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ABSTRACT

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Abstract

This thesis studies intellectual property right (also: IPR) strategies from the perspective of high growth startup companies. Due to technology development and intellectualization of business, large part of companies' assets are nowadays intangible. At the same time, the importance of protection instruments designed to protect these intangible assets, intellectual property rights, is increasing. Utilization of these instruments, however, requires understanding of the functioning of the IPR system, as well as financial resources. Startup companies aiming for growth need to be able compete with more established companies also in relation to intangible assets, but they might not have the required knowledge ot resources to fully utilize IPRs in their business. This research aims to understand what are the benefits a startup company can have from protecting their IPRs, and how can the company achieve those benefits.

Based on a review of previous literature, altogether 11 benefits of IPR registration were recognized. To answer to the research questions, six half-structured interviews were conducted with experts form different fields, all with experience in working with startup companies and IPR issues. The interviews were analyzed using different methods of qualitative data analysis, mainly derived from grounded theory and case study methods. As a result, out of the 11 benefits recognized from earlier literature, 8 were recognized to be relevant for startup companies. The most central benefits were recognized to be linked with the financial lifecycle of the startup company, including increasing credibility of the startup and stimulating an investment. In addition it was noticed, that startup companies are mainly able to utilize these benefits at later stages of their lifecycle. However, to be able to utilize the benefits at later stages, the startup company needs to be aware of the functioning of the IPR system and might need to apply for appropriate protection already early on.

As a result of this study, a three-step model was formed to describe different levels of IPR utilization. The first level of the model represents the minimum level of understanding that every startup company should have regarding IPRs. The second level views IPR strategy from a risk management perspective, including securing the minimum protection of the company's own IPRs, contract management and establishing processes for handling IPR issues. The last stage reflects strategic use of IPRs. At this third stage intellectual property rights have a central role in the startup company's business, and they are used in the company's value creation.

Key words	Startup, strategy, growth, intellectual property, IPR, intangible assets, lifecycle
Further information	

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Tiivistelmä

Tämä tutkielma käsittelee immateriaalioikeusstrategioita (myös: IPR-strategia) kasvuun tähtäävän startup-yrityksen näkökulmasta. Liiketoimintaympäristössä tapahtuneiden muutosten johdosta yhä suurempi osa yritysten omaisuudesta on aineetonta. Samalla tämän aineettoman omaisuuden suojaamiseen tarkoitettujen mekanismien, immateriaalioikeuksien, merkitys on kasvanut. Näiden oikeuksien käyttö edellyttää kuitenkin laajaa lainsäädännön tuntemista sekä taloudellisia resursseja. Kasvuun tähtäävän startup-yrityksen on kyettävä kilpailemaan vakiintuneempien yritysten kanssa, mutta niillä ei välttämättä ole tarvittavaa tietotaitoa tai resursseja immateriaalioikeuksiensa laajamittaiseen hyödyntämiseen liiketoiminnassa. Tämä tutkimus pyrkii selvittämään, mitä hyötyjä startup -yritys voi saavuttaa käyttämällä immateriaalioikeuksia liiketoiminnassaan. Lisäksi tässä tutkimuksessa pyritään kartoittamaan, millä keinoin startup-yritys voi saavuttaa nämä hyödyt.

Tutkimuksen aluksi tehdyssä kirjallisuuskatsauksessa tunnistettiin yhteensä 11 immateriaalioikeuksien tuomaa etua. Tutkimuskysymyksiin vastaamiseksi haastateltiin kuutta asiantuntijaa eri aloilta, joilla kaikilla on kokemusta startup-yritysten kanssa toimimisesta sekä immateriaalioikeuksista. Haastattelut toteutettiin puolistrukturoituina ja analysoitiin hyödyntäen kvalitatiivisen haastatteluaineiston analyysiin sopivia metodeja, erityisesti grounded theory- ja case-menetelmää. Haastattelujen tuloksena todettiin, että yhteensä 8 näistä 11 edusta voivat olla startup-yrityksen toiminnan kannalta oleellisia. Kaikkein keskeisimmiksi eduiksi nousivat startup-yrityksen rahoitukseen liittyvät edut, kuten uskottavuuden parantaminen sekä investointien houkuttelu. Lisäksi havaittiin, että monen edun hyödyntäminen on mahdollista vain, mikäli startup-yritys ymmärtää immateriaalioikeuksiin liittyvää lainsäädäntöä ja ryhtyy tarvittaviin suojaustoimenpiteisiin jo riittävän aikaisessa vaiheessa.

Tutkimuksen lopputuloksena laadittiin kolmiportainen malli, jolla voidaan jäsentää startup-yrityksen tämänhetkistä immateriaalioikeusstrategiaa sekä suunnitella tulevaa. Mallin alin taso edustaa vähimmäistasoa, jonka verran jokaisessa startup-yrityksessä tulisi ymmärtää immateriaalioikeusasioita. Seuraava taso kuvastaa riskinhallinnallista strategiaa, jossa keskeisintä on ymmärtää ja välttää liiketoiminnassa immateriaalioikeusasioihin liittyviä riskejä. Myös yrityksen sopimuksenhallinta liittyy tähän tasoon. Viimeinen taso edustaa strategista immateriaalioikeuksien käyttöä liiketoiminnassa. Tällä tasolla immateriaalioikeudet ovat liiketoiminnan keskiössä ja niitä käytetään myös tulonhankkimiskeinona.

Asiasanat	Immateriaalioikeus, strategia, kasvu, startup-yritys, aineeton omaisuus, IPR
Muita tietoja	

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STARTUP IPR-STRATEGIES

Why should startup companies protect their intellectual property?

Master´s Thesis
in Entrepreneurship

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Turku

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1 INTRODUCTION

The industrial revolution that started in the 18th century marked a transition to new, efficient manufacturing processes and towards the era of mass production that enabled lowering of unit costs and unprecedented wealth creation across the Western world. This transformation was brought along by some radical new innovations such as efficient steam engines and gas lighting that enabled factories to remain open for longer hours. With these developments, production could be concentrated in larger manufacturing units, resulting in accumulation of wealth for those owning these facilities and the raw materials. (e.g. King & Timmings 2001).

After this industrial era, the next evolution has been the transition towards the knowledge economy and information society. Key developments of this most recent period involve globalization and the digital revolution, including proliferation of Internet, personal computers and cellular phones, which have changed the market mechanisms of many industries. (e.g. Westeren 2012). With these developments it has become possible to transfer goods such as movies, games, computer programs, books and along 3D modeling and printers even physical objects, to the other side of the globe almost instantly and with close to zero transaction and reproduction costs. This has brought along both negative and positive consequences; on one hand, it has sometimes enabled unwarranted copying of the product without compensation for the creator or the owner, resulting in decrease in their returns (e.g. DeCastro, Balkin & Shepherd 2008, 77). On the other hand, it has also changed the power structures of industries, as owning physical properties and having large financial resources are no longer prerequisites for starting and growing a successful business. (Lönnqvist, Kujansivu & Antola 2005, 61). It has opened up possibilities for fast growing, innovative new companies in knowledge-intensive industries (in this study also called: startups).

As the importance of the physical assets of a company has decreased, the value of other assets has been growing; the value of companies' intellectual capital (also: IC). The term intellectual capital can be defined as "knowledge that can be converted into profit" (e.g. Harrison & Sullivan 2000, 140; Lönnqvist et al. 2005, 18), and even though measuring it can be challenging, it is recognized that nowadays a majority of companies' investments are made in intellectual capital (e.g. Tekes 2010, 13; Lönnqvist et al. 2005, 61). In fact, in some industries and countries, the value of a company's intellectual capital can be evaluated to be as high as 80–90 % of the value of the firm (e.g. Petrusson 2004, 46), and even terms such as intellectual property revolution are sometimes used (e.g. Pisano, 2006). Even within traditional industries, it is recognized that the focus of the firm as a producer of physical goods has to be replaced or complemented by a focus of the firm as a creator of intellectual capital (Petrusson 2004, 2).

Some parts of intellectual capital, such as human capital, are embodied in the employees of the company, and finding the best ways to utilize them is part of human resource management of the organization (Lönnqvist et al. 2005, 32). Other parts of intellectual capital, however, can also be codified in some way, separating the asset from the people and making it explicit. For some of these codified intellectual assets, such as designs, products, literary works and technical solutions, there are specifically designed legal protection instruments to secure the commercial rights of the owner. These assets that are legally protected are referred to by the legal term intellectual property (also: IP). (Harrison & Sullivan 2000, 140).

1.1 Protecting intellectual property

The increased intellectualization of business has lead to a development where legal instruments designed to protect intellectual property, intellectual property rights (hereon: IPRs), have an increasingly central role in companies' business strategies and in defining their competitive positions in the market (e.g. Hall 2007, 568; Powell & Snellman 2004, 199). These legal instruments include:

- Copyright and related rights
- Trademarks
- Industrial designs
- Patents
- Utility models

In addition other methods such as trade secrets, company names and web domains can be associated with protection of immaterial property, and they can also be viewed as a part of these protection instruments. In addition to using different methods to protect their assets, companies also need to be proactive when defending these obtained rights. Intellectual property right infringements are plaintiff crimes, meaning that the intellectual property owner is responsible for taking proceedings in the civil courts if they observe their rights being infringed (Lambert 2009, 57). There is no public authority monitoring these violations. Furthermore, the companies also need to look beyond their own business to make sure their operations are not infringing anyone else's rights.

The original purpose of the IPR system has been to promote technical advance and the progress of science and useful arts by ensuring returns from R&D investment (Cohen, Nelson & Walsh 2000, 3; Levin, Klevorick, Nelson & Winter 1987, 783; Granstrand 1999, 210, Hall & Ham Ziedonis 2001, 105). For example the patent system is built on the bargain that when filing for a patent, the inventor reveals the society the

information of the invention and in return gets a temporary monopoly over the information (Macdonald 2004, 136). More recently, however, the IPR system has also been criticized quite strongly for no longer fulfilling this original purpose of promoting innovation. It has been described as only fitting certain industries, such as pharmaceuticals, where R&D investments are very high and development times long. It has also been judged to rather hinder than promote the competitive free market, which is seen as accelerator of innovation. (e.g. Macdonald 2004; Boldrin & Levine 2008; Pikethly 2006, 58–60). According to findings by Kang & Seo (2006, 144), stronger IPRs alone are not enough to promote innovation, but in their research there is a positive correlation between IPRs and innovation, once other aspects, such as stage of economic development and industry structure, are jointly instigated.

1.2 Recent developments in the use of IPRs

IPR's are ban rights, in other words the owner of the IPR has the right to prevent others from exploiting it (e.g. Schox 2011, 11–12; Ham Ziedonis 2004, 806). In practice this means, that the commercial value of IPRs emerges from situations where the property has value to someone else, but they cannot exploit it without compensation. Due to this, the more widely IPR protection instruments are used, the greater their impact and importance becomes. The increased use causes a spiraling effect where the experienced importance of IPR's becomes an evolutionary process, generating increasing pressure for others to use IPR's in their business constructions as well. The more competitors focus on IPR's, the greater the incentive for a company to develop skills and tools for their IPR management. (Petrusson 2004, 15–16).

On the other hand, the increased use of IPR's in companies puts pressure also on the administrational and judicial institutions, such as patent offices, to reconstruct the IPR system to adapt to the changing business situations. (Petrusson 2004, 16). Over the last 25 years policy developments have involved a significant strengthening of patent-holder rights, which has resulted in an increase in patenting and also in the use of patents as a tool in firm strategy (e.g. Hall 2007, 574). For example the number of US patent applications doubled between the years 1992–2002 (Hall 2007, 578). Besides the growing number of patent applications, also the complexity of applications has increased, resulting in congestions in the patent system and increasing delays in patent approval (Siegel & Wright 2007, 531).

Alongside this development, also defending of IPR's becomes more important, resulting in increased amounts of money moving in the field of IPRs due to high litigation costs and increased need for special legal services. In 1997 the direct legal costs of a US patent trial alone could run in the range of 1–3 million dollars for each

side (Somaya 2004, 104), and nowadays the average estimate is closer to 7 million dollars (Rajala seminar presentation 4.12.2012). There is evidence that the cost of litigation falls most heavily on small firms that usually have more limited financial resources than larger companies (Lanjouw & Lerner 1997, 1). As the world of IP is changing, the law is trying to keep up with the technology changes that allow companies to operate in ways previously unknown (Trott 2005, 141).

1.3 IPR protection and startups

This being the reality in which companies operate today, small firms may find it especially difficult to commercialize their IP, either because of their unawareness of the IPR system, or because of the unproportionately high costs for using the system (Siegel & Wright 2007, 532). According to Petrusson (2004, 21), the increased focus on IPRs from the point of view of a small company means usually a more severe market climate, where large firms can create a web of overlapping IPR claims within which the small firms can then easily get caught. In fact, practically all empirical studies show that small and medium-sized enterprises do not use IPRs in the same way and as much as larger firms (Hanel 2006, 903, 914; Iversen, Mäkinen, Lööf, Oh, Jespersen, Junge & Bech 2009, 3–5; Tekes 2010, 11).

Small companies operating in fields such as retailing do not necessarily even have the need to be largely aware of intellectual property, other than perhaps paying attention to choosing a business name that is not yet owned by someone else. In many cases like this, small businesses can get sufficient knowledge of IPR's to avoid problems by a brief consultation with an attorney. (Harrison & Sullivan 2011, 167). However, as mentioned in the first section, for an innovative new company that is seeking fast growth and operates in a knowledge-intensive industry, globalization and intellectualization of business have opened up new business opportunities which are related to utilizing intellectual capital (e.g. Lönnqvist et al. 2005, 63).

These startup companies seeking fast growth are often focusing on achieving immediate, short-term targets such as sales. With this concentration on short-term business objectives, even startup company managers often argue against spending money on IPRs, as that investment does not necessarily help the company reach these immeadiate targets. In these kinds of situations, the startup may even make a conscious decision to ignore incorporating IP into their business. (Harrison & Sullivan 2011, 166). However, for example in technology intensive fields where the use of IPR's is common and even aggressive in some cases, and when companies operate in international markets already in the beginning of their lifecycle, neglecting IPR issues altogether may not be wise, even for a small, young company. In fact, according to Palfrey (2012, 15),

ignoring, neglecting or failing to manage intellectual property means probably running unnecessarily risks as an organization, and almost certainly leads into missing opportunities. Also Anderson & Eshima (2013, 414) recognize that as small companies tend to be constrained in their tangible resources, their intangible resources, such as brand identity and IPRs, take on particular strategic significance. The key managerial challenge for startup companies is not usually the innovation itself, but the commercialization of it; the translation of promising technologies into a stream of economic returns for the founders, investors and employees (Gans & Stern 2003, 333). Therefore neglecting IPRs as part of this commercialization process and as a way to appropriate returns from innovation can lead to making mistakes or overlooking some central business opportunities.

Seeing how IPRs are used in corporate strategies nowadays, it is increasingly important for also startups to understand the strategic perspectives of IPR's and the different choices companies can make to compete on the increasingly international markets (e.g. Candelin-Palmqvist, Sandberg & Mylly 2012, 502). The developments of the system can also provide some previously unattainable possibilities that are feasible also for small companies, are they aware of the functioning of the IPR system and able to utilize them.

1.3.1 Definitions used in the study

There are several definitions for a startup company used by different authors, and several different terms used to describe new high growth ventures. In this research, the term startup is used to describe a young company with a scalable business model and the potential to become large and valuable. The company is operating or aiming to operate at international markets and has an innovative competitive edge and a strategy for growth. The company is a small or medium-sized enterprise (also: SME) as defined by the European Commission, meaning that it employs less than 250 people, has a turnover of less than 50 million Euros and its balance sheet total is less than 43 million Euros (European Commission – SMEs 2013). The differentiating factors between startups and other SMEs are for example internationality, investments in innovation and clear growth orientation. Tekes uses the term "Young innovative growth company" to describe these companies (Tekes – Nuoret innovatiiviset kasvuyritykset 2011). Other commonly used terms include for example high-potential startup (Wasserman 2012), young high-growth venture (Ala-Mutka 2005), gazelle (Tilastokeskus 2011) or high-growth SME (European Commission – Seed and start-up finance 2013).

There are differences in definitions of what is considered to be high growth and what is considered to be a young company. This research follows the same growth definition

than Ala-Mutka (2005, 7), assuming that the company's growth rate is at least two digits in the long range and three digits during the high-growth period. For the purposes of this research, young is defined as being under five years old, constituting the seed phase, the startup phase and the growth phase as described by Ala-Mutka (2005, 60). Five years is also used in the definition by Tilastokeskus (2011), and it is often used as a margin when evaluating the success of a company, as approximately half of all new companies close down during the first five years of operating (see e.g. Dahl 2013, US Bureau of Labor Statistics 2012). In contrast, for example Tekes defines young innovative growth companies to be under 6 years old (Tekes – Nuoret innovatiiviset kasvuyritykset 2011).

1.4 Research questions and method

Earlier research has focused strongly on studying the use of IPRs, especially patents, in large corporations and especially in North American and European contexts (Candelin-Plamqvist et al. 2012, 502; Hanel 2006). These companies have the possibility of employing entire departments of lawyers, filing patents for every possible invention regardless of their relevance or current profitability, buying licenses and cross-licensing patent portfolios with any other companies necessary, not to mention the possibility to defend their rights in the long and expensive court proceedings against other players in the market.

Inter-industry differences in the use of IPRs have been discussed in some studies, as well as the fact that small, national companies do not necessarily have the same prerequisites for their IPR protection than large multinationals (e.g. Levin et al. 1987; Cohen et al. 2000; Iversen et al. 2009, 23; Lanjouw & Schankerman 2004, 45). Also comparisons between IPR use and strategies in different countries have been made (e.g. Granstrand 1999; Hanel 2006; Iversen et al. 2009, 18–20), but different stages of the company lifecycle in relation to the use of IPRs have not been given much attention, apart from the mentioning that the increased focus on IPR's can constitute a serious obstacle for growth in new ventures (Petrusson 2004, 22). In fact, organizational age has only recently been recognized as an overlooked, yet theoretically meaningful boundary condition on the ability of a firm to translate strategies into performance outcomes (e.g. Anderson & Eshima 2013, 417; Rosenbusch, Brinckmann & Bausch 2011, 442).

Therefore, this paper concentrates on looking at the beginning of the company lifecycle, particularily at startup companies seeking fast growth in the future. These companies are in a situation where they are still small and have very limited resources, but have a scalable business model and are directly targeting international markets.

