R&D to develop new promising projects may decide to start an R&D and IP partnership with a larger SME in the same industry. Through this partnership, the two SMEs will develop important synergies created by the co-development of new products and techniques. Since R&D costs are shared, the firms can work on projects that they could not have financed alone due to their high costs.

Not only is R&D shared, but also intellectual property. Indeed, when a co-developed invention is patented, the patent belongs to both firms since they are both cited as applicants.

This R&D and IP cooperation model based on a partnership has the potential to be very interesting for SMEs. It allows them to overcome the disadvantages caused by their small size and limited resources, while at the same time providing higher innovation ability and increased access to intellectual property to partner firms.

7 Conclusions and Recommendations

The present study's final chapter provides conclusions and recommendations for the IPI as well as for Swiss SMEs. The derived recommendations are based on the results from previous studies and on the research conducted by the case study team. In addition, the Benchmarking Study (Radauer, Streicher, 2008) and the Econometric Focus Study (Keupp, Lhuillery et al., 2009) received closer attention, as this present study should be seen in context with the other two studies.

7.1 Policy recommendations for the IPI

The following section presents policy recommendations aimed at the IPI. These recommendations have the common goal of supporting SMEs with their IP management, either by the IPI itself or by other institutions. The main objective of these recommendations is to make it easier for SMEs to access needed information on intellectual property and thus support these SMEs in their IP-related decision making processes.

A. Clear role of the IPI

As can be seen in the case studies, Swiss SMEs have differten perceptions of the IPI's role. While some SMEs are aware of the IPI's service-providing nature, others see the IPI merely as a traditional institution. The latter do not consult the IPI on issues concerning their management of intellectual property even though the IPI offers such services. This finding is in line with the results presented in the Benchmarking Study (Radauer, Streicher, 2008).

In this context, the IPI is advised to define a clear task for the Institute. Firstly, the IPI should internally determine its role. Secondly, it should, as a whole, communicate its role to its stakeholders. For communication purposes, different channels have been named by the SMEs in the case studies: industry-specific journals, trade fairs or direct contacts were among the most prominent ones. A more elaborate communication study is advised in order to reach as many SMEs as possible and to inform them about the IPI's role regarding intellectual property.

B. IPI within the Swiss Innovation System

Also consistent with the Benchmarking Study (Radauer, Streicher, 2008) is the conclusion regarding the IPI's position within the Swiss Innovation System. Some of the interviewed firms consider the IPI a useful source regarding any kind of information on intellectual property (e.g., when not to patent or which formal protection would be advisable for a certain product or service). Other firms, however, see the IPI as a source of information on trademarks, industrial designs and patents, only. Moreover, a third group of SMEs does not consider the IPI as a source of information at all. These

heterogeneous groups consult different institutions or sources when dealing with IP issues.

The case studies show that Swiss SMEs turn to a variety of institutions or sources of information whenever they have questions regarding the management of their intellectual property. Firstly, patent attorneys: a good deal of the interviewed SMEs consult patent attorneys on a regular basis, often not to solve complicated problems but to apply for a trademark, for instance, or to pay fees. Secondly, inter-trade organizations: these organizations are a popular source of information for many SMEs. Talking to people facing similar problems in the same industry is valuable and desirable for many SMEs as the case studies show. Thirdly, institutions focusing on broader topics such as innovation in general (e.g. the CTI/KTI) are a source of information for some SMEs. All three groups handle the topic of intellectual property in some respect although some SMEs complained that they were occasionally overwhelmed by the variety of offers regarding the topic of IP management.

In this respect, IPI should position itself among these players and select which services the IPI should offer itself and which requests it should relay to other institutions. Concurrently, the other institutions might do the same and recommend the IPI to help-seeking SMEs.

C. Visibility of support services

The interviewed SMEs showed a vested interest in support services in general. Comparing the needs these SMEs demonstrated with available services presented in the Benchmarking Study (Radauer, Streicher, 2008) revealed a basic phenomenon. The interviewed SMEs are looking for support services which are essentially already available. However, at the same time, these SMEs often fail to find a suitable offer among the many services available.