They are looking to be competing with already existing, more established companies in the near future, and therefore cannot merely disregard the strategies used by these companies.

Regarding this area, the research aims at answering two questions:

1. What are the benefits that a startup company seeking high growth can have from protecting their IPRs?
2. In what ways can the startup company achieve those benefits?

The meaning of the research is to study carefully the field of IPRs and IPR strategies, as well as the conditions in which startup companies operate in the beginning of their lifecycle, and thereafter to analyze, which uses and strategies are the ones feasible and strategically relevant for the reality of startup companies. Also the biggest obstacles for using IPRs and the most common mistakes made by startups in relation to IPRs are viewed, in order to understand the challenges and restrictions faced by these companies. The goal is to get new information and deepen the understanding of IPRs in the context of startups, to find patterns and to form a framework for understanding and further studying suitable IPR strategies for startups. To answer the research questions, semi-structured interviews are conducted with six experts from different organizations and backgrounds, with experience in IPRs and in dealing with several startup companies. The interview data is then analyzed by using methods typical for qualitative interviews, combining elements from mainly grounded theory and case study methods.

The remainder of this paper is organized as follows: chapter 2 presents an overview of the different legal protection instruments that companies can use to carry out their IPR strategy. They form the legal basis of discussion in this paper, and for that reason the logic of the IPR system is shortly outlined, written according to the Finnish legislation. Chapter 3 describes the lifecycle of startup companies and discusses different options available for early stage financing. The lifecycle model and financing options are later on used when discussing the suitability of different IPR strategies for the reality of startup companies. Fourth chapter outlines the different benefits of IPRs recognized in previous literature, and discusses the main characteristics and conditions for each of these. Chapter 5 presents in more detail the methodology used in this research, including descriptions of the data collection process and the persons interviewed for this research. Chapter 6 presents the main findings of the interviews in the context of the theories presented earlier in the paper, and finally chapter 7 discusses these findings in order to form a model for understanding startup IPR-strategies.

2 IPR PROTECTION INSTRUMENTS

Intellectual property rights consist of several legal protection instruments that can be mainly obtained by registration, but in some cases also through other means. IPRs are ban rights, i.e. it is not a right to commercialize or use the property but a right to prevent others from using it (e.g. Schox 2011, 11–12; Ham Ziedonis 2004, 806). The IPR system is not completely straightforward or trouble-free. One common challenge with IPRs is that the administrative arena of the property rights is mainly national, whereas business arenas nowadays are increasingly international even for small and medium sized businesses (e.g. Petrusson 2004, 108). Alongside with the digital revolution and the growth of Internet, this causes challenges and pressure to develop the IPR system. Therefore the policy framework of intellectual property rights remains constantly under review (e.g. Hall 2007, 569; WIPO patent report 2007, 6).

This thesis is written according to the Finnish legislation concerning protection of intellectual property rights. The Finnish legislation is close to identical with IPR legislations in other Nordic countries. In addition the Finnish legislation follows EU regulations and the international conventions of the World Intellectual Property Organization (WIPO) and the World Trade Organization (WTO). (See e.g. European Union, Summaries of EU legislation). On the other hand the Finnish system differs quite largely from for example the IPR system in the United States, where it has for example during the last decade become possible to get patent protection for software and business models, which are still not patentable in the EU (e.g. Graham 2008, 155, 161; Pikethly 2006, 60–61).

The next chapters present shortly the main legal aspects of the protection instruments that are used in this research when discussing intellectual property rights. These include copyright and related rights, trademarks, industrial designs, patents and utility models. The main features of these protection instruments are also summarized in Table1 at the end of this chapter. In addition to the actual protection instruments designed to protect the proprietor's commercial rights of their intellectual property, there are also other means of managing intellectual property worth mentioning in this context. These include trade secrets, web domains, company names, and defensive publishing, and they are also briefly described in this chapter. The more marginal areas of IPR's, such as geographical indications, layout designs of integrated circuits and plant variety protection fall out of the scope of this chapter and are therefore not described in detail, but are still worth mentioning here as part of intellectual property rights.

2.1 Copyright and related rights

Copyright and related rights are protection instruments for creative literary or artistic works, such as musical, dramatic, cinematographic or photographic works. Copyright comes to exist when the literary or artistic work is created, i.e. it does not require registering, and it is valid until seventy years have elapsed from the year of the author's death. Copyright provides the author the exclusive right to control a work by reproducing it and making it available to the public. According to the Finnish legislation also computer programs are considered to be literary works written in code language and protected by copyright. (Copyright Act 404/1961, § 1–2, §43).

The technologies enabling free copying and distribution resulting from the digital revolution and the proliferation of the Internet have generated a widespread disregard of copyright laws by the public at large (Bently, Davis & Ginsburg 2010, xviii). Governments have tried to fight against it by increasing criminal penalties for copyright infringements, with no apparent success (Bently et al. 2010, xvii).

2.2 Trademark

Trademark protection can be obtained for a special symbol for distinguishing goods purveyed in business in a certain industry from those of others. A trademark can consist of any kind of mark that can be graphically represented, such as words, figures, letters, numerals or the shape of the goods or their packaging. Trademark protection can be obtained either by registration or by establishing the trademark as a symbol specific to its proprietor's goods, always within a certain geographic region and certain industries. The trademark remains in force for ten years after the registration date, and renewal of the trademark is possible without limitations making it the only intellectual property right apart from trade secrets that can in theory remain in force without expiration. (Trademarks Act 7/1964, §1–2, §22).

Companies' trademark strategies are increasingly integrated with their branding and marketing strategies. (Petrusson 2004, 18). Globalization and the possibility to outsource production have transformed several previously manufacturing-oriented companies into primarily trademark- and brand-oriented companies, and even industries such as the car industry are beginning to realize that their innovations are also related to their communicated values. For the customer, the claimed values can be even more important that the actual physical goods, making it harder to separate brands and trademarks from the product concepts or even the companies. (Petrusson 2004, 126).

2.3 Industrial design

A design that is new and has individual character can be protected through design registration, providing the creator the exclusive right to the design. Design here means the appearance of the product or part of the product, resulting from the lines, contours, colors, shape, texture, materials or other features of the product or its ornamentation. Industrial design registration can be especially useful form of protection when the appearance of the product does not involve sufficient creative step to fulfill the requirements of copyright protection, i.e. it is not"artistic" enough. Registration of a design is valid for five years from the application date and it can be renewed for two further five-year periods, making the maximum term of protection 15 years. (Registered Designs Act 221/1971, § 1–2, § 24)

Previously companies have not been active in applying for industrial design rights, mainly due to the fact that there has been little evidence of the effectiveness of the protection in courts. Their importance is, however, increasing. (Oesch et al. 2005, 169–175). One sign of the increased importance of design rights are the numerous design right infringement cases around the world for example between Apple and Samsung during the last two years relating to rounded edges of tablet computers (e.g. BBC News 18.10.2012). Patent infringement lawsuits have been going on for long between large multinational companies, especially on such industries as computing, but the fierce involvement of also design rights is something that is only now emerging.

2.4 Patent

Patents can be used to protect inventions that are susceptible of industrial application and that are new in relation to what was known before the filing date of the patent application and which differ essentially therefrom. Patents give their proprietor an exclusive right to exploit an invention in the geographic area where it is registered. To get protection on several areas the proprietor must file applications in each area separately. A granted patent may be maintained for up to 20 years from the filing date of the application. Everything made available to the public by any means, such as writing or lectures, is considered as already known, meaning that if it is to be patented, the invention must be kept a secret until filing the application. Patent applications are made public after a grace period of 18 months from the application date, and are thereafter available to the public in different databases. This means, that anyone can find out the technical details of how the protected invention has been made, but they are not allowed to commercially exploit the invention in the region where it is protected

without the patent holder's permission until the patent expires. (Patents Act 550/ 1967, §1–2, §40).

Patents are probably the most tangible and most discussed form of intellectual property. They provide the strongest protection and they have the greatest effect on the commercial success and market value of companies today. (Rivette & Kline 2000a, 56). Recent policy developments have generally involved a significant strengthening of patent-holder rights, resulting in an increased number of patent applicaitons as well as increasing complexity of the applications. This, in its turn, has caused increasing delays in patent approval. (Siegel & Wright 2007, 531).

2.5 Utility model

Utility model right (sometimes referred to as "minor patent" or "small patent"), is a protection instrument that is used only in a small, but still significant, number of regions, including countries like Finland, Germany, Russia and China but excluding for example the United States, the UK, Norway and Sweden (for a complete list see: WIPO – Where can utility models be acquired?). The utility model, similarly to patents, protects a technical solution that is commercially exploitable. The main difference between utility models and patents is, that the requirements for utility models are less stringent than for patents and the requirement of non-obviousness is lower. Utility model protection can be sought for innovations of incremental rather than radical character that may not meet the patentability criteria. Utility models are also cheaper, simpler and faster to obtain and maintain. (WIPO – Protecting innovations by utility models). In Finland the term of protection of a utility model registration is four years, after which it can be renewed to last for total of ten years altogether, making it also a more short-term protection instrument than a patent. (Act on Utility Model Rights 800/1991, §1–3, § 25).

2.6 Trade secret

When dealing with intangible, immaterial property, there is often also the option of keeping the property as a trade secret. This applies especially well to situations when the property is for example a method of production, a recipe or a technical solution that is not apparent from the actual product for example by the means of reverse-engineering (e.g. Levin et al. 1987, 795; Grandstrand 1999, 186; Barrett 2002, 191–193; Ernst 1995, 226). The secrecy can be enforced by different kinds of contracts such as non-disclosure agreements, and there is no one single correct way for managing trade secrets.

As patent applications are made public after the grace period of 18 months, a patented invention is always disclosed to the public even though it cannot be commercially exploited by others. If the invention is something that is not apparent from the end product, patenting it can give competitors unnecessary additional information on how the invention has been made. If it is not possible to prove which method has been used to make the end product, the inventor has no means of proving that their patent has been infringed by others, meaning that the patent does not actually provide any protection against copying (e.g. Sullivan 1998, 181; Graham 2008, 159; Teece 1986, 287). In these cases, keeping the invention as a trade secret might be a good option. The problem with trade secrets is that they are rather unstable, and once a trade secret is revealed, there is no way of protecting it again. Non-disclosure agreements and other contracts can include a penalty fee for breaching the contract, but that does not make it impossible to break it. (Barrett 2002, 191–193)

2.7 Defensive publishing

Defensive publishing is also an alternative way of protecting intellectual property that can be considered instead of patenting, seeking utility model protection or keeping the invention as a trade secret (see: Figure 2). It can be used to advance the state of the art of an industry, thereby raising the bar for competitors' patent applications. By disclosing an invention to the public in some forum (e.g. peer-reviewed journals, online publications, filing a public patent application without proceeding to registration), a company can ensure that the novelty criterion in the patent law will not be fulfilled by patent applications regarding that invention filed after the publishing day of the information, making it thereby impossible for anybody to patent that particular solution. In other words, a defensive publication can cause the invention in question to become obvious or lacking novelty in the eyes of the patent office. (Barret 2002, 191–193; Schox 2011, 27).

For example IBM used to issue a publication called *IBM Technical Disclosure Bulletin*, to make public some of their inventions. This way the company could reduce the possibility that a competitor's patent claims would cover their inventions, without the need to file for a patent application themselves. IBM Technical Disclosure Bulletin is cited widely in other patent applications, which would suggest that the strategy of defensive publications is successful. (Barret 2002, 191). A possible negative effect of defensive publishing is that even the company that encloses the invention to the public in the first place is not able to patent it afterwards. Therefore the decision about defensive publishing should always be made with care and it should be aligned with the

company's comprehensive IPR strategy. This way the company can avoid making strategic mistakes that could harm its IP position.

Defensive publishing is a strategy that should be considered when trade secrets are not secure enough to protect the invention, but the cost of patenting would exceed the benefits of monopoly right guaranteed by a patent. These include e.g. incremental inventions that are covered by existing patent claims and are not embodied in a product with long-term marketability, or uses of a core technology that are not likely to gain patent protection (e.g. due to lack of novelty). As defensive publishing does not require lots of resources, it can also be an option for a small company that does not have the financial resources to secure patent protection, but wishes to take action in order to secure operating space. (Barrett 2002, 191–193, Schox 2011, 27).

Figure 1 presents the four alternative options for protecting a technical invention. In one extreme end there is the trade secret, which is the only form of protection that does not include publishing the invention in some way, as applications for both patents and utility models are made public after a certain period of time. Patent is more challenging to obtain than a utility model, as the novelty of the invention is inspected more thoroughly as a part of the patent granting process. Utility model is cheaper and faster to obtain than a patent, but it also is a more short-term protection instrument, as the maximum protection period of a utility model is only 10 years. Defensive publication represents the other extreme end, and the only protection it gives is the confirmation that no one else will be able to patent or otherwise protect the published invention.

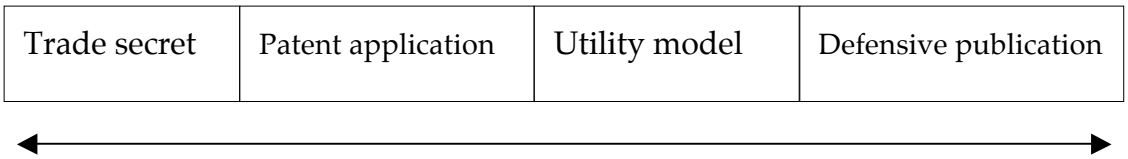

Figure 1 Options for protecting a technical invention

2.8 Company name and web domain

The company name is registered when the company is initially founded, and at that point it is verified that there is no other company working under the exact same company name in the same country. The company name needs to be individual and distinctive, and it must not be likely to be confused with a company name or a trademark that has been registered or filed earlier. It is notable that there are different criteria for distinctiveness of trademarks and company names, and even though a name would be approved for a company name, it might be that the responding trademark

causes a risk of confusion with a similar trademark owned by someone else, and the registration is therefore not accepted. When assessing whether a name can be registered as a company name, under consideration are its spelling, pronunciation and the line of business it is used in. (National Board of Patents and Registration of Finland – Exclusive right to a company name 2011).

The company can also register an available domain for the company web pages in exchange for a fee. Web domains ending with the Finnish national country code *.fi* are granted for maximum of five years at a time. If there are several applications regarding the same name, the domain is granted for the application that has first arrived. However, a domain name shall not be illegally based on a protected name or a trademark owned by someone else, giving some presedency for trademark owners. (Domain Name Act 228/2003, § 2, § 4:3, § 4a:3, § 4a:5). These three dimensions; trademark(s), company name and web domain(s), are all matters relating to distinguishing the company from its competitors and to building the company's brand and image (see Figure 3). Therefore certain level of unity between these three factors can benefit the company in their marketing efforts, ensuring coherence in different communication channels.

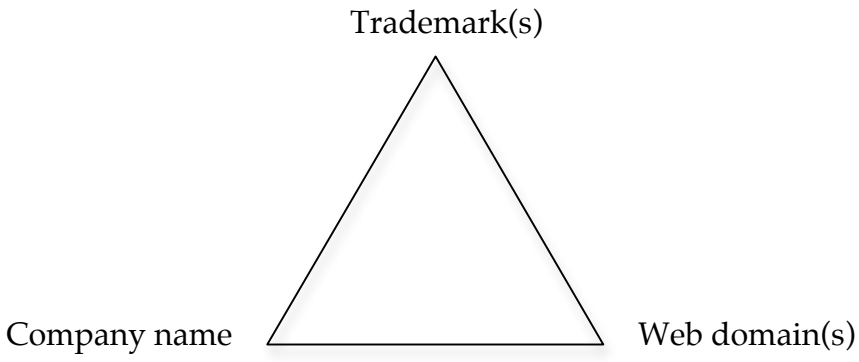

Figure 2 Marks distinguishing the company from its competitors

Table 1 Summary of IP protection instruments

	Patent	Utility model	Industrial design	Trademark	Copyright
WHAT CAN BE PROTECTED?	Technical solution that is commercially exploitable	Technical solution that is commercially exploitable	The appearance of an object or part of an object	Marks to identify good or services (name, logo, sound etc. or combination of these) within a specified industry	Artistic creations (literary, musical etc. works)
REQUIRE-MENTS	Novelty, utility and non-abviousness	Novelty, utility and non-obviousness (not as stringent as patent)	Individual character, can be presented graphically	Distinctiveness, can be presented graphically	Creative step, originality
MAXIMUM LENGTH OF PROTECTION	20 years fom the filing date of application	10 years	15 years	Infinite, if renewed duly	Life of the author(s) + 70 years
HOW TO OBTAIN?	Filing an application for each jurisdiction (processing takes usually at least 2 years)	Application for each jurisdiction (no processing time)	Application for each jurisdiction (no processing time)	Establish by use/ apply for each jurisdiction	Automatically created
RELATED COSTS (For registration in Finland)	Registration 450€ Publishing 450€ Yearly fees 155–900€	Registration 250 € Renewal 250€ every four/ two years	Registration 185€ Renewal starting from 275€ every five years	Registration 215 € Renewal 235 € every ten years	Free of charge

Table 1 summarizes the main IPR protection instruments. Descriptions are derived from the related laws; The Copyright Act 404/1961, Patents Act 550/1967, Registered Designs Act 221/1971, Trademarks Act 7/1964 and Act on Utility Model Rights 800/1991. The prices for IPR registration presented in the last row of Table 1 are from the National board of patents and registration of Finland (National Board of Patents and Registration of Finland – Price list, 2013).

3 STARTUP LIFECYCLE AND FINANCING

Starting a new venture can be described as an activity including opportunity identification, followed by assembling the required resources and implementing a practical action plan, and finally at some time, flexibly collecting the rewards (Sahlman, Stevenson, Roberts & Bhidé 1999, 1). In this research, the concentration is on startups with a scalable business model that are looking for fast growth in the future. This kind of startup companies are often based on some new innovation, and often, but not always, are technology- or science-based, as this enables scalability of the business without large investments in production facilities that are related to more traditional industries (e.g. Pikethly 2006, 77; Wasserman 2012). These ventures with large growth potential are often associated with large risks and high levels of uncertainty, with the foundation of the business relying solely on future expectations. (e.g. Romain & Pottelsberghe de la Potterie 2006, 222; Ala-Mutka 2005, 7).