It is therefore recommended to install a central contact point for SMEs. This central contact point would act as a broker connecting SMEs with a certain IP-related problem (e.g. is it advisable to patent the company's new technology?) to a trustworthy and prudential service provider.

D. Exchange of information rather than educational training

To many firms, intellectual property is a confidential topic. At the same time, however, companies are keen to share their own IP-related experiences and to learn from other companies' experiences. Several SMEs the study group interviewed stated they would happily engage in such an informational exchange.

The IPI is advised to act as an intermediate regarding this issue. Its task would be to bring companies together that are interested in the same aspects of intellectual property. Furthermore, industry-specific gatherings could help SMEs to get to know

companies facing similar problems. These regular meetings could address a specific topic and interested firms could participate.

E. Different SME – different problem

One of the key findings presented in the Economic Focus Study (Keupp, Lhuillery et al., 2009) is the fact that there is no service for SMEs that would help most SMEs per se. The SMEs represented in this report's case studies paint quite a similar picture. The questions they have regarding IP management range from a fundamental understanding to complex problems such as litigation costs in China. Therefore, a service such as a three-day "IP management for SMEs" course would leave most SMEs unsatisfied while overwhelming the other few. Besides this, a further conclusion can be drawn from the heterogeneity of SMEs. Having a lack of, or no knowledge on IP management services, SMEs currently turn to a patent/trademark attorney first.

F. General education on IP

Most IP responsible persons interviewed complained that the informational level among engineers in SMEs on IPRs is rudimentary. They furthermore explained that a lot of innovative firms would be helped if the topic was addressed in the education of engineers. Teaching intellectual property at bachelor level would guarantee a wide basic knowledge on this increasingly important subject. Sending engineers to continuing education regarding intellectual property is also considered an option by many SMEs. Again, it is necessary to point out that continuing education courses do already exist. At the same time, however, it is essential to inform interested SMEs about such courses.

7.2 Recommendations for SMEs

The following recommendations are addressed to SMEs in Switzerland. The study has shown that SMEs have strikingly diverse levels of information regarding intellectual property. As seen in the case studies, these diverse levels of information are not an industry effect as one might assume at first. They are merely the result of the commitment and the dedication the responsible staff members have towards this topic.

A. General information

The study team encourages SMEs, as a first step, to inform themselves about intellectual property. IPI's website (www.ige.ch), for instance, is a well-proven starting point for companies to get general information on intellectual property. Furthermore, the website offers step-by-step instructions on how to apply for a trademark, patent, etc. Furthermore, a search on one of the various online platforms (e.g. www.espacenet.ch or www.swissreg.ch) can give SMEs a first feeling for IPRs in their industry.

A lot of SMEs claim that patents, industrial designs or trademarks are not useful in their specific industry. This might, in some cases, be true but getting to this point and making this decision requires prior knowledge on the topic. The decision of whether or not to use IPRs should never be based on a gut feeling. In the case studies, several firms can be found that changed their attitide towards IPRs and the use of them after a deeper understanding of the topic. Therefore, it is advisable for any SME to inform itself about the IPR system and the possibilities and dangers that lie within it.

B. Raising awareness among the employees

As stated before in the recommendations aimed at the IPI, staff members educated on intellectual property are of considerable value to innovative firms. This helps the companies to develop (e.g., if engineers are able to conduct patent searches themselves) and later to protect their developments. It is therefore recommended to raise the general awareness of intellectual property among the staff working in R&D.

C. Evaluating existing property rights

Most Swiss SMEs do not use IPRs at all (Keupp, Lhuillery et al., 2009). On the other hand, companies can be found that seemingly overuse IPRs. These companies invest heavily in patents, trademarks and industrial designs which they hardly use, they could never litigate or they could sell/license to make a profit.

SMEs are advised to regularly ask themselves whether a certain IPR is worth the money it is costing the company. Furthermore, SMEs should ask themselves if other companies could use a given IPR in a more profitable way. The interviewed SMEs revealed a large potential the companies can unlock by using a proper and continuous IPR evaluation.

D. Questioning old IP strategies

Among the SMEs presented in the case studies, several can be found that follow an IP strategy which has been in the company for decades. In modern markets, it is not only reasonable to have an IP strategy but also to question this strategy on a regular basis. Some presented companies annually invest large amounts of money into their IPRs but are very hesitant to invest some time into questioning their IP strategy.

Markets, competitors and products change over time, so why should the IP strategy not? Licensing, for instance, is a strategy for intellectual property hardly seen among SMEs. In-licensing, some SMEs claimed, would be an option but out-licensing, most SMEs agreed on, is out of the question - mostly for reasons based on the companies' history.

E. Do it yourself or consult a patent/trademark attorney

The case studies show that SMEs have the tendency to either cope with their entire IP management themselves or to completely outsource the issue to a patent/trademark attorney. There is no, and there should be no, rule of thumb regarding when to consult a patent/trademark attorney. However, the interviewed companies showed that many SMEs either do not seek the help of an attorney at all or outsource their entire IP management to one. Companies who are informed about the management of intellectual property and are aware of the savings potential, used patent attorneys more selectively. This is why the study team advises all SMEs to inform themselves about IP issues and question their under or over use of patent/trademark attorneys.

Literature

Amgwerd, L., Crevoisier, O., Tissot, N., 2004. La propriété intellectuelle, un outil au service des petites et moyennes entreprises. Société neuchâteloise des sciences économiques et sociales.

Arora, A., Gambardella, A., Pammolli, F., Riccaboni, M., 2000. The nature and the extent of the market for technology in biopharmaceuticals. Paper presented at the International Conference on Technology Policy and Innovation: Economic and Historical Perspectives, Paris, France.

Arundel, A., 2001. The relative effectiveness of patents and secrecy for appropriation. Research Policy, Vol. 30 (2001), pp. 611-624.

Blackburn, R. A., editor, 2003. Intellectual property and innovation management in small firms. Routledge, London.

Blind, K., Edler, J., Frietsch, R., Schmoch, U., 2006. Motives to patent: Empirical evidence from Germany. Research Policy, Vol. 35 (2006), pp. 655-672.

Boutellier, R., Gassmann, O., von Zedtwitz, M., 2007. Managing Global Innovation. Uncovering the Secrets of Future Competitiveness. Springer, Berlin, 3rd edition (forthcoming).

Boutellier, R., Hallbauer, S., Locker, A., 1995. Technologiestrategie für kleinere und mittlere Unternehmen. University of St.Gallen.

Cohen, W.M., Nelson, R.R., Walsh, J.P., 2000. Protecting their intellectual assets: appropriability conditions and why US manufacturing firms patent (or not). NBER Working Paper, wp 7552.

Derwent, 2000. Dismantling The Barriers: Pan-European Survey On The Use Of Patents And Patent Information By Small To Medium Sized Enterprises. London.

Eisenhardt, K., 1989. Building Theories from Case Study Research. The Academy of Management Review, Vol. 14, Issue 4, pp. 532-550.

Eisenhardt, K., Graebner, M., 2007. Theory Building from Cases: Opportunities and Challenges. Academy of Management Journal, Vol. 50, Issue 1, pp. 25-32.

EPO (European Patent Office), 2007. Annual Report 2007.
http://www.epo.org/about-us/publications/general-information/annual-reports/2007.html

Gassmann, O., Bader, M.A., 2007. Patentmanagement. Innovationen erfolgreich nutzen und schützen. Springer, Berlin.

Graham, S.J.H. and Mowery, D.C., 2003. Intellectual property protection in the U.S. software industry. In: W.M. Cohen and A. Merrill (eds.), Patents in the knowledge-based economy, National Academies Press, pp. 219-258.

Greenhalgh, C., Longland, M., Bosworth, D., 2001. Protecting Intellectual Property: British, European and American Patents and Trade Marks of Selected UK Companies 1986-95. Oxford Intellectual Property Research Centre, Electronical Journal of Intellectual Property Rights, http://www.oiprc.ox.ac.uk/EJWP0101.pdf

Hall, B., Ham-Ziedonis, R., 2001. The patent paradox revisited: an empirical study of patenting in the US semiconductor industry, 1979–1995. RAND Journal of Economics, Vol. 32, pp. 101–128.