Both Gans & Stern (2003, 333) and Bhidé (1999, 133) recognize appropriating returns from innovation as a key challenge for startup companies rather than the innovation itself. According to Bhidé, especially for what he calls revolutionary ventures, the new concepts are often difficult to prove, but once proven, they can be easy to imitate. Therefore appropriate barriers to entry are needed in order to protect the startup and its innovations. IPR protection is one way to secure these entry barriers. Also Rosenbusch et al. (2011, 452) found in their study that although innovation can imply high investments, risks and uncertainty for SMEs, the benefits such as differentiation from competition and entry barriers for potential imitators generally seem to outweigh the costs of innovation. Another central challenge for startup companies and their strategies is that as the company and its operating environment are changing continuously, also the problems faced and the skills needed to deal with them change as the company grows (Churchill & Lewis 1983, 11). This requires flexibility from both the entrepreneurs and the company strategy, including the use of IPRs. Startup companies usually operate at short time frames and try to adapt to quickly changing environments, while seizing market opportunities before they disappear or someone else manages to take advantage of the opportunity first. The strategies and financial analytical frameworks used in large corporations usually require more time, money and data than a startup entrepreneur can afford. Therefore, finding an effective middle ground between planning too much and not planning at all is a central consideration for developing a startup strategy. (Bhidé 1999, 121).

This chapter first presents a framework for understanding different phases of startup lifecycle and the different characteristics of each of these stages. After that, an overview of the different financing options available for startup companies at these different stages of growth, as well as their relation to IPRs, are shortly presented. As securing

sufficient financing is recognized to pose a central obstacle for growth for small companies (e.g Churchill & Lewis 1983, 7; Rosenbusch, Brinckmann & Müller 2013, 335; Deeds, DeCarolis & Coombs1997, 32), different strategic options for how to acquire the required capital are an important consideration in a startup. In acquiring the necessary financing, IPRs of the startup companies can play a central role. At the end of this chapter, an overview of the different stages of the startup lifecycle and the different financing options available at each of them are presented in Table 2.

3.1 Lifecycle of a startup

Many studies have recognized the company's ability to adapt and make changes in their products or production processes according to market developments as a success factor for firm growth (e.g. Littunen & Tohmo 2003, 197; Churchill & Lewis 1983, 9–10; Rosenbusch et al. 2011, 453). In the beginning of the lifecycle of a startup company, these changes are rapid and continuous, as the company aims to constantly develop and grow. As traditional lifecycle and growth models are not fully appropriable for the conditions of small businesses, Churchill & Lewis (1983, 3) have formed a separate, five-stage model for describing growth in small, young ventures. Also Ala-Mutka (2005, 218) has formed a five-stage model to describe different phases of growth venturing. Moore (2002, 12), on the other hand, has created a model for technology adoption lifecycle, describing how new technological innovations are proliferated and establish their position in the market, similarly to the startup companies based on new innovations. In this chapter, a general lifecycle model for a startup is described (Figure 3), combining elements from all of these rather similar models.

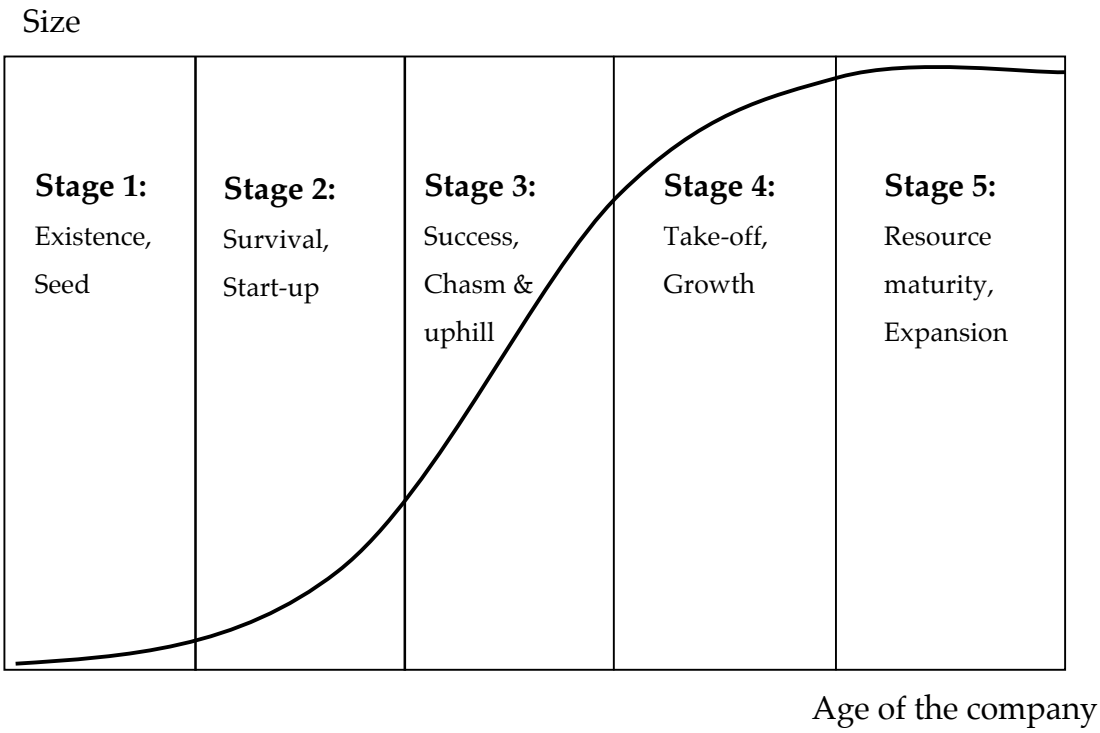

Figure 3 Growth stages of small firms (modified from Ala-Mutka 2005, 218; Churchill & Lewis 1983, 3)

In the model by Churchill & Lewis (1983, 3), the first stage is labeled "existence". In this phase, the company's strategy is mainly to remain alive and try to become a viable business. Focus is on obtaining customers and in delivering the products or services contracted for. Ala-Mutka (2005, 218) calls this stage the "seed" phase, and emphasizes the need for the company to expand their customer base. According to him, this stage can also be regarded as the time before the actual firm is started. (Ala-Mutka 2005, 216). Moore (2002, 12) concentrates on the customers of the company who, according to him, at this early phase are the few innovators that seek out new innovations even before the formal marketing has started. Both Moore and Ala-Mutka mention this first stage as the moment for the new venture to get proof of their concept, in order to be able to target larger audiences in the later stages. Main source of funding at this point is the owner financing coming from the startup team as well as their friends and family, and a central concern is whether there is enough money to survive on. (Churchill & Lewis 1983, 4; Ala-Mutka 2005, 218). If, at this first stage, the company runs out of capital or the owner cannot accept the demands the business places, the option is to close down the business or sell it for its asset value. Otherwise, the company can proceed to stage two. (Churchill& Lewis 1983, 4).

At the second stage, called "survival" by Lewis & Churchill and "Start-up" by Ala-Mutka, the company has already demonstrated that it is a workable business entity. The company has enough customers to survive and is able to satisfy them well enough to

keep them. (Churchill & Lewis 1983, 4). At this point, according to Ala-Mutka (2005, 217–219), a more detailed strategy is already needed and the startup needs to start setting some boundaries to their operations. Also the business model should be defined latest during this stage. According to him, even though attracting angel investors is possible already at this stage, usually the venture has still very scarce resources and needs to concentrate on some niche or otherwise limited market segment. Moore (2002, 12) calls the customers at this phase "early adopters", who are the key to opening up a new market segment. According to Churchill & Lewis (1983, 4), here the key problem is to generate enough cash flow to reach the break-even point and to be able to grow the business. Being able to grow in size and profitability, the company can move on to the third level they call "success".

In the third level, according to Lewis & Churchill (1983, 4–7), the owner has two options; either they can concentrate on keeping the company stable and profitable, or they can invest in growing the company. As this research concentrates on startup companies looking for growth, mainly the latter option is relevant at this point. Also Ala-Mutka and Moore recognize this third stage to be somewhat of a "milestone" for the startup company, and Ala-Mutka has labeled this stage as "Chasm & uphill" to describe the challenges faced by startups at this phase. According to him, this is also the most risky phase of the startup lifecycle. (Ala-Mutka 2005, 218). According to Moore (2002, 13–20), to move from the second stage to the third and to be able to target the larger user group he calls "early adopters", the company needs to cross a chasm that separates these two user groups. According to him, this is the most challenging transition in the lifecycle model, and requires specific attention from the founders. To attract customers at this point, the company needs good references and is expected to be able to deliver a full functioning product. Both Churchill & Lewis and Ala-Mutka identify this phase with already a more systematic approach to business, including standardized business processes, hiring a professional manager and installing relevant systems (Ala-Mutka 2005, 219; Churchill & Lewis 1983, 7). Ala-Mutka and Moore both emphasize the importance of sales and marketing efforts of the startup at this stage of company development (Ala-Mutka 2005, 219; Moore 2002, 42–46).

In the fourth stage of the model, which Churchill & Lewis call "take-off" and Ala-Mutka "growth", the company is faced with the challenge of how to grow rapidly and how to finance that growth. Both operational and strategic planning is relevant at this stage, and the manager has to be able to delegate some parts of the increasingly growing amount of responsibilities. (Churchill & Lewis 1983, 7). More people are involved in the startup by this stage, forcing structures to become more formal (Ala-Mutka 2005, 219). According to Moore (2002, 13), the fourth customer group called" late majority" forms about one-third of the total buying population of any given segment. In his model at this point, the innovation can be seen to become an established standard in the

market, and the selling costs of the startup company are decreasing rapidly. The founder of the company can also be replaced at this stage, either voluntarily or involuntarily, by the company's investors or creditors (Churchill & Lewis 1983, 9). Also Ala-Mutka (2005, 218) recognizes this fourth stage as the moment when the startup starts attracting venture capital financing in addition to using insider financing and angel investors. According to Churchill & Lewis (1983, 9), should the owner fail at overcoming the managerial and financial challenges of this phase, the company can be sold, often even at profit.

The last stage of the model, labeled "resource maturity" by Churchill & Lewis and "expansion" by Ala-Mutka, is the phase where the company is professionalized and the management force of the company is expanded to eliminate potential inefficiencies produced by growth. At this stage the systems used by the company are extensive and well-developed, and the owner and the business are quite separate both financially and operationally. (Churchill & Lewis 1983, 9). According to Ala-Mutka (2005, 218), this is the stage when it is possible for the startup to become a listed public company through initial public offering (also: IPO). If the company has outside investors, they might be looking for exit opportunities at this phase. At this point, the company can also start looking for new customers and new opportunities for growing the business. Moore (2002, 13) recognizes the last user group called "laggards" as an opportunity usually not worth pursuing. This would also support the view that at this point, the startup can start looking for new growth opportunities outside its now established operations. It is pointed out by Churchill & Lewis (1983, 11) that one company rarely can be defined to be completely at one level at a time; in reality, companies usually are on one level in some respect and on another when it comes to some other aspects.

3.2 Financing in startups

Startup companies are based heavily on future expectations of growth and profits. In the beginning the company might not even have a ready product, but the founders are investing time and money into the company in the hope that someday it will bring profits to its owners. (Romain & Pottelsberghe de la Potterie 2006, 222; Ala-Mutka 2005, 7). In this early phase the company is therefore almost always unprofitable, requiring investments from the founders or from outsiders to enable product development, marketing, sales and other costs related to running and growing the business. (Churchill & Lewis 1983, 4).

It is recognized by Churchill & Lewis (1983, 11), that what they call "high-technology startups" are often started by entrepreneurs and investors with the main intention of rapid growth followed by raising public equity in initial public offering or

selling the startup to another company. This can also be seen to be the case for startups looking for high growth studied in this research, although here the scope has not been limited to only technology startups. According to the authors, this kind of a strategy requires acquiring outside capital already almost from the beginning of the venture. Also McNally (1995, 10) recognizes that there often is a need for external investment in technology-based growth firms already in their very early stages of development. On the other hand, previous studies suggest that the type of financial alternatives available to firms vary throughout the lifecycle of the business as a result of developments in for example scale, demand for finance and the company's asset structure (Cassar 2004, 264; Berger & Udell 1998, 614). In many studies it is shown, for example, that in the beginning of a venture, many startups are heavily dependent on initial insider finance due to difficulties in obtaining external financing (Berger & Udell 1998, 622).

Capital decisions and the use of debt and equity at startup companies have been shown to have important implications for the operations of the business, risk of failure, firm performance and the potential of business expansion in the future (Cassar 2004, 263). In addition, lack of financing is a common obstacle for growth in new ventures (e.g Churchill & Lewis 1983, 7; Rosenbusch, Brinckmann & Müller 2013, 335). However, due to the lack of track record, information asymmetry and heavy reliance on future expectations, financing at early stage ventures and startup companies differs from financing of larger or public companies (Chua, Chrisman, Kellermanns & Wu 2011, 472; Cassar 2004, 264–265; Berger & Udell 1998, 616). When there is limited amount of evidence of previous success, financiers need to look at other evidence in order to evaluate the potential of a startup. These aspects can include the owner's individual characteristics and reputation, but also the company asset structure, including its tangible and intangible assets such as IPRs (Cassar 2004, 264; Berger & Udell 1998, 615). On the other hand, the startup companies may have difficulties in building a reputation and convincing potential investors of their credibility and quality (Chua et al. 2011, 472; Berger & Udell 1998, 616).

Startup companies have several possible sources of financing, often depending on their age, growth stage, industry, strategy and other factors (e.g. Cassar 2004, 264). It is recognized that for high-growth, high-risk new ventures, equity capital in the form of angel investment and/ or venture capital is often raised before they obtain significant amount of external debt finance. (Berger & Udell 1998, 624; McNally 1995, 32). One reason for this can be the startup's lack of tangible collaterals often required by banks and other sources of external debt finance (Berger & Udell 624; Cassar 2004, 277).

Figure 4 presents different financing options available for a high growth startup company in the different stages of the company lifecycle. Similarly to the lifecycle model, the financing lifecycle is a theoretical framework and in practice it is hard to distinguish exactly in which stage the startup company is. It is notable that in addition to

the financing options presented in this chapter, different countries have different kinds of systems for public financial support that new companies can apply for. As this study concentrates on strategic planning of startup companies in relation to IPRs, detailed descriptions of these different kinds of public allowances granted for companies are not central for the purposes of this research. It can be mentioned that in addition to the financing options presented in this chapter, also some public funding can be available for the startup company, depending on the local system.

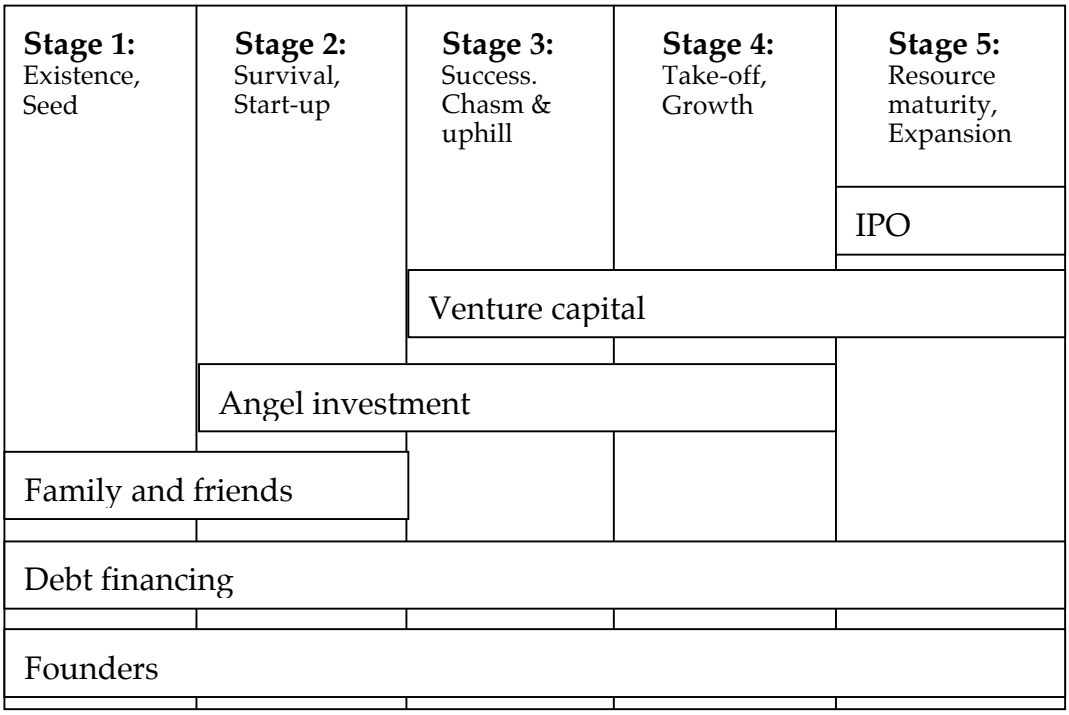

Figure 4 Financial lifecycle of a startup (modified from McNally 1995, 11; Berger & Udell 1998, 623; Churchill & Lewis 1983, 3; Ala-Mutka 2005, 218)

3.2.1 Owner financing

The term owner finance is here used to mean all the funds provided by the startup team and their family and friends prior to the inception of the startup company as well as during different stages of its lifecycle. (e.g. Berger & Udell 1998, 622; Winborg, Landström 2000, 243). Other terms used to describe this private early stage financing include for example initial insider investment (e.g. Berger & Udell 1998), bootstrap finance (e.g. Bhidé 1992; Winborg & Landström 2000) and "family, friends and fools" or "FFF" (e.g. Kotha & George 2012). Owner financing is needed especially in the very

early stage of the startup's development when the product or business concept is still under development. At this stage the startup company can also be developing the formal business plan, which is then at later stages used as a sales document to acquire financing from other sources. (Berger& Udell 1998, 622). Winborg & Landström (2000, 248) recognize owner financing as an option for newly established, fast growing businesses showing still relatively low profit margins and experiencing great need for additional finance. IPRs are not likely to play a role in the amount owner financing available for the startup company, as it is usually mainly a question of how much financial resources the founders and their family and friends happen to have.

3.2.2 Debt financing

In debt financing the startup company can apply for a loan, either for a short-term or for a long-term, that it pays back in agreed schedule and with agreed interest rate. Usual sources of debt financing are banks, but also other alternatives such as different kinds of financial institutions are available. (e.g. Berger & Udell 1998, 623; de Bettignies & Brader 2007, 809). Debt financing leaves the founder with full ownership of the startup company as opposed to equity financing, where part of the ownership of the company is trasferred to the investors (de Bettignies & Brander 2007, 809).