Hall, M., Oppenheim, C., Sheen, M., 1999. Barriers to the use of patent information in UK small and medium-sized enterprises, part 1: Questionnaire survey. Journal of Information Science, Vol. 25, Issue 5, pp. 335-350.

Hall, M., Oppenheim, C., Sheen, M., 2000. Barriers to the use of patent information in UK small and medium-sized enterprises, part 2: Results of in-depth interviews. Journal of Information Science, Vol. 26, Issue 2, pp. 87-99.

Hanel, P., 2006. Intellectual property rights business management practices: A survey of the literature, Technovation, Vol. 26, pp. 895.

Harabi, N., 1995. Sources of technical progress: Empirical evidences from Swiss industry. Economics of Innovation and New Technology, Vol. 4, Issue 1, pp. 67-77.

Iversen, E., 2001. Norwegian Small and Medium-sized Enterprises and the Intellectual Property Rights System: Exploration and Analysis. STEP, www.wipo.int/sme/en/documents/research/norway/norway_study.pdf

Keupp, M.M.; Lhuillery, S.; Garcia-Torres, M. A.; Raffo, J., 2009. Economic Focus Study on SMEs and Intellectual Property in Switzerland. 2nd Report of the IPI SME-IP Project. Swiss Federal Institute of Intellectual Property (IPI), Berne (forthcoming).

Kitching, J., Blackburn, R., 1999. Intellectual property management in the small and medium enterprise (SME). Journal of Small Business and Enterprise Development, Vol. 5, Issue 4, pp. 327-335.

Levin, R.C., 1982. The semiconductor industry, in: R.R. Nelsen (eds.): Government and technical progress: a cross-industry, analysis, pp. 9-100, Pergamon Press.

Levin, R.C., Klevorick, A.K., Nelson, R.R., Winter, S.G., 1987. Appropriating the returns from industrial research and development. Brookings Papers on Economic Activity, pp. 783–831.

Licht, G., Zoz, K., 1998. Patents and R&D – An Econometric Investigation Using Applications for German, European and US Patents by German Companies. Annales d´Économie et de Statistique 49/50 1998.

Lincoln, Y., Cuba, E.G., 1985. Naturalistic inquiry, Beverly Hills, Sage.

McDonald, S., 2003. Exploring the hidden costs of patents. In P. Drahos and R. Mayne (eds) Global Intellectual Property Rights: Knowledge, Access and Development, Basingstoke, Macmillan.

Merges, R.P., 1996. A comparative look at property rights and the software industry. In: Mowery, D.C. (ed.).The international computer industry: A comparative study of industry evolution and structure, Oxford University Press.

Merges, R.P., Menell, P.S., Lemley, M.A., 2003. Intellectual property in the new technological age. Aspen Publishers, 2nd edition, pp. 855-987.

Moulin A., Lie, H.T., 2005. Intellectual Property Rights and Nordic SMEs – A Study of IPR Practice in the IT and Biotech Sectors. Leogriff AS, Oslo.

Pazderka, B., 1999. Patent protection and pharmaceutical R&D spending in Canada. Canadian Public Policy.

Porter, M.E., 1979. How competitive forces shape strategy. Harvard Business Review, March/April 1979.

Porter, M.E., 1980. Competitive strategy: techniques for analysing industries and competitors. Free Press, New York.

Radauer, A.; Streicher J. (2008): "Support Services in the Field of Intellectual Property Rights (IPR) for SMEs in Switzerland - A Review." 1st Report of the IPI SME-IP Project. Swiss Federal Institute of Intellectual Property (IPI), Berne. http://www.ige.ch/e/institut/documents/i1050101e.pdf

Taylor, C.T., Silberston, Z.A., 1973. The Economic Impact of the Patent System. Cambridge at the University Press, London.

Thomas, S., 2003. Intellectual property in biotechnology firms. In: R.A. Blackburn (ed.), Intellectual property and innovation management in small firms, Routledge, pp. 69-84.

Thumm, N., 2003. Research and Patenting in Biotechnology – A Survey in Switzerland. Swiss Federal Institute of Intellectual Property, Bern.

Thumm, N., 2004. Strategic patenting in biotechnology, Technology Analysis and Strategic Management, Vol. 16, pp. 529-538.

University of Dublin, 2001. Enforcing small firms patent rights. European Commission, Enterprise DG, Luxemburg.

von Hippel, E., 1988. The sources of innovation, chapter 4: The functional source of innovation as an economic phenomenon. Oxford University Press, pp. 43-56.

Yin, R., 2003. Case Study Research – Design and Methods (3rd edition). Thousand Oaks CA, SAGE Publications.

ANNEX
QUESTIONNAIRE

SME Case Study IPI Project

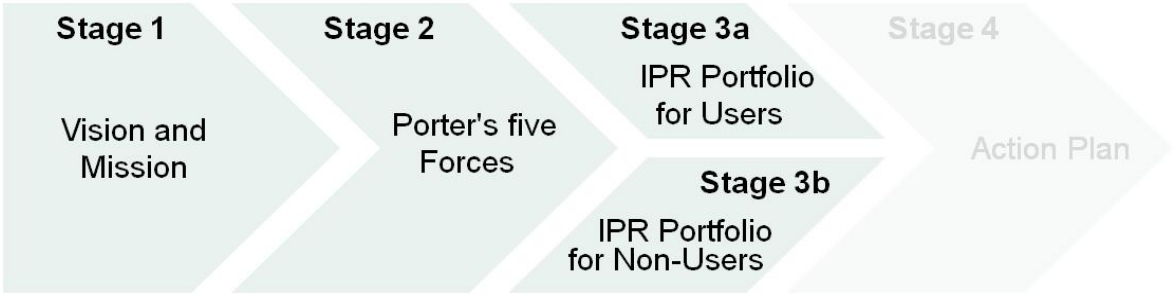
Questionnaire

Participant Information

Last Name: .....
First name: .....
Title: .....
Company: .....
Department: .....
Phone: .....
Fax: .....
Email: .....
Address: .....
Website: .....

Structure of the Questionnaire

The questionnaire will be structured in the following sections:



I General information regarding the SME

II Strategy Management

III Intellectual Property Portfolio - Questions for users

IV Intellectual Property Portfolio - Questions for non-users

V Concluding Questions

Glossary

I General Information regarding the SME

I.1 For a full understanding of your company organization, please prepare an anonymous organizational chart of your IP (incl. exploitation) unit(s) within the overall company structure.

Please indicate

I.2 your field/industry:
_____

I.5 your number of employees:
_____

I.6 the number of R&D staff in your organization:
_____

I.7 the number of staff responsible for IP management:
_____

I.8 What was your turnover last year? 2007:
_____

I.9 Please indicate your R&D sites, the number of FTEs (Full Time Equivalents) and your R&D expenses.

Number of R&D facilities	
Number of R&D FTEs	
Number of IP FTEs	
R&D expenses	
IP Budget	

II Strategy Management

II.1 Vision and Mission

What is the vision and mission of your company?

II.2 Competitive environment

II.2.1 Supplier Power: How do you judge your firm's dependency on the supplier(s)?

a) What is the number of suppliers?
b) Is the company able to substitute the supplier(s) if necessary

II.2.3 Buyer Power: How do you judge the power of your buyers/customers in terms of products and prices?

a) What is the number of customers?
b) What is the size of each order per customer (average, if necessary)?
c) Do your customers significantly influence your product prices?

II.2.4 Threat of New Entry: How important is the threat of new entry in your industry segment?