According to Cassar (2004, 277), a positive relationship can be observed between (especially long-term) debt financing and companies' fixed assets that can be used as collateral. This can be due to the contracting mechanisms of the institutions providing debt financing that emphasize the importance of the company's fixed assets when making the investment decision (Cassar 2004, 277; Berger & Udell 1998, 638). Therefore also startup companies that usually lack valuble fixed assets can have difficulties in applying for debt financing, making equity financing usually a more feasible option for high growth new ventures (Berger & Udell 1998, 624; McNally 1995, 32). Private loans raised by the founders for other purposes, such as the founders' student loans used to finance the development of the startup company, are here considered to be part of owner financing.

3.2.3 Angel investment

Angel investors are individuals who generally invest their own funds, and they usually concentrate only on the early funding stages of startups (Mason & Harrison 2002, 220; Wright & Robbie 1998, 530; Berger & Udell 1998, 619). Many angel investors have a background in entrepreneurship and business management themselves, and understand

their investment as a contribution”back” to other entrepreneurs. In addition to funding, they usually provide their investment targets with other support such as mentoring and networks. (Rosenbusch et al. 2013, 337; Mason & Harrison 2002, 213). Angel investors frequently pursue also non-economic goals such as supporting entrepreneus, and they may feel less pressure to appropriate returns from their funded firms as opposed to corporate venture capitalists, as the latter is often expected to generate substantial profits to satisfy their own investors (Mason & Harrison 2002, 212; Wright & Robbie 1998, 531).

Compared to corporate venture capitalists, angel investors can be more selective in their investment decisions, as they do not have the same obligation to invest. (Mason & Harrison 2002, 213). On the other hand, it is recognized that angel investors do not necessarily encounter as many potential investment targets as do formal venture capitalists, and therefore they are choosing their targets from a more limited amount of options. (Wright & Robbie 1998, 531). Business angels can usually devote more time on the companies they invest in, and they do not usually use same kind of strict criteria for evaluating the potential of a startup. (Mason & Harrison 2002, 213).

3.2.4 Venture capital

A major source for equity financing for new growth companies is venture capital (also: VC). (e.g. Maier & Walker 1987, 213; Gregorio & Shane 2003, 211; Rosenbusch et al. 2013, 336; Chang 2004, 724). Venture capital finance is raised either from large financial institutions, such as banks and insurance companies, or from independent limited partnership venture capital funds (Berger & Udell 1998, 619; Mason & Harrison 2002, 220). Venture capital investment decisions are done by professional fund managers based on strict criteria and often on purely economical considerations (Mason & Harrison 2002, 220). As opposed to angel investors, venture capitalists are often looking at slightly more mature startups with the potential to grow to significant size quickly. Venture capitalists are looking to generate a large annual return, as they need to both finance their own operations of scanning and evaluating the numerous potential investment targets, and at the same time be able to realize returns for their own investors. (Bagley & Dauchy 1999, 263; Chang 2004, 724–725).

In addition to financial resources, venture capitalists can also bring into the startup valuable operating assistance such as objectivity, experience and complementary knowledge that can help the company to grow and compete. (Rosenbusch et al. 2013, 337: Carney 2008, 290; Gregorio & Shane 2003, 211; Chang 2004, 725). Venture financing can also involve making organizational changes in the startup, as financing contracts can sometimes include bringing in new members to the company’s board of

directors or replacing the senior management with more experenced professionals. (McNally 1995, 18; Chang 2004, 725). This sometimes means that the founders loose significant share of their decision-making power in exchange of the equity investment (e.g. de Bettignies & Brander 2007, 809).

When making the investment decision, in addition to investigating the product or idea of the startup, the venture capitalists also perform a thorough due diligence process looking into all of the company's documentation to overcome any uncertainty and information asymmetry (Carney 2008, 290; Gregorio & Shane 2003, 211). The importance of including also the company's intangible assets into this process has been recognized for a long time (see e.g. Harvey & Lusch 1995, 8), and nowadays it is a standard part of the due diligence process to also go through the startup's IPRs, as well as agreements with suppliers, customers, major shareholders and employees. (Carney 2008, 290). In fact, according to Locket, Murray & Wright (2002, 1011), the primary attraction to a venture capitalist in technology-based businesses is the identification of a business that is founded on unique and protectable intellectual property rights. If the company has valuable trade secrets or proprietary information, it should try to obtain confidentiality agreements from the prospective investors in the beginning of the due diligence process (Carney 2008, 291), although not all investors might be willing to enter into such agreements.

As part of the due diligence process, the venture capitalist also ensures that all employees have entered into appropriate confidentiality agreements in respect to the company's intellectual property and that the company has sufficient legal rights to all intellectual property to conduct its business (Carney 2008, 293–294). In addition, the company's attorneys are required to give opinion letters to the VCs to effect that the company holds good title to its patents and patent applications, and that the company's use and exploitation of its patents will not be subject to restriction because of patent rights of others (Carney 2008, 294). Therefore it can be concluded that latest at the stage when the startup is applying for venture capital financing, IPRs can affect the startup company's opportunities.

3.2.5 Public equity

Public equity that the company raises for the first time in initial public offering when listing in the stock exchange, is usually regarded as the last stage of growth financing (e.g. Ala-Mutka 2005, 249). IPO requires the company already quite established position and financial resources, also affecting its suitability for later stage financing. IPO is in many cases used as a measurement of success of the company, especially for younger firms (e.g. Chang 2004, 722; Deeds et al.1997, 32), and for many growth

startups especially in technology-intensive fields, exit through an IPO or acquisition by a larger company is from the beginning the main goal of the founders (e.g. Churchill & Lewis 1983, 11). Earlier research suggests that on average, a startup that has received venture capital financing will issue an IPO more quickly than a startup without such support (Chang 2004, 722). One reason for this may also be the venture capitalists' wish to realize their profits from the investment as soon as possible (Chang 2004, 723).

The most important reason for a company to issue an IPO is to infuse a significant amount of investment capital into the firm. Owner financing, angel investment and venture capital are important sources of early stage financing of a startup company, but once the company reaches a level where it needs a significant amount of capital to finance rapid growth and expansion or to pursue extensive research and development projects, the firm is usually required to access the public equity market by issuing an initial public offering. (Deeds et al. 1997, 32).

Table 2 Summary of stages of growth in a startup company, modified from Churchill & Lewis (1983, 3–11), Ala-Mutka (2005, 60, 218) and Moore (2002, 12)

Stage	1. Existence/ Seed	2. Survival/ Start-up	3. Success/ Chasm & uphill	4. Take-off/ Growth	5. Resource maturity/ Expansion
Market	Early market	Early market	Early market – Mainstream	Mainstream	Mainstream
Customer group	Innovators	Early adopters	Early majority	Late majority	Laggards
Task	Proof of concept	Develop commercial products and services, develop a business model	Crossing the chasm	Distribution in volume, increasing profitability	Searching new growth opportunities, Exit for investors
Challenges	Getting first customers	Satisfying customers, reaching break-even point	Sales and marketing, financing growth	Sales and marketing, financing growth, formalization of structures	Continue growth through finding new opportunities
Source of financing	Owner financing, Debt financing	Owner financing, Angel investors, Debt financing	Owner financing, Angel investors, Venture capital, Debt financing	Angel investors, Venture capital, Debt financing	Venture capital, IPO, Debt financing
Risk level	Low	Medium	Extremely high	Medium	High

4 BENEFITS OF IPR PROTECTION

Earlier research recognizes a number of ways in which companies can use IPRs in their business. It is recognized that the reasons for which companies use IP rights vary based on the size and strategy of the company as well as across industries (e.g. Cohen et al. 2000, 23–24, Hanel 2006, 901; Schox 2011, 22), and can be divided into defensive and offensive use (e.g. Harrison & Sullivan 2000, 142). In this research also the lifecycle of the company is taken into account when we look at early stage ventures and the reasons for protecting IPRs in startup companies.

Earlier literature has recognized several reasons for why companies typically protect their IPRs. These reasons include:

1. Protecting competitive advantage
2. Generating licensing revenue
3. Preventing others from registering the property
4. Blocking
5. Strengthening positions in negotiations
6. Deterring a patent infringement lawsuit
7. Stimulating an acquisition or an investment
8. Enhancing the company image or credibility
9. Measuring R&D performance
10. Access to markets
11. Motivating personnel

Some of the reasons are mainly relevant for patens, while others can be applied to any part IPR protection. The decision to protect IPRs in a company can be based on a single reason or a combination of several of these reasons (Schox 2011, 22). The key to successful utilization of IPRs in business is recognized in many studies to be efficient integration of IPRs into the overall company strategy. Also approaching IPRs from a broader perspective, instead of looking only at patents or trademarks, is seen to be beneficial. (e.g. Chasser & Wolfe 2010, 2–4). This chapter describes each of these uses that companies can have of their IPRs, which are then later on in chapter 7 analyzed from the perspective of a startup company based on the expert interviews.

4.1 Protecting competitive advantage

IPRs give the proprietor the exclusive right to commercially exploit the property, preventing others from copying it without compensation. As the original purpose of the IPR system has been to promote innovation and the progress of science and useful arts

by ensuring returns from R&D investment (Cohen et al. 2000, 3; Levin et al. 1987, 783; Granstrand 1999, 210, Hall & Ham Ziedonis 2001, 105), protecting competitive advantage and preventing others from copying the invention can be seen to be the traditional use of IPRs. For example in the researches of Cohen et al. (2000, 17) and Granstrand (1999, 210), it was the first motive behind companies' patenting. When protecting a competitive advantage, the company's IP portfolio can be used to create a fence around the core technologies of the company that for example increase the performance of the product or reduce its manufacturing costs. The fence forces competitors to design around the protected technology or to license the technology from the company. In capital-intensive markets even a pending patent application may dissuade potential competitors from entering the market, or it can at least increase the development time and costs of competitors. For startup companies, building a patent portfolio to protect a competitive advantage can be a way to prevent larger companies from stealing their core technology. (Schox 2011, 23).

There can be seen large inter-industry differences in the use of IPRs, and for example in the pharmaceuticals industry where R&D costs are high, the use of patents as a protection of competitive advantage is common and even necessary to ensure sufficient return from R&D investments (e.g. Cohen et al. 2000, 23; Hanel 2006, 910; Levin et al. 1987, 796, Somaya 2004, 105, Mansfield 1986, 174).

4.2 Generating licensing revenue

Another traditional reason for protecting IPRs in addition to preventing others from copying the property is the generation of revenue by licensing the achieved exclusive rights to others. To be able to license a property, the company must be able to prove that it is actually owned by them, and for that purpose the registered IPRs are useful. Traditionally companies used to sell licenses for their existing technologies to markets in which the company itself had no interests in operating, but more recently developing an individual licensing business outside the own immediate product areas, or having licensing as the sole core of the business have become more common. (Granstrand 1999, 212). For example IBM increased their annual patent licensing revenues from $30 million in 1990 to nearly $1 billion in 2000, as the company started to actively look for licensing opportunities in their large portfolio (Rivette & Kline 2000b, 124).

Similarly to protecting competitive advantage, generating licensing revenues is a common reason for patenting for example in the pharmaceuticals industry (Cohen et al. 2000, 23). More generally, in fields where patents are an effective means of preventing competitors from copying or duplicating the invention, they tend to also be effective in generating royalty income (Levin et al. 1987, 799). In Cohen et al.'s research (2000,

18), licensing was found to be the second least important reason for applying patents, whereas in Granstrand's research (1999, 211) it was listed as the fourth out of ten motives. According to Schox (presentation 4.9.2012, Espoo), getting into licensing business can be difficult for a startup company, as it requires large sales efforts and credibility from the company.

4.2.1 No exposure strategy

No exposure strategy is a rather new business model, also called "trolling" or "patent trolls", that has emerged alongside the increases in patenting during the last decade. The companies following the no exposure strategy are non-practicing entities (NPEs), in other words they are purely in the business of owning IPR's and they have no sales or production of their own. The companies develop or purchase IPR's that might be useful for someone else, and after that concentrate on licensing or selling the rights to other companies. Since they do not sell anything besides their own IPR's, they are completely avoiding the risk of litigation. (E.g. Bagley 2008, 137; Macdonald 2004, 146).

4.3 Preventing others from registering the property

One reason mentioned in earlier research for protecting IPRs and especially for filing patent applications, is merely to make sure that someone else does not, even though the company itself at the moment would have no use for the invention. As Shox (2011, 27) mentions, the same outcome can also be accomplished by more inexpensive ways, namely by defensive publishing. Once the invention is disclosed to public in some forum, patent applications regarding that invention will be evaluated to be lacking novelty by patent examiners, and the invention cannot be patented by anyone anymore. Therefore filing for patents merely to prevent others from patenting the invention, which is a capital-intensive effort, is a strategy suitable for mainly large corporations, and it is typically a complementary, not main reason for protecting IPRs.

4.4 Blocking

Blocking is related to the same idea as the previous benefit, i.e. preventing others from registering a certain property, but in the case of blocking, also substituting or complementing inventions are protected in addition to the main invention itself. In practice, when using the blocking strategy, the company looks beyond their intial

protected invention in order to recognize other related inventions that could act as substitutes or complements for their product, and protects also them in order to have the better control over the solutions that end users and other companies have to use in that field. (e.g. Granstrand 1999, 218–222; Cohen et al. 2000, 22). In fact, blocking can be seen as a strategy for achieving several other end benefits described in this chapter, such as generating licensing revenue or strengthening positions in negotiations. It is a so called ”offensive” strategy, where the company does not necessarily intend to use the property themselves, but registers it to distract competitors in some way (e.g. Cohen et al. 2000, 22). There are many names used to describe this phenomenon in literature, such as building patent fences (Cohen et al. 2000, 22), shields (Monk 2009, 476), walls (Rivette & Kline 2000a, 58) and thickets (Shapiro 2001; Hall & Ziedonis 2001, 102; Bagley 2008, 136) or surrounding (Granstrand 1999, 220), clustering (Rivette & Kline 2000a, 58), fencing (Grandstrand 1999, 220) and bracketing (Rivette & Kline 2000a, 58).

The reason for protecting substituting products or technologies can be to prevent competition and to complicate the option of inventing around the invention. (Cohen et al. 2000, 22). The more costly and difficult it is for the infringing party to invent around the patented technology, the more favorable the negotiation position of the party who owns the ban right (Hall & Ziedonis 2001, 109). When blocking is used for protecting complementing inventions, it can be in order to secure licensing revenues, or to force inclusion in cross-licensing negotiations. It is a suitable strategy for complex product industries where several separately patentable inventions need to be combined in order to form a single, commercializable end product. By holding the property rights of one necessary element, the company can strengthen their market position significantly. (Shapiro 2001, 123; Cohen et al. 2000, 22).

4.5 Strengthening positions in negotiations

The use of IPRs, and especially patents, as tools for negotiation has become a common strategic practice, particularly among large corporations and within certain industries. For example systems products industries, such as computer industry that makes products that include numerous patented inventions, are becoming more and more dependent on gaining access to other companies’ patents in order to be able to commercialize their own products. It is estimated, for example, that an average 3G mobile phone is already affected by approximately 18 000 and a PC by 15 000 patents internationally (Monk 2008, 485). Therefore companies on these industries have been remarkably active in devising mechanisms, such as cross-licensing of patent portfolios,

to secure this access. (Somaya 2004, 119; Cohen et al. 2000, 19; Bagley 2008, 136; Shapiro 2001, 119).

To strengthen their bargaining power in negotiations with other companies, it has become a common practice for especially large corporations with voluminous resources to build different kinds of offensive patent portfolios to ensure room for operation especially in patent-intensive industries where litigation cases are many and expensive. (e.g. MacDonald 2004, Somaya 2004, Monk 2008, Rivette & Kline 2000a; Gilardoni 2007, 423). This is closely related to the blocking phenomenon described in previous section, but to strengthen positions in negotiations, all kinds of inventions can be protected in order to build a credible portfolio, not just those that are complements or substitutes to certain products or technologies.

In fact, Cohen et al. (2000, 24) recognized a positive correlation between the respondent's number of patent applications and the patenting motive of strengthening the company's bargaining position, which would suggest that the mere quantity of patents is important in negotiations. These portfolios are based on mutual deterrence; if two firms have patents aimed at each others' products, neither will litigate for the fear that the other company will do the same (Monk 2008, 476), a phenomenon also referred to as mutual hold-up, or "mutually assured destruction" to indicate similarities with the strategies in the Cold War (Monk 2008, 476, Somaya 2004, 119; Schox 2011, 26). For example IBM, the company owning the widest patent portfolio in the world (e.g. Monk 2008, 486; IBM Press release 11.1.2012; Somaya 2004, 120), does no longer feel the need to get licenses from other companies. Even if they were infringing some other company's patent, the other company operating in the same industry would most likely also be infringing some of IBM's patents. (Monk 2008, 486).

4.6 Deterring a patent infringement lawsuit

The use of patents for preventing infringement lawsuits is related to the use of patents in strengthening the bargaining positions of the company in general; in this case, the patent portfolio can be used to negotiate a settlement of differences (for example by agreeing on cross-licensing) rather than proceeding to a trial or arbitration in case of an alleged infringement. In some cases, only the possibility of a countersuit can be enough to deter the infringement suit. (e.g. Sullivan 1998, 181, Macdonald 2004, 148; Shapiro 2001, 127). In fact, some research suggests that the most valuable patents are not those likely to be used by the patent holder but those likely to be infringed upon by competitors, since the main role of the patent is as a bargaining chip to buy freedom (Hanel 2006, 902).

Preventing infringement suits was another motive for patenting, in addition to strengthening bargaining power, that Cohen et al. (2000, 24) found to be positively correlated with the number of the respondent's patent applications, suggesting that the firms in the industries that patent the most tend to be more concerned with negotiations and prevention of suits, and that building a strong patent portfolio is seen as a suitable strategy for handling these concerns.

According to Schox (presentation 4.9.2012, Espoo), also a startup company can have use of patents in deterring an infringement lawsuit by larger companies as the start-up gets big enough to threaten existing actors in the market. Having a valuable patent gives the start-up company the opportunity to file a countersuit in case they are accused of infringing another company's patent. The possibility of a countersuit is, according to Schox's experience, often enough to delay or prevent these accusations, although the efficiency of the tool is hard to measure as there is no statistics over the lawsuits that were never filed. It is, however, recognized for example by Bagley (2008, 136) that small companies with smaller patent portfolios may not be able to "maneuver" this in the same way than larger companies, meaning that they might not be as able to efficiently avoid liability for patent infringement even though they would have some patents of their own.

4.7 Stimulating an acquisition or an investment

Small companies are usually the ones looking for an investment or to be acquired by larger firms, and therefore using IPRs to stimulate an acquisition or an investment is an important reason behind IPR protection for especially SMEs and startups. According to Schox (2011, 26), smaller companies are often acquired by larger companies based solely on their ownership of essential piece of IP. From the investors' point of view, IPRs can be viewed as an asset that could stimulate an acquisition in the future, or at least as a deposit that can be sold in case the company would fail, reducing the risk of the investment.

Overall, according to Bryer & Simensky (2002, xxvii), a significant majority of all mergers and acquisitions in the past decade occurred because of the acquirer's perceived need for the target's intellectual property assets, such as unique patents, technologies, Internet domain names and media portfolios containing copyrighted material. In the study of Lockett et al. (2002, 1026), the authors found out that lack of intellectual property protection was a key reason why technology based ventures were refused funding compared to non-technology-based ones. On the other hand, Pikethly (2006, 77) found in the UK, that making patent protection available for non-technical business methods, which currently are not patentable in the UK, would have very little effect on

encouraging investment in such innovations. However, he does recognize that in some other fields patent protection plays a significant role in encouraging investment, which would imply that the effect that IPRs have on investment decisions is industry- and case-dependent.

Stimulating an acquisition or an investment is linked to the strategy mentioned in the next chapter, enhancing the company image, as IPRs in an investment or acquisition situation are also contributing to the company image and credibility. In this research the differentiation between these two categories is interpreted to be that when acting as a stimulator of an acquisition, the company is acquired specifically to gain access to the company's IPRs and only secondarily for its other merits such as overall company image. When talking about investments, the investment decision is primarily based on, or strongly influenced by, the value of the company's IPRs.

4.8 Enhancing the company image

Enhancing the company image is mentioned by some studies as one reason for patenting, although it is considered less important than for example protecting competitive advantage or strengthening positions in negotiations (Gilardoni 2007, 423). Petrusson (2004, 18) recognizes enhancing the reputation of the firm as one motivation for big industries to patent, and according to Sullivan (1998, 110) a large and strong portfolio and the means to continue generating large numbers of quality innovations is a measure of the technological and commercial strength of a technology company. The number of patents held by companies can be seen as a measure of their inventive and technological capabilities, and therefore, according to Granstrand (1999, 213), they can also be used to demonstrate the company's inventive superiority.

According to Schox (2011, 27) registered IPRs can enhance the company's credibility in the eyes of consumers as well as other stakeholders, which for a young company can be highly beneficial. He also mentions that ”patent pending” or ”patented” markings can be used in marketing efforts to indicate uniqueness of a product and to convey a message to consumers that the product cannot be obtained somewhere else.

4.9 Measuring R&D performance

In their research, Cohen et al. (2000, 17–18) recognized measuring the internal performance of the firm's technologists as one of the reasons behind patenting in U.S. manufacturing firms, although it was reported the least important among all the reasons. Also Petrusson (2004, 18) and Sullivan (1998, 110) recognize measuring the

performance of the firm's researchers as one motivation for patenting. According to Levin et al. (1987, 798), as R&D operations usually require a team effort, measuring individual performance in R&D teams can be challenging. The rigorous legal standards for identifying inventors on patent applications help in this process. Ernst (1995, 226) mentions patent information more broadly to be potentially a helpful tool for human resource management, since it provides objective information to identify contributors to technological progress and enables remuneration of the inventors.

In addition to gaining access to new markets, which is described in more detail in the next section, measuring the performance of the R&D personnel was recognized by Levin et al. (1987, 798) as the other reason for patenting not directly linked to appropriating returns from investments. This can be one of the reasons for the experienced low importance of this benefit in also Cohen et al.'s (2000, 17–18) study. In more recent studies (e.g. Harrison & Sullivan 2000, 142) , new reasons for protecting IPRs that are also not directly linked to appropriating returns from investment have been recognized. Examples of these are for example deterring from an infringement lawsuit (section 4.6) and motivating personnel (4.11).

4.10 Access to new markets

Access to new markets has been mentioned in some studies as a reason behind companies' patenting, although it has not been given much attention. For example Sullivan (1998, 27, 110–111) mentions IPRs as a basis for negotiating a strategic alliance with a partner in a market area where the company otherwise would not have access. Also Schox (2011, 24) mentions access to competitor's channels as a reason for protecting IPRs in a situation where the company is not able to fully satisfy the demand for their products. In this kind of a situation, if the company has proper IPR protection to ensure that their product or service will not be illicitly copied, the company can license their IPRs to a competitor or a partner operating at different market areas in order to broaden the distribution of their products to new regions. Schox also mentions that for a technology company, this can be a way to increase acceptance of the technology on a wider scale and establish, or at least influence, the market standard for a certain technology at a certain region.

Levin et al. (1987, 798) mentions gaining access to certain foreign markets as a reason for companies' patenting, as some developing countries have required as a condition of entry for US companies that they license their technology for a host-country firm. According to him, some patents are filed primarily to permit such licensing. The practices between different regions and their special requirements, however, vary largely from country to country. There have also been some major

developments in harmonization of IPR practices in different countries since the publishing of Levin et al.'s study, the most central of which is probably the TRIPS agreement (trade related aspects of intellectual property rights) by World Trade Organization (WTO). The agreement entered into force in 1995, and several countries have joined it since then. (e.g. Candelin-Palmqvist et al. 2012, 506; Hallenborg, Ceccagnoli & Clendenin 2008, 70). The kinds of limitations or special requirements described by Levin et al. are nowadays rather marginal due to this harmonization, and have little effect on an average startup company in the beginning of its lifecycle. Therefore closer studying of this phenomenon falls out of the scope of this research.

4.11 Motivating personnell

Motivating personnel is another use of IPRs related to the management of human resources, and it is not directly linked to appropriating returns from investments (Gilardoni 2007, 423; Ernst 1995, 226). This is another benefit that is recognized but not discussed widely in earlier literature. According to Gilardoni (2007, 423), patents can be used as an instrument for encouraging the creativeness of employees. The ideas from lower hierarchical levels of an organization should be welcomed and employees have the satisfaction of knowing that their efforts are being taken seriously. Overall, this can be seen as part of building an innovative organizational culture.

Also Granstrand (1999, 265–267) discusses the relationship between organizational culture, management and patenting in companies. He emphasizes the importance of involving the top management in the company's IPR issues and making patenting a common concern for all the company's engineers. He also discusses different alternatives for rewarding inventive work by individuals and teams, as well as different patenting incentives for personnel. He suggests that clear, quantified objectives and reward schemes should be linked to patenting, and gives an example of a Japanese firm where the employee who has applied for most patents in a gets a cash reward.

According to Anderson & Eshima (2013, 424), there is generally a universally positive effect on firm growth from entrepreneurial behavior, which can be seen to be part of this kind of an organizational culture that encourages innovativeness. In their research sample, younger, more entrepreneurial firms with competitive advantage provided by intangible resources exhibited the highest level of growth, showing the importance of both organizational culture and IPRs in the success of growth companies.

5 RESEARCH METHODOLOGY

The goal of this research is to study the complex field of intellectual property right strategies from the point of view of startup companies with limited resources in the beginning of the company life cycle. The purpose is to map this relatively unobserved part of IPR strategies, trying specifically to recognize the benefits and opportunities that startup companies can attain by adopting a strategic approach towards IPRs and by making the right choices in their IPR protection. The study also looks at the most common risks and challenges faced by startups in the field of IPRs, in order to recognize the necessary actions the companies need to take to avoid them. The questions this research seeks to answer are:

1. What are the benefits that a startup company seeking high growth can have from protecting their IPRs?
2. In what ways can the startup company achieve those benefits?

This chapter first describes the research approach and research methods used in this study. After that the data collection procedure is presented in detail, including descriptions of each of the interviewees. In the final part, methods used in analyzing the interview data are presented. Also a short evaluation of the methods used in this study is presented in the end of the chapter.

5.1 Research approach

As the research on the area of IPR strategies in the context of company lifecycle is still in its infancy, the aim of the research is to gather and organize new information on the phenomenon in order to better understand it and to guide the way for future research on the subject. Therefore the study is organized by using qualitative research methods that fit the exploratory nature of this subject (e.g. Salkind 2012, 213; Denzin & Lincoln 2005, 8). Qualitative research methods can be used to uncover and understand what lies behind any phenomenon about which little is yet known (Strauss & Corbin1990, 19). It has also been recognized in the review by Candelin-Palmqvist et al. (2012, 508), that there is need for more qualitative studies in the field of IPR research in order to answer the “how” and “why” questions of this field. This research aims to fill part of this gap by answering these questions from the perspective of startup companies. Qulitative research in general can be defined as a set of interpretative, material practices that aim to produce a series of representations of the world, making it also a naturalistic approach (e.g. Denzin & Lincoln 2005, 3).

It is recognized in previous studies (e.g. Hanel 2006, 903, 914; Iversen et al. 2009, 3–5; Harrison & Sullivan 2011, 167), that small companies are not very well aware of IPR issues and are not fully able to exploit the IPR system, having to most often seek for outside expertise to guide them in protecting their IPRs. As the purpose of this paper is to look for guidelines and best practices in the field, looking directly at how IPRs are at the moment protected at startup companies would not necessarily give the best answer to that question. Therefore this research seeks out to the experts with experience in guiding several companies with their IPR issues, to find the ways in which startup companies can best benefit from IPR protection.

The field of IPR strategies and startup companies is multidimensional, often combining at least law, business as well as design or technology (e.g. Hanel 2006, 895), and therefore getting a comprehensive view of the subject requires some level of understanding of all of these areas. That is why this research is done by conducting interviews with experts from different fields and backgrounds, all with experience in dealing with several early stage ventures, thus decreasing the risk of overlooking some central aspects relating to use of IPRs in startups.

5.2 Research method

For analyzing and interpreting expert interviews, there is no straightforward, single appropriate method. Instead, suitable methods depend on the research questions, the research approach and the data itself. The methods are typically defined in more detail as a part of the process of going through, coding and interpreting the data gathered. (Ruusuvuori, Nikander & Hyvärinen 2010, 11; Alasuutari 1995, 83). For this research, the methods are derived from a range of methodology literature concerning qualitative data analysis. The analysis is based on mainly characteristics from grounded theory and case study methods, which both are used for exploratory research to build new theory and broaden understanding of previously unknown topic areas. The empirical data and its interpretation have a central role in both methods. (e.g. Eisenhardt 1989, 532, 548; Eisenhardt & Graebner 2007, 25; Strauss & Corbin 1990, 24). It is noteworthy to mention that the different terms, such as qualitative research, naturalistic inquiry, grounded theory building or theory building from cases, are sometimes also used in a confusingly overlapping manner, highlighting that even making a clear distinction between these methods is not always straightforward (Eisenhardt & Graebner 2007, 26, 30).

Grounded theory research method was originally developed by Barney Glaser and Anselm Strauss in their book *The Discovery of Grounded Research* in 1967. It was presented as an alternative for previously dominant logico-deductive research approach

which concentrates on testing hypotheses formed by the researcher. They argued that this method ignores the process of theory formation, which actually evolves through continuous interplay between analysis and data collection. (Silverman 1985, 3; Strauss & Corbin 1990, 23–25; Eriksson & Kovalainen 2008, 155, 158). Also other qualitative methods have since then adopted a similar approach, where hypotheses are not a necessary starting point for a research and can be formed also along the way as the research progresses (e.g. Silverman 1985, 3; Alasuutari 1995, 269). Grounded theory method has since then established its position in qualitative business research, and it is used with a specific set of procedures in order to carve out middle-range theory, delimited to specific aspects of studied phenomena, from and with the help of the empirical data (Eriksson & Kovalainen 2008, 154).

Grounded theory method uses both deduction and induction, and specific to this method is that in the research process the data collection and data analysis are overlapping, forming an iterative process. (Strauss & Corbin 1990, 148; Eriksson & Kovalainen 2008, 156; Eisenhardt 1989, 538; Charmaz 2005, 508). This is a common feature for analysis of expert interviews in also other methods (Alastalo & Åkerman 2010, 373). Data collection and analysis is started early on in the research process, and theory chapters and literature review are adapted based on things arising from the empirical data. Also in this research, the theoretical framework has been complemented and refocused based on topics arising from the interviews. Data collection also is a dynamic process in grounded theory research, and for example need for new viewpoints and interviewee candidates can be recognized still during the analysis process. (Strauss & Corbin 1990, 157; Eisenhardt 1989, 538).

The early studies regarding grounded theory followed the objectivist assumptions embedded in positivism, whereas lateron studies have been carried out using also constructivist assumptions (Silverman 2006, 96–97; Eriksson & Kovalainen 2008, 156–157). In this research paper, the approach follows the more recent constructivist approach, where the assumption is that when conducting the interviews, instead of merely collecting facts independent from the research setting, the interviewee and the interviewer are actively engaged in mutually constructing meaning (e.g. Silverman 2006, 118).

Conducting a research using purely grounded theory method as originally described by Glaser and Strauss has, however, been criticized for several reasons. Among other things, the method strongly emphasizes the importance of discovering issues emerging from the data, instead of previous literature which is seen as constraining and limiting for the creativity of the researcher. Therefore, for pure grounded theory research, it is recommended that the researcher does not ”restrict” themselves by studying literature before the data collection process. (Strauss & Corbin 1990, 49–50). Even though more recently the method has been modified and used by other authors and researchers in a

more flexible manner (e.g. Charmaz 2005, 508–509), this research does not attempt to follow the grounded theory method as such. Instead, tools and methods typical for data analysis in grounded theory research, such as coding processes, are utilized and then complemented by elements from other qualitative methods, mainly the case study method and to some extent also discourse analysis. This combining of elements and methods is again typical for analyzing qualitative interviews (e.g. Ruusuvuori et al. 2010, 19; Silverman 2006, 237).

Case study is a common research method in fields such as sociology, political science as well as business (Yin 2003, 1; Salkind 2012, 217), and can involve either single or multiple cases (Eisenhardt 1989, 534; Stake 2006, 1). Case studies are used to retain a holistic understanding of real-life events and complex social phenomena that would not necessarily be reached through other means such as surveys or questionnaires (Eisenhardt 1989, 534; Yin 2003, 2; Salkind 2012, 217). In a single case study this is done by examining a single setting in as intense and detailed manner as possible in order to get rich understanding of the studied phenomenon. In a multiple case study, broader understanding of an overall phenomenon is sought for through triangulation and comparison between different cases (Stake 2006, 33–40; Eisenhardt 1989, 540). Case study method is most appropriate in the early stage of research on a topic or to provide fresh perspectives to an already researched topic (Eisenhardt 1989, 548; Salkind 2012, 218). Therefore it can also be useful when trying to broaden understanding of the use of IPRs in startup companies. When using case study method for building new theory, it is again common for the data collection and data analysis processes to overlap making the data collection a flexible process, similarily to the grounded theory research (Eisenhardt 1989, 538–539).

This research is not a pure case study in itself either, as the expert interviews concentrated on IPR strategies in startups in general and were not limited to studying only specific case companies. However, as the experts all had experience in working with several startups in regards to their IPR protection, they were often able to validate their opinions by giving examples from real life companies. In addition, two of the interviewees were currently working as IP managers in small, young companies and thus they were able to present detailed case examples of successful utilization of IPRs in a small business. Therefore features of the case study method are also utilized in analyzing the data for this research.

Third method that is utilized in this research is discourse analysis, which is used as part of the open coding process when analyzing the interviews. In discourse analysis, language is regarded as the medium for interaction, and rhetorical organization of talk is analyzed to understand people's actions (e.g. Silverman 2006, 224). The context-relevant cultural distinctions, categorizations, interpretations and classifications made by the interviewee are in the center of discourse analysis (e.g. Pietilä 2010, 213;

Alasuutari 1995, 165). Based on the discourse of the interviews in this research, three categories were formed as part of the coding process to describe the different levels of IPR usage in chapter 7.

5.3 Data collection

The interviewees were chosen partly by finding the candidates with most experience from their fields of expertise with understanding of the startup world, and partly by using snowballing method after recognizing the initial candidates for the interviews. All interviewees were contacted by phone and/ or e-mail to arrange the interviews. As is customary for the grounded theory research method and also to theory building case studies, the comprehension of what kind of expertise would still be needed to understand the phenomenon grew while conducting the initial interviews (e.g. Strauss & Corbin 1990, 178; Eisenhardt 1989, 539), which then also guided the selection of subsequent interviewees. Most of the interviewees have experience of several different aspects relating to startup IPR protection, such as early stage financing, entrepreneurship, internationalization and technology development, which ensures that a wide range of subjects of interest came up in the interviews and will be covered in this research.

The persons interviewed in this study are, in chronological order:

1. Ilkka Kivimäki (Investor, serial entrepreneur, startup coach)
2. Martti Mikkola (SME IP consultant)
3. Markku Rajala (IP manager, inventor, entrepreneur, patent attorney)
4. Marja-Leena Mansala (Master of laws, public sector)
5. Samuli Simojoki (Master of laws, private sector, startup coach)
6. Olli Pekonen (IPR director, entrepreneur, inventor, patent attorney)

Ilkka Kivimäki (M.Sc., Industrial Management) is the Chairman and co-founder of Startup Sauna foundation, which aims at connecting the most promising startup companies from Northern Europe and Russia with experienced serial entrepreneurs, investors and media from around the world. In practice the Startup Sauna consists of an internship program for university graduates, an accelerator program for early-stage startups, a yearly conference bringing together the region's early-stage startup ecosystem and a co-working space in Otaniemi. Kivimäki is a serial entrepreneur himself, and has sold one of his companies Wicom Communications to SAP AG in 2007. He is an early-stage investor, and as the chairman of the Startup Sauna he follows the development of a large number of startup companies from idea to execution every year.

Martti Mikkola (M.Sc. Tech.) is a former Senior Advisor for Intellectual Property and leader of the IP team at Foundation for Finnish inventions, where he was teaching and lecturing on IP issues for business advisors and entrepreneurs, evaluating inventions, judging funding applications and managing patenting processes. Currently he works as an IP consultant specializing on small- and medium-sized companies.

Markku Rajala (M.Sc. Physics, electronics) is Intellectual Property Manager at Pegasor Oy, a small Finnish growth company founded in 2008 with global operations in the field of fine- and nanoparticle sensor technologies, representing one of the very few small and young companies with dedicated IP manager and structured IP management. Rajala is a patent attorney and a serial entrepreneur, listed as an inventor in a large number of patents. He is also a board member at Licensing Executives Society LES Scandinavia.