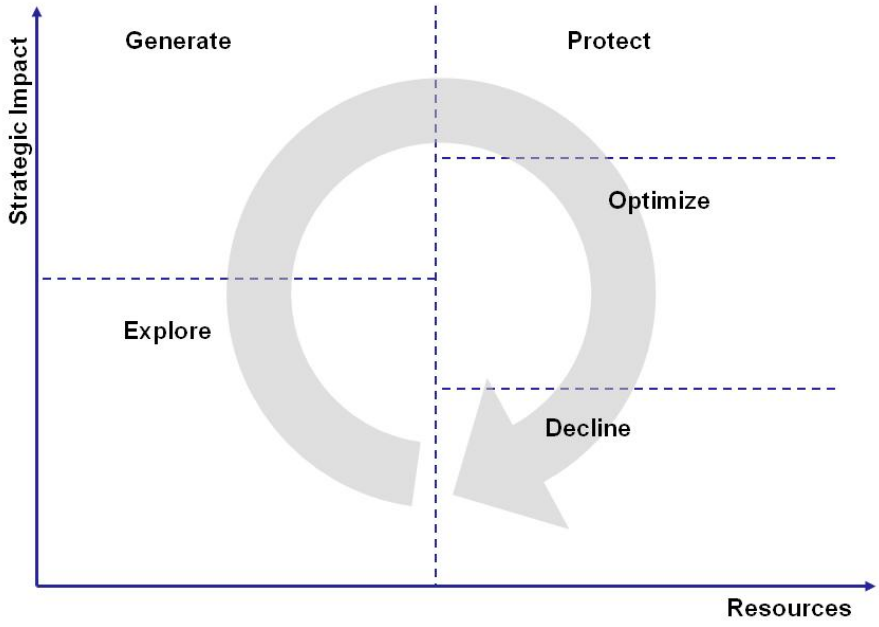
a) Does your competitor require the knowledge of a specialist to enter the market?
b) What barriers of entry does your competitor face?

II.2.5 Threat of Substitution: Are your customers able to substitute your product/service easily?

II.2.6 Competitive Rivalry: How would you describe your rivalry situation regarding your competitors?

a) How many competitors exist in your company's market?
b) Regarding your major competitors, what is the difference?

III Intellectual Property Portfolio - Questions for Users



III.1 Explore: How does your company identify and evaluate new ideas/technologies?

a) Who is involved in the R&D projects of your company?
   a. Internal
   b. Academia
   c. External Consultants
   d. Customers

b) What evaluation measures does the company use?

c) Who is involved in the evaluation process?

d) How often is this process conducted?

e) What strategic methods are used to identify new ventures?
   a. Patent Databases: if so, what kind?
   b. Trade Fairs
   c. Patent Pools
   d. Funding partners

f) Who decides on moving forward with a new project?

III.2 Generate: How and when does your company decide to seek formal IP protection (including patents, trademarks, copyright and design)?

a) What are some motives for seeking IP protection?
   a. Freedom of Action
   b. Blockage of Competitors
   c. Creating another company
   d. Increase the interest for an acquisition by another company
   e. Optimize the ROI

b) For patents, how is the monitoring conducted and how often?

c) For all forms of IP, are competitors identified?
   a. If so, what methods are used to identify competitors?
   b. What identifies and defines a competitor?
   c. Is the search limited to certain countries? If so, why?

d) Is there an analysis of competitor activities?
   a. What is considered (i.e. market share, profit, IP, etc.)?
   b. How is this information used to benefit your company?

e) Are potential in-licensing agreements considered? If so, through what means and for what purpose?

III. 3 Protect: What methods are used to protect your company's IP?

a) Is there a fixed criteria used to determine the method of protection?

b) Does the company have an IP policy?

c) For patents, are patent clusters created?
   a. Who manages the process?
   b. What is the strategy behind the process? (Broad vs. specific)

d) Are other industries considered for licensing purposes?
   a. How are the industries considered?
   b. What industries have potential for your company?

e) For IP other than patents, what forms of protection are used and why?
   a. Copyright
   b. Trademark
   c. Design

f) What experiences has your company encountered regarding the application process of IP?

III. 4 Optimize: How is your company's IP optimized to achieve the largest ROI?

a) Are certain countries considered when seeking IP protection?
   a. If so, what countries?
   b. Why?

b) What type of cost-benefit ratio is used?

c) What is your company's timeline? (to achieve ROI)

d) Does the company use specific management processes?

e) What are the criteria to achieve that?

f) For patents, does your company file deterrence patents to protect against possible substitute patents?

g) Is out-licensing considered within own market?
   a. If so, what department receives the revenue of the licensing agreements?
   b. Does this department also assume the cost for the administrative and managerial process?

III. 5 Decline: How and when does your company decide to discontinue IP protection for a product or invention?

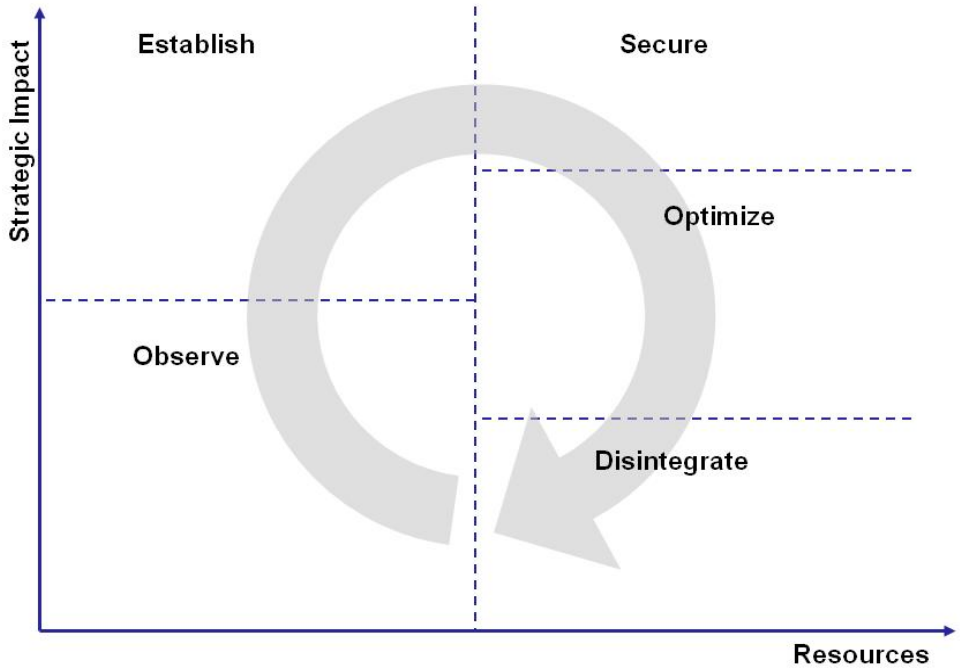
a) What are deciding factors used to discontinue formal IP protection?

b) Who decides on these factors or who is involved in this process?

c) What is considered to sell IP rather than license?

d) What is considered when abandoning the protected invention?
   a. Does litigation costs factor into the decision?
   b. How many litigations cases has your company been involved?
   c. Is time considered? If so, by what means?

IV Intellectual Property Portfolio - Questions for non-users



IV.1 Observe: How does your company identify and evaluate new ideas/technologies?

a) Who is involved in R&D projects of your company?
   a. Internal
   b. Academia
   c. External Consultants
   d. Customers

b) What evaluation measures does the company use?

c) Who is involved in the evaluation process?

d) How often is this process conducted?

e) What strategic methods are used to identify new ventures?
   a. Patent Databases: if so, what kind?
   b. Trade Fairs
   c. Patent Pools
   d. Funding partners

f) Who decides on moving forward with a new project?

IV.2 Establish: Why does your company decide not to seek formal IP protection (including patents, trademarks, copyright and design)?

a) How does your company handle infringing activities?

b) What would be your motives to seek formal IP protection?

   a. Freedom of Action
   b. Blockage of Competitors
   c. Creating another company
   d. Increase the interest for an acquisition by another company
   e. Optimize the ROI

c) Does your company identify competitors?

   a. If so, what methods are used to identify competitors?
   b. What identifies and defines a competitor?
   c. Is the search limited to certain countries? If so, why?

d) Is there an analysis of competitor activities?

   a. What is considered (i.e. market share, profit, IP, etc.)?
   b. How is this information used to benefit your company?

e) If there is no formal protection for your company's IP, how does your company engage in licensing agreements?