Marja-Leena Mansala (Master of Laws) is Secretary-general of IPR University Center, which is a joint institute between the University of Helsinki, the University of Turku, Aalto University and the Swedish School of Economics and Business Administration, established in 2002. The institute aims to create collaboration between researchers and institutions representing different disciplines and coordinates and promotes education and research into issues of intellectual property rights. The institute arranges courses and seminars and provides information services, stating that in the global context of business and academic research it is impossible to operate without IPR knowledge.

Samuli Simojoki (Master of Laws) is a partner at attorneys at law Borenius with wide experience in technology commercialization and IPR utilization models in different fields of business and technology, advising on intellectual property rights and IPR strategies. He has been involved in the legal matters relating to Finnish startup and technology companies since late 1990s, and has been an IPR coach in Startup Sauna combining legal perspective with the business realities of startup companies.

Olli Pekonen (D.Sc. Electromagnetics, electronics, MBA), is IPR Director at Beneq Ltd., a Finnish SME founded in 2005, currently working on rapidly expanding the company's IPR portfolio. He has experience in growth entrepreneurship, having co-founded APLAC Solutions Corp., which was later on merged with the US company AWR Inc. He is a registered patent attorney, member of the Finland Chamber of Commerce Commission of IPR and the chairman of Finnish Association for Corporate Patent Agents.

The interviews were conducted as semi-structured, with some open-ended questions and general discussion topics to be covered outlined beforehand. As all the interviewees had different backgrounds and the goal of the research was to utilize their extensive, individual experiences to get broad understanding of the phenomenon, room was left in the interview structure for the interviewees to guide the discussion to the areas they

found to be most relevant for the subject. (e.g. Silverman 2006, 110). The research topic was always presented as a first thing in the beginning of the interview, after which in each of the interviews the interviewee shared their experiences and views on the subject in a rather conversational way. Specifying questions were posed when necessary, and towards the end the conversation was guided with open-ended questions to interest areas not yet covered by the interviewee, if there were any. This kind of an open-ended interview structure, resembling a guided conversation, is very typical for case study method (Yin 2003, 90; Eisenhardt & Graebner 2007, 28). The interviews lasted on average approximately 1 hour, and they were all recorded and transcribed. In addition, notes were taken during all of the interviews in order to record observations and also initial analysis of for example connections and differences between different cases (e.g. Eisenhardt 1989, 539).

5.4 Analyzing the data

The empirical data was analyzed by using an open coding method that is typical for grounded theory research. In this kind of coding process, the empirical data presented in the form of text is grouped and organized by recognizing common concepts and themes from the text. (e.g. Silverman 2006, 96; Strauss & Corbin 1990, 61–74) Features of discourse analysis were also used in this phase to study how the interviewees talked about different aspects of IPR strategies. (e.g. Silverman 2006, 223). From these themes and concepts, categories were then formed to function as the foundation for theory formation. Key to this categorization process is constant comparison of the data from each of the interviews, and also from the previous literature. (e.g. Luomanen 2010, 352; Strauss & Corbin 1990, 62).

Once the expert interviews were transcribed, each of the interviews was first read through thoroughly and individually several times and all the lines of the text were numbered. After that, each interview text was first grouped by using the method of open coding, where lines, sentences or even entire paragraphs of the text are sorted by common themes and categories. (e.g. Luomanen 2010, 356–360). Also simple questions such as”what”,”how” and”when” were used to facilitate recognition of potential new categories (Strauss & Corbin 1990, 64). Some parts of text could also belong to several different categories simultaneously. New categories were recognized when processing each transcription, and altogether approximately 20 common themes were recognized, some of them appearing in only one interview transcription and several that were present in all interviews. Some of the categories were more narrow or insignificant including only one or two single comments, whereas some of them clearly turned out to be more central, gathering large amounts of notions from all of the interviewees.

The next step of the coding process was linking themes together, making connections between different categories and combining them where possible (also called *axial coding*). After that, the most central categories were recognized and other categories organized in relation to them (also called *selective coding*). At this point some categories were also recognized as unrelevant and were left out. (e.g. Luomanen 2010, 360–366; Strauss & Corbin 1990). In the end, this categorization was used as a basis for analyzing the expert interviews in chapter 6 and 7.

In the following chapter, the findings of the interviews are presented using the theoretical framework of benefits of IPR registrations outlined in chapter 4. Each of the benefits is discussed and analyzed based on the empirical data, taking into account also the context of startup companies and the aspects related to their lifecycle and financing as presented in chapter 3. The goal is, based on the expert interviews, to evaluate which of the benefits of IPR registration found in earlier literature are feasible and useful in the context of startup companies. In the discussion chapter, a descriptive three-stage model of the levels of IPR usage is formed based on analyzing the discourse and content in the expert interviews. This model can be used to structure and analyze the use of IPRs in a startup company, and it can also be used as a basis for creating an IPR strategy in a startup company.

5.5 Evaluation of the method

Qualitative research is sometimes criticized for being unscientific, only exploratory or subjective due to its interpretative nature. Also the generalizability of the results is often questioned, especially in case study research. (e.g. Denzin & Lincoln 2005, 8; Eisenhardt 1989, 547; Yin 2003, 10; Alasuutari 1995, 231). However, it is noted by Yin (2003, 10) that the same critique can be presented regarding any research and method, which is not carefully conducted and documented, and that criticized case studies have often failed to follow systematic procedures. Regarding the generalizability of results, he notes that similarly to experiments, findings form a single case study can be generalized to theoretical propositions, even though they are not generalizable to populations or universes.

Alasuutari (1995, 237) also points out that generalizability is often not the goal of qualitative research, as the purpose of the study is explaining and describing a phenomenon, not proving its existence. That is also the case in this research, which aims to desrcibe the ways in which a startup company could utilize IPRs in their business. In this research, the data has been collected from experts from different fields and backgrounds all with experience from working with several startup companies, in order to have a well representative sample that does not overlook central aspect of IPR

protection (e.g. Alasuutari 1995, 243). The goal of this is to also increase the inner validity and reliability of the study (e.g. Yin 2003, 34–39; Silverman 2006, 282; Ruusuvuori et al. 2010, 27).

The analysis phase in qualitative studies is often criticized for being the least codified part of the process, and for there sometimes being a huge chasm separating the data from the conclusions derived from it (Eisenhardt 1989, 539; Yin 2003, 10). One reason for this is recognized to be the lack of methodological literature that would provide researchers with the specific procedures to be followed in data analysis (Yin 2003, 10). To avoid this problem and to make the analysis transparent, the coding process and other parts of the analysis used in this research are based on a range of methodology literature and are described in detail in chapter 5.4. Another goal of this explicit description of the methods and processes is to increase the reliability of the study (Silverman 2006, 282; Ruusuvuori et al. 2010, 27). Direct quotations from the interviews are also used when suitable to demonstrate what the analysis is based on (Silverman 2006, 277).

6 FINDINGS

Chapter four outlined altogether 11 benefits that earlier research has recognized to be reasons behind patenting and other IPR protection in companies of different sizes and operating in a variety of industries. To revise, these benefits include:

1. Protecting competitive advantage
2. Generating licensing revenue
3. Preventing others from registering the property
4. Blocking
5. Strengthening positions in negotiations
6. Deterring a patent infringement lawsuit
7. Stimulating an acquisition or an investment
8. Enhancing the company image or credibility
9. Measuring R&D performance
10. Access to markets
11. Motivating personnel

In the expert interviews conducted for this research, benefits relating to the financial lifecycle of the startup company, presented in chapter 3, were seen to be the most central for scalable startup companies. In the above listing, these would belong mainly under categories number 7 and 8, namely stimulating an acquisition or an investment and enhancing the company image or credibility.

Out of the other nine benefits, the three last ones, measuring R&D performance, access to markets and motivating personnel, did not appear in the interviewees' comments at all. Also in previous research these three reasons have been reported to be among the least important reasons for companies' IPR protection. (e.g. Cohen et al. 2000, 17–18; Granstrand 1999, 211; Gilardoni 2007, 423) In the case of startup companies, this could be explained at least to some extent by the fact that as these companies are on the whole rather small organizations, there is no need for specific procedures for measuring R&D performance. There rarely is separate R&D personnel in a startup company and as a consequence using registered IPRs such as the number of granted patents as a motivational or measurement tools might not be as helpful as some other methods. Startup companies also operate on short life spans and with limited financial resources, which leads to them rarely having several or even any actually granted patents, making it a less useful measurement tool. As these three reasons were thereby not considered relevant for the purposes of startup companies by the interviewees, are they also not analyzed further in this chapter. It can be mentioned that they most likely are mainly suited to larger or at least older organizations, and therefore they fall out of the scope of this topic.

The rest of this chapter analyzes first in detail the benefits of IPRs relating to the company financial lifecycle based on the expert interviews, as this was seen as the most central aspect of startup IPR protection. After that, the remaining six benefits recognized as somewhat relevant to startup companies by the interviewees are discussed and analyzed in each of their own section.

6.1 Benefits of IPRs in relation to the financial lifecycle of the startup company

The strongest benefits startups can gain from protecting their intellectual property and registering IPRs seem to be linked with the financial lifecycle of the growth company. These were the categories with most quotations in the open coding process, and in frequency, the benefits relating to the image, credibility, investments and acquisition of the startup company were the ones most often mentioned in the interviews. Using the same categorization and numbering as in the theory chapter, the benefits related to the financial lifecycle of the company are numbers 7 and 8; stimulating an acquisition or an investment and enhancing the company image or credibility (especially in the eyes of potential investors). As in the interviews these two categories were most often treated as one and the same thing, or at least as two aspects to the same end result, they are also discussed together in this chapter. These two benefits of IPRs are analyzed here using the same framework of startup financial lifecycle presented in chapter 3 (Figure 5).

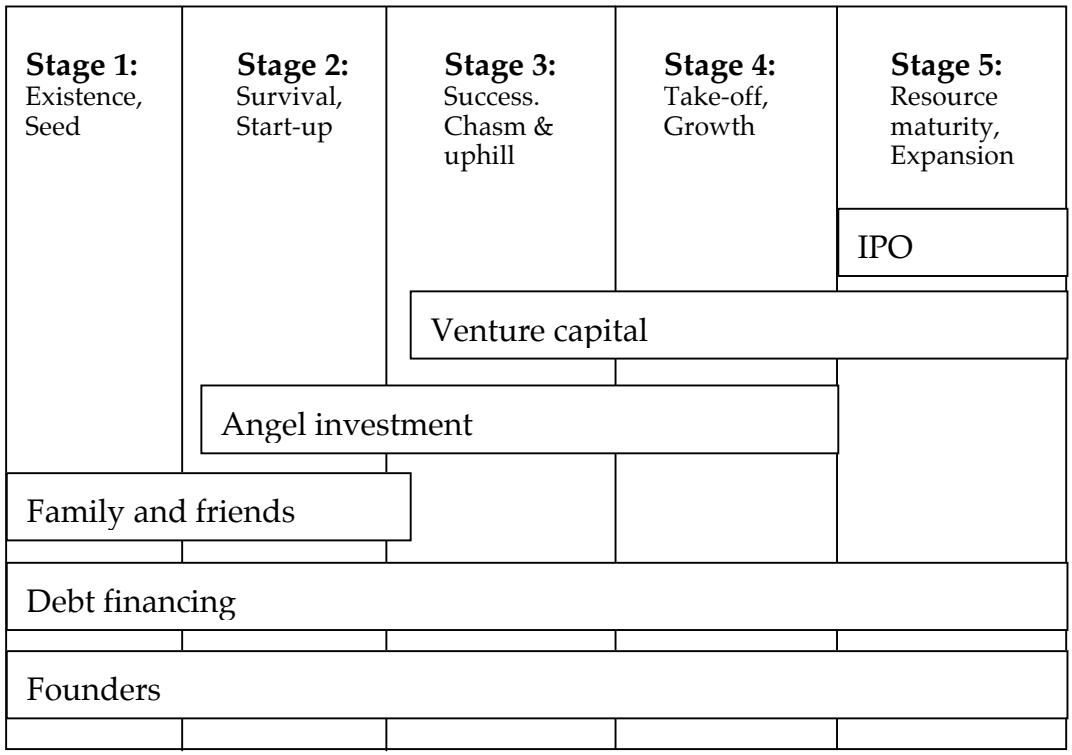

Figure 5 Financial lifecycle of a startup (modified from McNally 1995, 11; Berger & Udell 1998, 623; Churchill & Lewis 1983, 3; Ala-Mutka 2005, 218)

At the earliest stage of the startup lifecycle, the seed or existence phase, the company is mainly operating on funds from the owners and their friends and family. At this point, an official company has not necessarily been founded yet, but it might have a product or a prototype already developed. (Ala-Mutka 2005, 218; Churchill & Lewis 1983, 3–4). At this point, acquisition or investment is hardly topical for a startup company trying to find its first customers. However, in this attempt to attract first users, enhancing the image and credibility of the company is very relevant. Due to the long time spans of granting patents, the company can at best have a pending application, unless the company is utilizing a protected invention that has been invented already some time before starting the company. Other forms of IPR protection are faster to acquire, and can be utlilized already at the very early phase of operations. As the main stakeholders the startup company needs to attract at this phase are new users, IPRs alone can hardly be used for creating a sufficiently attractive image. Product development, sales and marketing play a central role at this stage (Ala-Mutka 2005, 216), and IPRs can be used mainly as a supportive measure. However, it is worth noticing that should the company wish to utilize IPRs at later stages of its lifecycle, it might be necessary to protect relevant IPRs already at this stage. For example for getting patent protection, the invention needs to be new in relation to what was known before the filing date of the application (Patents Act 550/ 1967, §1–2). Therefore any sales or even marketing done

before applying for relevant protection can mean that the startup company looses the opportunity altogether to get patent protection for their invention. As Mansala describes the importance of timing when applying for patent protection:

*Then (*once the product is on the market*) the train has already gone! And most likely it has gone already some time before that.*

Marja-Leena Mansala 1.3.2013

At the second stage of the lifecycle of a startup company, called survival or start-up stage, the company needs to define their business model and can already start attracting some initial, very early stage angel investors. The startup also needs to attract new customers and broaden their user base in order to reach the break-even point and to start growing. (Ala-Mutka 2005, 218; Churchill & Lewis, 4) In attracting these new users, similarly to the first stage, IPRs serve mainly as a supporting function, sales and marketing being more central in reaching potential customers. However, to be able to attract investment already at this very early and uncertain stage, the company needs to be able to communicate to the investors that they have something unique and innovative, and that they also have a way of appropriating returns from their products and services. For this purpose, IPRs can be very useful. For potential investors, granted IPRs can be a signal of the innovativeness of the company's products or servises. They can also enhance the startup's image by showing that the founders are serious about their business, know their market and competitors and understand enough of the functioning of IPR system to apply for appropriate protection. According to Mikkola:

If the company wants outside investment, then IPRs are a good test for seeing if they actually have something original. And in many cases that is already a good enough argument.

Martti Mikkola, 15.2.2013

The third stage of the lifecycle is described as somewhat of a milestone for startup companies, and at this point the startup faces the challenges of transforming from a small new venture into a real growth company. At this point, acquiring angel investment can also be a central concern. (Ala-Mutka 2005, 218). Therefore from this third stage onwards, the role of IPRs as a stimulator of investment can also be emphasized. On the other hand, as increasing credibility in the eyes of investors is one part of stimulating an investment, from this stage forward it is difficult to unambiguously separate between these two benefits. When stimulating an investement, IPRs can also be regarded as a tool for risk management from the investors' point of view in case the startup company does not succeed. A startup company does not have large real assets that could act as a

collateral in case they fail, but for example relevant patents on some core technology can even have a rather high resale value. As Pekonen describes the situation:

In a startup company that does not own forests or gold bars or real estate properties in the city centre of Helsinki, it is an absolute fact that they have nothing else of value, than maybe the IP. - - Even that's hazy. But it's still like having a national lottery coupon with three rounds left in it, once you've already scratched all the other possible tickets.

Olli Pekonen 14.3.2013

The fourth stage of the model is the point when the startup is likely to have an opportunity to attract veture capital investments, as it has enough proof of its viability and potential for extremely fast growth that venture capitalists often look for. (Bagley & Dauchy 1999, 263; Chang 2004, 724–725). When evaluating potential investment targets and making investment decisions, venture capitalists often go through an official due diligence process of the startup company, also including a due diligence of the company's IPRs. At this point, it is essential that the company can transparently show that they have all the necessary rights to the IP they utilize in their business, and also all the contratcs the company has made to for example license IP from other companies. (Carney 2008, 290) According to Kivimäki, any disputes or unclarities related to IPRs at this point can freeze the investment negotiations once and for all. As venture capitalists are scanning through numerous potential investment targets and they have several other options as well, they have no reason to invest in a company that has problems with IPR protection. Also Rajala recognizes the importance of proper IPR management in the due diligence process:

The fact that your IPR portfolio is organized and the entire process is systematic and we can show that we actually own the inventions, we have all the transferring documents and there's a clear process for how we utilize it… For the due diligence process it is tremendously important. So that has been the other reason to keep the portfolio in control.

Markku Rajala, 26.2.2013

In the interviews Mansala also points out that when discussing about IPRs and startup financing, one central challenge is related to the increased amount of products or services based on software. Software is mainly protected by copyright (with some exceptions for example in the US, where software has sometimes also been granted patent protection (e.g. Pikethly 2006, 60–61), which is a right that issues automatically as the product is created. Therefore, as opposed to patents, utility models, trademarks

and industrial designs, there is no official certificate for copyright protected products, or a register where they would be listed. This decreases the value of copyright as a stimulator of investment, as the owner of the copyright has no official record of their property, and the investor has very little chance of verifying the existence and real ownership of the copyright.

At the last stage, labeled resource maturity or expansion, also acquisitions and other exit-opportunities such as initial public offering become relevant considerations. Especially if the startup wishes to be acquired by another company, it needs to be able to demonstrate in detail all aspects related to its IPR portfolio and IP management. For the acquiring firm it is essential to ensure that all the necessary rights to the the intellectual properties, that often are among the central reasons for buying the other company in the first place, are trasferred as a part of the acquisition:

There's the mergers and acquisitions; if for example the entrepreneur wishes to retire and sell the company, then it will matter if things have been tied to the company. If it has some kind of an IPR portfolio.