IV. 3 Secure: What methods are used to protect your company's inventions?

a) Is there a fixed criteria used to determine the method of protection?

b) How often is this criteria method used per year?

c) Under what circumstances would your company seek a formal method of IP protection?

   a. Cheaper
   b. Quicker process
   c. More knowledge
   d. Simpler application process

d) Are other industries considered for licensing purposes?

   a. How are the industries considered?
   b. What industries have potential for your company?
   c. How will the introduction to the industry be conducted?

e) For trade secrets, what forms of protection are used?

f) Has your company had any experiences regarding the application process of IP? If so, what – explain.

IV. 4 Optimize: How does your company optimize the usage of its inventions without the formal protection of IP?

a) Are there any countries that are problematic or "interesting"?
   a. If so, what countries?
   b. Why?

b) What is your company's timeline to achieve ROI?

c) Is licensing considered within your company's established market?
   a. If so, what department is responsible for the licensing agreements?

IV. 5 Disintegrate: How and when does your company decide to discontinue protecting a product or invention?

b) What criterion is used?

c) Who decides on this criterion, or who is involved in this process?

d) What is considered to sell IP (i.e. trade secret) rather than seek formal protection?

e) What is considered when abandoning the protected invention?
   a. Does litigation costs factor into the decision?
   b. How many litigations cases has your company been involved?
   c. Is time considered? If so, by what means?

V Concluding Questions

V.1 Have you ever contacted the IPI for a specific service?

V.2 What IPI Services did you ask for?

V.3 Did you receive the needed information?

V.4 What do you wish to be improved regarding the services of the IPI?

V.5 Which role do patent attorneys play for the company's IP activities?

V.6 Has the company been involved in IPR infringements? If so, what happened?

V.7 Can you give us an interesting case regarding IP system management, one very successful and one unsuccessful?

V.8 Tell us an IP story and your experiences?

V.9 Does the company follow the open innovation process?

V.10 Who is involved in your open innovation process (customer, competitor or supplier)?

Glossary

Buyer Power: It deals with the question of how easy it is for buyers to drive prices down. Again, this is driven by the number of buyers, the importance of each individual buyer to your business, the cost to them of switching from your products and services to those of someone else, and so on. If you deal with few, powerful buyers, they are often able to dictate terms to you.

FTE (Full Time Equivalent): The FTE is a way to measure a worker's involvement in a project. An FTE of 1.0 means that the person is equivalent to a full-time worker, while an FTE of 0.5 signals that the worker is only half-time.

IPI (Institut für Geistiges Eigentum): Swiss Federal Institute of Intellectual Property.

IP (Intellectual Property): "Intellectual Property refers to creations of the mind: inventions, literary works and symbols, names, images, and designs used in commerce." (World Intellectual Property Organization)

- ➔ **Intellectual Property Rights (IPRs):** Rights to protect IP against imitation. They include patents, trademarks and industrial designs as registrable rights and copyrights and contractual agreements as non-registrable rights.

Licensing: A licensing agreement is a written contract under which the owner of a copyright, patent, trademark, industrial design or other IP, allows the licensee to use, make or sell copies of the original.

- ➔ **In-licensing:** You buy a license of an IP right.
- ➔ **Out-licensing:** You sell a license of an IP right.

ROI (Return on Investment): The ROI is the ratio of the net income to the average capital employed in a firm or project. Expressed usually as a percentage, it is a measure of the profitability which indicates whether or not a firm is using its resources in an efficient manner.

SME (Small and Medium-sized Enterprise): A firm with less than 250 employees (European definition).

Supplier Power: It deals with the question of how easy it is for suppliers to drive up prices. This is determined by the number of suppliers of each key input, the uniqueness of their product or service, their strength, the cost of switching from one to another. The fewer the supplier choices, and the more the suppliers' help is needed, the more powerful the suppliers are.