Martti Mikkola 15.2.2013

Kivimäki recognizes this to be also a central part of the risk management of the acquiring firm. If the acquired company is a small startup, it might have been able to operate in peace from larger competitors in the same industry. New companies with mainly national or very narrow operations are rarely interesting or threatening to other players in the market. They may have even been infringing a larger company's IPRs, intentionally or unintentionally, without any interest or concern from the larger counterpart. However, once the startup is acquired and it becomes part of a larger, more established corporation, any IPR violations or other problems suddenly start to get attention also from competitors. Any problems occurring after the acquisition can turn out to be very expensive for the acquiring company, and therefore the due diligence process conducted prior to acquisition is usually extremely thorough.

There's the example when a larger company acquired a startup with IPR violations in the background… The startup had used some protected material from another large company to support their customers' installations. The other company was not interested when it was just a few guys making their living out of the startup company. So what, no one cares. But once it was acquired, a huge hassle started. One billion for compensation, plus immediatly shutting down the startup, loosing closer to a hundrer million what they had paid for it in the first place… Plus all the time it took. A cosmic mess-up.

Ilkka Kivimäki 14.2.2013

This also goes to show that in relation to enhancing the company image and stimulating an acquisition or an investment, the importance of proper IPR protection and management seems to increase as the startup company matures. This is also logical seeing that investments, acquisitions and exits become more and more relevant to the startup company as it grows. In the beginning the main role of IPR management is to ensure that no protection opportunities are lost unintentionally, and seeking outside investment is not yet topical. As the company grows, opportunities for outside financing increase, and so does the role of IPRs in stimulating these investments.

The role of IPRs in enhancing the company image in the eyes of customers seems to remain rather the same throughout the entire lifecycle of the startup. At some situations it can be valuable for the company to be able to demonstrate their innovativeness by showing that they own the exclusive rights to their products. Otherwise companies tend to emphasize other aspects such as product or service features in their marketing communications. One exception are the trademarks of the company, which can become central for communicating the values the startup brings to its customers. If the trademark becomes a recognized brand of the company, the IPR itself can have great value in enhancing the company image in the eyes of the customers.

As a conclusion it can be said, that enhancing the company's image and credibility is very relevant for a startup company at all stages of its lifecycle and it plays a central role in the success of the startup company. IPR protection is only one part of this image enhancement, and it can be less relevant for the customers of the company, at least until the company has managed to establish a trademark that is recognized and appreciated by the users. In the eyes of potential investors, however, IPRs are a good tool for increasing credibility of the startup and for showing that the company is based on something innovative and unique. When the company is looking for investments from venture capitalists or wishes to be acquired by another company, the importance of proper IPR protection and management increases considerably, and can be very central for the future of the startup company.

6.2 Protecting competitive advantage

The traditional use of IPRs, the protection of competitive advantage and prevention of copying, appeared as a basic benefit achieved with IPR registration also for startup companies in all of the expert interviews, although the degree to which companies can actively utilize this benefit is somewhat industry dependent. For example for companies developing software products or services, the main protection instrument is copyright. Copyright does not require separate registering, making it an easy-to-use instrument for

also startup companies. However, it can be for example more difficult to proove a violation of a copyright than it is of a patent, for which the owner has a clear certificate.

The importance of protecting a competitive advantage seems to also be increasing as the company grows and matures. Similarly to the benefits relating to company image or investments, however, the startup might need to apply for protection already very early on in its lifecycle in order to not to miss any protection opportunities. This, on the other hand, requires that the startup understands the functioning of the IPR system well enough to know this, and also that the startup company understands the aspects of their operations and products or services that could be protected by some IPR instruments.

As in the case of acquisitions, larger companies might not be paying much attention to the products or services of the startup company while it is very small or operates mainly on a national level. However, once it starts to grow, gets proof of its concept and starts to attract more customers, already established companies might be tempted to enter into competition with the startup:

If the speeches given in the beginning about the promising future of the startup, if they come true, then others will be interested as well. Then there's the established, typically larger companies that say that we want to be there as well.

Martti Mikkola 15.2.2013

To make sure that a larger company cannot simply without compensation utilize the startup's innovation once it proves to be viable and profitable, the startup needs to secure some barriers to entry for these other companies. IPR protection is a very efficient barrier in this situation, as it is a legal right to exclude others from exploiting the property, and the only option for others to utilize it is to get licenses from the startup company (e.g. Ham Ziedonis 2004, 806). Other option is to invent around the startup's technology, but that can already mean a delay in the larger company's market entry, giving the startup a head start in the market. Without any barriers, the larger company has the possibility to simply take over the market with their already established reputation, production capacity and distribution and marketing channels.

6.3 Generating licensing reveneue

The interviewees had somewhat differing opinions on whether or not it is feasible for a startup company to generate revenues by licensing their IPRs. According to Kivimäki, getting into licensing business usually requires already a more established position, meaning that by the time that a company is generating revenues by licensing their IPRs, they already are a steady growth company. Also Schox (presentation 4.9.2012) has

come to the same conclusion, saying that licensing a technology requires vast sales efforts, and therefore it usually is not worthwhile for a startup company to try to license their IPRs. Of course the categorizations here also depend on what is considered a startup company and what is seen as an already established company.

The case example of the technology company Pegasor illustrates the situation well; according to Rajala, once the company grew and reached a level where their own capacity was not enough to manufacture any larger quantities to meet the demand, they were faced with a decision: whether they would need to find outside investment to finance building a larger manufacturing unit, or they could expand their business into technology licensing and sell their IPR to other companies, in this case in addition to their own manufacturing and sales operations. The company chose the latter option, and in order to charge proper royalties for their technology, the company started a systematic process for recognizing and protecting their IP.

According to Rajala, the licensing negotiations typically take up to two years of time, which would make it impossible for the small company to survive financially if they did not have their own manufacturing and sales in addition to the technology licensing. This demonstrates the same challenge recognized by Kivimäki and Schox, that licensing as a core of business is a challenging option for a startup company. However, as the case of Pegasor shows, in addition to own operations, licensing can be a suitable way for a startup company to expand and balance their business, while maintaining financial independence.

They (licensing and own manufacturing) *complement each other nicely. Sometimes in one part of business it can look like nothing's going forward, but then in the other part you might be like: "Ha, we made a deal!"*

Markku Rajala 26.2.2013

Another example of successful licensing business is brought up by Mikkola, who mentions Rovio and their trademark Angry Birds as a fast growing and successful business. The trademark is originally recognized from a mobile game carrying the same name and portraying the Angry Birds characters, but subsequently the trademark has been licensed to numerous partners in different manufacturing fields ranging from toys to groceries and to cosmetics industry (e.g. Brightman 2012). This way, the company has been able to generate licensing revenues without any production costs and efforts of their own. On the other hand, this is only possible for a trademark that is highly recognized and valued, making it an unattainable strategy for companies in the early startup phase, but it can be seen as an example of a desirable future state of a high potential startup and as one way of making money with IPRs.

To be able to sell licenses, especially when selling to larger companies, the company has to be able to demonstrate that they actually own the property rights to what they are selling. As Simojoki points out:

If a small Finnish company sells their technology for example to Samsung, and the solution infringes someone else's patent, it is Samsung that is going to be sued, not the small Finnish company.
Samuli Simojoki 8.3.2013

According to Rajala, also the compensation for the license is considerably larger when selling registered IPRs as opposed to some kind of know-how licensing without actual property rights, although that is also technically possible.

It is noteworthy that licensing can concern all different forms of IPRs, from selling copyrighted material to patents, as in the case of Pegasor, or trademarks, as in the case of Angry Birds. As getting a patent granted takes always several years in minimum, regardless of the jurisdiction, getting into patent licensing business takes also a long time and might therefore not be a convenient option for a startup company. However, Rajala points out that utility model protection, which is also used to protect technological solutions but is notably faster and cheaper to obtain that patent, is another option for companies operating in the regions where utility models are used such as Finland, China or Russia. Utility model can be licensed in the same way and for the same price than patent, but the challenge with utility model is that it is only valid for maximum 10 years. Therefore Rajala recommends for example protecting a smaller but significant detail of the invention with utility model, in order to be able to start licensing it, and then applying for patent protection for the larger scale invention. This can be especially efficient strategy for a startup company that does not have steady revenue streams from other sources that would enable the company to wait for the decision from a patent office for several years, but still has some unique solution that they want to protect.

6.3.1 Non-practicing entities

In the interviews, the question of the non-practicing entities (NPEs), the companies that only own and protect IPRs but do not have any production or sales of their own, also came up. These entities, also sometimes addressed in a negative tone as"patent trolls", have generally been regarded as companies that misuse the IPR system and even blackmail companies that use IPRs in a more traditional way to protect their property. However, in the interviews it was mentioned that from the perspective of a startup

company, these NPEs can be even helpful. This is due to an extension of the operations of NPEs; according to some of the interviewees, the NPEs sometimes also take over the legal proceedings from another company in exchange for potential profits that come out of the litigation. The NPEs usually have the financial resources required for the long and expensive court proceedings, whereas for startup companies litigation might be expensive enough to close down the entire company. Therefore, should the startup company be faced with a lawsuit from a larger corporation, the startup has the chance of handing over the court proceedings to the NPE. Should the NPE win the case against the larger company, it gets at least part of the profit as a commission. As the startup company without this help could be forced to close down their operations altogether, it is a very profitable option for them. It is mentioned in the interviews that this way the NPEs can also make the situation more equal between larger and smaller companies, as previously the larger companies have in some cases been able to use their larger size and financial resources to intimidate smaller companies:

These non-practicing entities, it's not so trivial that they would be just some evil abusers of the system. They create new kinds of dynamics to this market where companies that otherwise would not have resources to defend their patents, now are able to do that in a credible way. Large companies of course find this uncomfortable, and they have the power to bring up that perspective in the media as well. Therefore many don't notice that for startup companies this is good chance to get better positions in patent discussions.

Samuli Simojoki 8.3.2013

6.4 Preventing others from registering the property

The fear that someone else will come up with the same solution than your company and will apply for a patent protection is a real concern in small companies, at least in some industries. Company with large resources can avoid these situations by filing for a patent themselves, but for a startup company the situation can be troublesome if they do not have the resources for patenting, and especially if there is a larger company that is active in patenting operating on the same field. In these situations, a feasible solution for the startup company can be to publish the invention by for example filing an application without going to any further proceedings with it. This way the company can effectively prevent anyone from patenting the solution, including themselves, but at the same time they reveal the invention to the public.

According to the interviewees' experiences, this could be a very useful strategy for startup companies, but it is not widely used due to lack of awareness of the functioning

of the patent system. Pekonen also points out that in that case the startup company needs some other competitive edge, as if the invention is published, then both the startup company and larger companies in the industry have the same knowledge. To be able to compete in a situation where all the companies have access to the same invention, the startup company can be in a disadvantaged situation due to for example its lack of financial resources, established distribution channels and relationship. Mansala also points out that even though in practice this strategy can sometimes be helpful, if the company is looking for outside investment, publishing your potentially unique inventions might not be highly regarded by potential investors.

6.5 Blocking

Following the blocking strategy, i.e. protecting also substituting and complementing inventions in addition to the main invention, can be challenging for startup companies, as building extensive IPR protection is a rather costly effort. For startups with scarce resources, pursuing any IPR strategy is in fact feasible mainly when it has the potential to also generate some income, enables the startup to avoid some large risks, or it is otherwise a necessity in order for the startup company to be able to operate.

As mentioned in the theory chapter, blocking is usually used as a way to reach some other end benefits, such as licensing revenues or to strengthen positions in negotiations, although larger companies can also use it only to create obstacles for their competitors (e.g. Cohen at al. 2000, 22). In that sense, the blocking strategy can be worth pursuing for startup companies if it enables the company to either enter important negotiations with other companies, or if it can be a source of licensing revenue for the startup. Rajala gives an example of this from their company:

And of course we also go through competitor's patents, and if we come up with something new, we see if it could be useful for the competitor. And if it is, then we try to protect it in a way that the competitor cannot use it.

Markku Rajala 26.2.2013

This way IPR protection can make it possible for the startup company to get licensing revenues from the other company by blocking for example complementing inventions. Of course licensing negotiations also require some resources from the startup company, at least time. For that reason, utilizing the blocking strategy should be a careful consideration in a startup, and might be mainly useful once the startup is more mature and is able to concentrate on issues that are outside the scope of running their daily operations.

6.6 Strengthening positions in negotiations

Strengthening positions in negotiations is seen to be particularly beneficial in those industries where IPR protection is aggressive and which are dealing with complex products combining numerous patented inventions. In these industries, it can sometimes be even impossible to operate without using others' patented core technologies, which means that companies are forced to obtain licenses from other actors in the market. (e.g. Somaya 2004, 119; Cohen et al. 2000, 19; Bagley 2008, 136; Shapiro 2001, 119). When that is the situation, licensing negotiations become significant in a completely new level. Simojoki describes it with a metaphor from gambling industry:

That's the spirit of the game. If you wish to play, it's nice to have some gaming chips of your own.

Samuli Simojoki 8.3.2013

For startups wishing to operate on those industries, having even some kind of an IPR portfolio can be beneficial. In some cases IPRs can be used just to get access to negotiations with larger companies (e.g. Cohen et al. 2000, 22), but in other situations they can also enable cross-licensing agreement with another company. In this kind of a situation, instead of two companies paying for the right to use each others' IPR protected property, the companies agree on cross-licensing of each others' portfolios, thereby decreasing the transaction costs of both parties. (e.g. Somaya 2004, 119; Shapiro 2001, 119). For a startup company this could provide a way to save their scarce resources. In these situations, however, the IPRs always have to be somehow relevant for the industry and for the other counterpart, to ensure that the ban right held by a startup company does have some effect on the operations of the other company.

Of course it depends on if they in any way bite into the other company's offerings. But the antennas come out immediately on the other side if there's even a theoretical possibility of an infringement. Because then the company thinks that what's easiest for us; start fighting about it, buy the other company away, or just forget about it.

Olli Pekonen 14.3.2013

If the startup company holds IPRs that are in some way useful or threatening to another company, their negotiation position with other companies is from the beginning much stronger than without the IPRs. In addition to licensing negotiations, IPRs can also be useful in different kinds of partnership or sales negotiations. Similarly to licensing negotiations, in these situations IPRs can both help the company to get access to negotiations in the first place, or to help reduce costs for the startup. In any

partnership negotiations which end up with making some kind of a joint development agreement between the startup and another company, it is essential to define what is included in the agreement. Negligently written joint development agreement can for example cause the startup to guarantee the partnering company permission to use the startup's IPR protected property, in the worst case without compensation and in perpetuity.

6.7 Deterring a patent infringement lawsuit

Deterring a patent infringement lawsuit is a rather complicated benefit of IPRs, as it is impossible for a company to measure the times they did not face a lawsuit on the grounds of their IPR portfolio. In the interviews it became apparent, that in the very early stages of their operations, startup companies can usually operate rather undisturbed by larger competitors:

Nobody attacks very small firms. If they don't have any money, then no one's interested. Because it's a waste of time.
Ilkka Kivimäki, 14.2.3013

For this reason, it is also probable that deterring a patent infringement lawsuit mainly concerns startups at the later stages of their operations. However, to be able to build a patent portfolio that would ensure another company to later deter from filing a lawsuit against the startup company, suitable actions to protect the IP should be taken already early on. Once the startup is already operating close to another company and possibly infringing someone else's IPRs, it can already be too late for starting to file for patents, especially if the inventions are already used in the company's products or services.

Another benefit of IPRs, that is similar to deterring a lawsuit and that is also impossible to measure but can be very useful for companies, was mentioned in the interviews; the fact that another company can make the decision of not entering certain markets due to someone else's strong IPRs:

We have been in many of these cases on the other side of the table making these analyses. For example there was one Finnish firm, we did a patent analysis for them with a patent attorney, and they were really excited to have two relevant Finnish patents in one industry. And then when we started looking into it, it turned out that a large Japanese corporation had around 200 global patents that were really close to the two Finnish ones. And then we made some conclusions for how they should develop their business… And the Japanese corporation never found out that this kind of a discussion

ever took place or that their patent portfolio lead into a Finnish company not challenging them in a certain business area.

Samuli Simojoki 8.3.2013

In this case the company considering entering a certain market was smaller than the one already operating on the field. However, the situation can also be the contrary, if the smaller firm's IPRs on a specific field are strong and relevant enough. The company owning the IPRs will never find out if some other company was considering entering a certain market and becoming a competitor of the company, but decided not to do so because of the strong IPR protection held by the other company in that specific market. This benefit is also related to protecting the competitive advantage of a company, since that is the concrete outcome of the protection in this case.

7 DISCUSSION

Previous chapter outlined the benefits that startup companies can gain from utilizing IPRs in their business, using a framework formed from earlier literature regarding reasons for protecting IPRs and a model for startup lifecycle. From the eleven benefits recognized in earlier literature, altogether eight were found to be at least somewhat relevant for startup companies. Out of these eight, two benefits relating to the financial lifecycle of a startup company were emphasized more than others in the expert interviews, and they were recognized to be among the most central ones for startup companies.

In analyzing the potential benefits that startups can have from IPRs, it became apparent that many of the benefits could be fully utilized mainly at the later stages of the startup lifecycle. However, in order to be able to utilize them later, the startup company would have to recognize the benefit and file for appropriate protection already early on. Otherwise it might be that the company is not able to utilize the benefit even at the later stages, as it might for example be too late to apply for a relevant patent.

In addition to this notion of the IPRs being in some cases most beneficial at the later stages of the startup lifecycle, when conducting the interviews, some kind of a chronologic analogy or idea of the dynamic process nature of IPR protection kept appearing in the comments of the experts. These comments included statements like:

Those things are the complete non-brainers, those you just have to do or you'll be totally screwed in there. There's just no other option.

Ilkka Kivimäki, 14.2.2013

The next step, when you become seroius with IP issues, is then to hire Kolster or Papula or Borenius or some other patent law firm to take care of your investment.

Olli Pekonen 14.3.2013

Many companies start off purely defensively; as long as we get to operate undisturbed, we don't want to think about these things. - - But then on some industries, or later when the business develops, a more offensive way may be very relevant.

Samuli Simojoki, 8.3.2013

By analyzing the discourse in the interviews, themes and expressions relating to time and different sophistication levels of IPR protection were categorized as part of the open coding process. Out of these expressions, three groups were distinguished to illustrate three different phases or levels related to IPR protection. These three levels were based on a view that kept appearing in the interviewees' comments of there being some kind

of a minimum level or a beginning, then a moderate middle-stage or a basic level, and finally something refined and sophisticated, some kind of a desired final level. Based on these three groups, a three-step model was formed to illustrate the process from the minimum level of understanding that a startup company should have of IPR issues, through risk management perspective all the way to strategic use of IPRs in business. These three levels are presented in Figure 6.

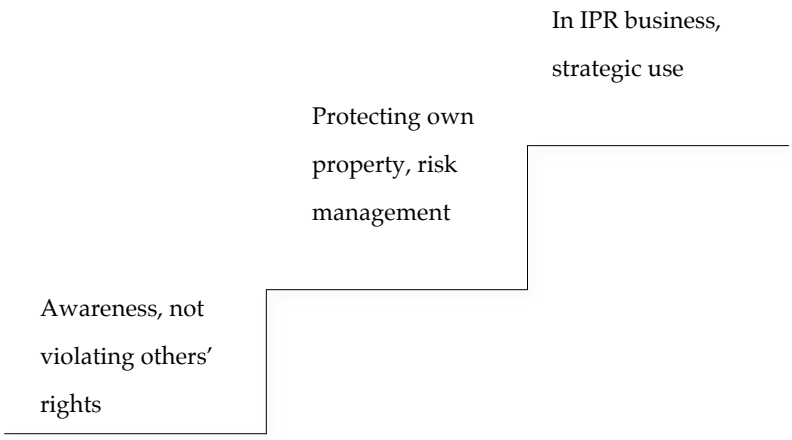

Figure 6 Levels of startup IPR usage

The model can be interpreted either as a process evolving over time, where a company can proceed from one step to the other as it develops and matures over time, or it can be seen as three levels where companies are situated based on how IPR-intensive field are they operating in and how much are they utilizing IPRs in their own business, regardless of the time passing and of the age of the company. The statements and expressions by the interviewees used both variations without a clear distinction between them. The latter interpretation is probably closer to the reality of companies, as it is at least in theory possible to skip some of the steps and for example to start from the day one as a startup company to directly utilize IPRs widely and strategically. Therefore the model cannot also be directly linked to the lifecycle framework of startup companies used in previous chapter, although as the startup company grows and matures, it can be useful for it to move towards the third stage and strategic use of IPRs in order to fully utilize the benefits of IPRs in for example seeking outside investment. Even then, the stages are not separable in the sense that each step always includes more refined practices for IPR management than the previous one, and as a result, the second level contains also everything involved in the first level, and the third level contains everything involved in both of the first two levels. When proceeding to further levels in the model, a company integrates IPRs more closely to their operations and as a result

also the benefits of IPRs described earlier in this research become more widely available to the company. Therefore, to be able to fully exploit the benefits of IPRs, the company should be aiming towards the highest level, the strategic use of IPRs.

If applied to all new companies, irrespective of their industry, strategy and growth targets, for some companies it might indeed be optimal to stay on the first level of the model and not to use any more resources on proceeding to the next levels. For example for a clearly local, not-scalable business such as traditional florist's shop, intensive IPR usage might not bring any added value. However, as this research is concentrated on scalable startups that usually aim to operate on international markets and are often based on some new products, technologies or other innovations, which often contain at least some immaterial aspects such as software or design facilitating the scalability of their business, proceeding to the next stages of the model becomes more significant. The situations where a scalable startup company would benefit most from merely staying on the first stage of the model are quite rare. The following sections discuss each of these three levels of IPR protection. The most central aspects of each of the stages are described, including the practical considerations that companies need to make at each phase.

7.1 Level I: Planning and understanding

The first stage forms the minimum level that a company should understand about IPR matters. This includes the general awareness of the existence of IPRs and the possibilities of protecting IP. This also includes making sure that your business is not violating anyone else's IP rights, in other words verifying the company's freedom to operate.

There is no law requiring you to protect your own IP, but the law does forbid you from violating the rights of others.
Martti Mikkola, 15.2.2013

The interviewees had somewhat differing opinions about whether or not the minimum level of understanding should include also registering some IPRs. According to Kivimäki, Mansala and Simojoki, for a company looking for growth, proper company name and trademark protection is an absolute prerequisite, whereas in Rajala's opinion a company does not necessarily need to register anything, as long as the decision is made wittingly and the matter has been given thought. Notwithstanding, the main idea among all the interviewees is that the company should think about their strategy, and based on that also think about necessary IPR protection.

There is agreement among all the interviewees that understanding the company's own field of business, including some level of competitor analysis also covering their IPRs, is advisable to all scalable startup companies already in the very early phase. Should this studying be postponed or neglected, the company might be basing their plans and strategy on false understanding of the market, which in worst case might cause the entire startup to fail if for example they had planned to operate on a market where a larger competitor holds strong patent rights to core technologies, and the startup is not able to license them. This studying of the market ensures that the startup company understands the environment in which they wish to operate.

Another dimension related to this first phase is controlled sharing of information. Should the company have an invention providing a technical solution to a problem, enclosing that invention to the public too early and unintentionally will result in the company missing the opportunity to protect the invention with a patent in the future. Also, certain parts of the business, such as manufacturing processes or recipes, could turn out to be valuable competitive assets for the company as trade secrets, but once the information is shared it is hard to secure the secret anymore. To realize this need for controlled information sharing, the startup company needs some elementary understanding of the functioning of IPR system.

The key to the entire first level of the model is the consciousness of IPRs. In general, it gives an alarming signal if a startup company looking for growth is not even aware of how IPR issues relate to their business:

So you don't have enough interest in IPRs to stop and think about if your journey comes to an end when you drive straight into someone else's fence?

Martti Mikkola, 15.2.2013

7.2 Level II: Risk management and minimum protection

The second level of the model reflects already a more active approach towards IPRs and on this level the concentration is on risk management and avoiding the largest drawbacks that companies face relating to IPRs. Also the minimum level of protecting own property that every startup company should consider is discussed. For startups looking for growth, latest this phase most likely includes registering some IPRs, as in many situations registering is necessary in order to avoid certain risks. Following sections discuss the largest IPR-related risks recognized by the interviewees and the measures that companies can take in order to avoid them.

Latest at this stage appropriate protection of the names used in the business, whether they are product or service names or the company name or a combination of these,

should be secured in order to avoid certain unwanted situations. Name is recognized by the interviewees as the most important part, as the company is always based on selling something, and for customers to be able to recognize the seller or the product or service, it needs to be called something. In addition to the name, other parts relating to the recognition of the company, such as a logo, could be protected with a trademark if it seen as valuable to the company in differentiating them from the competitors. Securing the trademarks includes also making sure that no one else is operating under the same or a similar name or uses a similar logo in the same industry that causes the risk of confusion in the eyes of customers.

The names and other signs should be chosen taking into account the different regions where the company intends to operate in the future. This is in order to avoid a situation, where the company is forced to operate under different brands in different regions due to someone else's protected trademark, or for example due to awkward association issues with the company name in the local language. Mikkola also points out, that even though the startup company would be planning to operate on a region where at the moment no one is using the same name, it might be that in future there is a new entrant to the market from some other region that has already been using the name in some other markets. It is possible to establish a trademark by use, but in a dispute situation like this it can be rather hard to prove if the trademark has actually been established. Main reason for protecting these names and signs is to make sure that as the company engages in marketing efforts and starts building a brand, the company is also the one benefiting from these investments and the company has the freedom to use the names and signs they have chosen as their distinguishing marks. There can be large costs related to changing a name or a logo after the company has started investing in marketing and producing material, and registering a trademark minimizes the risk of ambiguity in these situations.

One other central aspect recognized as a common error related to IPRs in new ventures is overlooking the transferring of rights from individuals to the company. In essence, this transferring of rights is a question of contract management. IPRs are always personal, assigned to the author or the inventor, and they need to be transferred to a company by some kind of an agreement, for instance as a part of an employment or licensing contract. This applies to all IPRs related to the business, such as copyright to a source code, company logo or the visuals used in the company web pages or marketing material, as well as patents, designs and utility models used in the company's products and processes. This is to ensure that the company actually owns or has the right to use everything they are utilizing in their business:

If the investor or buyer finds out that the company doesn't in reality even own what they think they own, that cannot be compensated for with any amount of dinners. It's a real disaster.

Olli Pekonen, 14.3.2013

According to the interviewees, the startup company should pay particular attention to this transferring of rights in situations when:

- The developing of the startup has begun already when the founders have still been employed by someone else
- Some potentially IPR protected work has already been done before the company was officially founded
- The company has used outside help in some parts of the business, for example in early product development or designing material for the company

Depending on the employment contract, should the startup be somehow related to the same industry than the founder's previous employer, it might be that the IP rights to any parts of the business developed when working for this company actually belong to the former employer. At least the founder might need to prove that no material or resources, such as computers, phones, contact lists or even office supplies, from the previous employer were used in developing IP related to the startup company.

It is common that some work is already put into developing the business idea before an actual company is founded. Before the company exists, formal contracts are not necessarily drawn between people involved in the development of the idea. In this kinds of situations, rights to any part of property developed before the foundation of the company are not automatically transferred to the new company, even though contracts for transferring any rights in the future would be made with all the founders when the company is registered. Especially if the product of the startup is somehow based on an early version developed by some founders or an outside developer, it is crucial to remember to transfer also any necessary earlier rights from these developers to the company.

Also, if the startup company is using outside help in some part of their business, for example if they are using source code or an invention from someone else in their products or services or if they are using a graphic designer to design their logo and brochures, it is important to make sure that also all the necessary IPRs for this material are transferred to the company. This includes also managing the use of open source software in the company's products and services; some licensing terms of open source software include the notion that the product containing this open source software must be distributed under the same open source licensing conditions. This means, that the company might need to for example give the users the right to freely copy and modify

also the new software. This might not always be in the interests of the startup company, and in the case they do not wish to follow these conditions, they should be careful to only use proprietary software in their product development. (See e.g. Open Source Initiative – Licensing).

In addition to transferring the necessary rights form individuals to the company, other parts of contract management are also essential in decreasing risks related to IPRs. As IPRs are immaterial in nature, even defining what the IPR consists of is a matter of agreement. Therefore, whenever buying, selling or licensing IPRs, it is necessary to define what the traded object actually is and what rights are transferred. Central in this overall contract management is the process of drawing up and documenting the contracts. Proper documentation is necessary in case any kind of disputes arise regarding the rights to the property. A clear, structured process minimizes the risk of overlooking the transferring of necessary rights. Also, having standardized, carefully written contract templates decreases the risk of unintentionally entering into unprofitable or even harmful agreements, for example due to too broadly defined scope of the contract. In the early phase of business, the startup company might for example be tempted to grant very broad rights to their first customers in order to ensure successful sales negotiations, but if this is not done negligently, the consequences for the future of the company might be detrimental.

With one poor IP-agreement, a company can drown themselves completely. And in the early phase, the lawyers are not needed for fighting or avoiding disputes, but they are needed for ensuring that the company does not unintentionally make an agreement where they give out too much, especially without compensation.

Olli Pekonen, 14.3.2013

7.3 Level III: Towards strategic use of IPRs

The latest stage forms a situation where IPRs are an inseparable part of the company's strategy. IPRs are not only regarded as necessary tools in avoiding risks, but they are in the center of the company's value creation. The interviewees' comments related to this last stage were partly describing a company being "in IPR business", illustrated with some real case examples, and partly it was described as a desirable future scenario that companies should strive for.

IPR as such, it's like a tool in a closet. Nice to have, but it has no value in itself. - - But IPR plus a contract; when it's used for something, when someone else needs it –

that's the picture of a Euro. - - It's the more refined thing, owning something that has value for someone else.

Martti Mikkola 15.2.2013

To be able to use IPRs strategically, the company needs to thoroughly understand the functioning of the IPR system and the potential benefits it creates. Therefore, the model also reflects the deepening of understanding as the company moves from mere awareness of IPRs in the first stage to the level where the company has enough knowledge to be able to fully exploit the benefits generated by the IPR system in the last stage. This evolution could happen suddenly, requiring probably in most cases some outside help and studying done by the founders, or it can develop gradually alongside the general maturing of the company. If the founder of the startup already is familiar with the IPR system, the startup company could also use IPRs strategically from the very beginning:

One reason for why we did it like this (utilized IPRs strategically in their business since the beginning) *is that me and another one of our people had worked with IPRs previously, and, well, a third guy had an inventor background. So we had pretty good understanding of the opportunities of IPRs at the time the company was founded. That's probably where it originates.*

Markku Rajala 26.2.2013

Some correlation could possibly be also detected between the financial lifecycle of the startup company presented in the earlier chapters and the evolution of startup's IPR usage towards the strategic use. As issues such as seeking outside investment become more relevant for the startup company as it matures, also the utilization of IPRs in a strategic way, for example as a way to enhance the credibility of the company in the eyes of potential investors and to stimulate an investment, becomes more relevant.

Another central issue related to the strategic use of IPRs, is that the use of IPRs needs to be firmly linked to the overall strategy of the startup company. The overall strategy needs to take into account the opportunities provided by the company's IPR portfolio, and utilize them in pursuing the company's strategic goals.

Success ultimately comes down to building IPR strategies that are an integral part of your business strategy.

Samuli Simojoki, 8.3.2013

This includes also the constant evaluation and development of the startup's IPR portfolio. As the company and the market evolve, also the IPR portfolio of the startup

company should be developed to respond to the new challenges and opportunities arising from the new situations:

Patent and patent portfolio is by no means static, it is a very dynamic tool that needs to be maintained and updated constantly. It requires a lot of work that cannot be externalized.

Markku Rajala 26.2.2013

This emphasizes the fact that if the company wishes to utilize IPRs strategically in their business, it is essential to have the understanding of the IPR system inside the company, as such an integral part of company's strategic planning cannot merely be outsourced to a patent attorney or a law firm. It is essential to understand the capabilities and future expectations of the startup company when formulating the IPR strategy, as it is not enough to only look at current markets, products and services of the company. Seeing where the company's product development is going, recognizing potential future markets and thinking about possible new business areas are part of building the startup company's strategy. Understanding how IPRs can be best utilized in these future scenarios, and recognizing the scenarios in which IPRs provide the strongest support for the business, is in the essence of strategic utilization of IPRs.

8 CONCLUSIONS

The interest for this topic arises when a small, young company is aiming to the same markets with large, established players with vast resources, and is looking to compete with them even though the company only has short operating history and usually very limited resources. In this situation, the small company needs to play by the same rules and face the same challenges than all the established actors in the market, but they might not be able to fully exploit all the possibilities available. For example, the role of intellectual property rights has increased significantly alongside the intellectualization of business, and companies in some industries have widely adopted offensive IPR strategies to strengthen their positions in licensing negotiations (e.g. Gilardoni 2007, 423). However, the building of patent portfolio necessary for this kind of a strategy is a very capital-intensive effort, and therefore not often feasible for a company in the beginning of its lifecycle. This means, that the small startup company needs to be even smarter in planning their strategy and in using their scarce resources.

The questions this research aimed to answer are:

1. What are the benefits that a startup company seeking high growth can have from protecting their IPRs?
2. In what ways can the startup company achieve those benefits?

From earlier research, altogether eleven benefits that companies can attain by registering IPRs were recognized. Startup companies were discussed from the basis of a lifecycle model, describing the different phases that new ventures go through, from the very beginning towards becoming established growth companies. As sufficient financing is a general obstacle for growth in new ventures (e.g Churchill & Lewis 1983, 7; Rosenbusch, Brinckmann & Müller 2013, 335; Deeds, DeCarolis & Coombs1997, 32), also the available financing options at different stages of the lifecycle model were presented.

To find out which of the eleven benefits of IPR registration recognized in earlier literature are feasible for these startup companies at different stages of their lifecycle, six in-depth interviews were conducted with experts from different backgrounds and fields, all with broad experience in working with IPR issues and startup companies. Based on the expert interviews, eight out of the eleven benefits were recognized as somewhat relevant for startup companies. These benefits include: 1) protecting competitive advantage, 2) generating licensing revenue, 3) preventing others from registering the property, 4) blocking, 5) strengthening positions in negotiations, 6) deterring a patent infringement lawsuit, 7) stimulating an acquisition or an investment and 8) enhancing the company image or credibility. Out of these eight benefits, most emphasis was given in the interviews to the last two, namely stimulating an acquisition

or an investment and enhancing the image of the startup company. These two benefits are linked to the financing of the startup company, and in the interviews they were to large part discussed as one and the same thing. When analyzing these two benefits in relation to the startup lifecycle framework including the different financing options available, it was recognized that IPRs can play a central role in enhancing the image and credibility of the startup company especially at the eyes of potential investors, once the startup company has reached sufficient growth level to start attracting outside investment. According to the framework, this is usually after the second or third level of the five-stage lifecycle model (Ala-Mutka 2005, 218).

After that, results of the expert interviews related to the remaining six benefits were discussed in the context of the startup lifecycle. Also here it could be recognized, that in many cases the benefits become relevant for the startup company only once it reaches a certain level of growth and maturity. However, to be able to utilize the benefit, it is often necessary for the startup company to take some measures to protect their IPRs already earlier, as some protection opportunities might not be available at later stages.

Based on the expert interviews, a descriptive three-stage model was then formulated to reflect different levels of IPR usage in startup companies. The first level, which presents the minimum level of understanding that each startup company should have of IPRs, includes awareness of the system and not violating others' rights. The second stage of the model represents a risk-management view, concentrating on securing a minimum protection of the startup company's own IPRs, contract management as well as implementing relevant processes for handling IPR-related matters. The last stage of the model desrcribes strategic use of IPRs, where IPRs are a firm part of the company's overall strategy and are used for the startup company's value creation.

As a conclusion it can be said, that there are clear benefits from IPR registration also relevant for startup companies. As at the earliest stages of a startup company's lifecycle the concentration is on obtaining the first customers and delivering the products or services contracted for (e.g. Churchill & Lewis 1983, 3), IPRs do not necessarily play a large role in the very beginning of the startup's lifecycle. However, as startup companies looking for growth often need outside financing in order to accelerate their growth, also IPRs become relevant for the startup's strategy as it matures. Also other benefits become mainly relevant for the startup company as it grows; for example, small, early stage startup companies rarely have to be concerned about facing a patent infringement lawsuit, but once the company becomes large enough to pose a threat to existing companies, this attitude can change, and at that point the startup might be able to utilize their IPRs to deter the lawsuit. In order to be able to utilize all of these benefits, the startup company might need to take some actions already early on to protect its IPRs. For example for getting patent protection, absolute newness is required of the invention. Therefore the startup company needs to apply for relevant protection

already before introducing the invention to the market. The very first step towards utilizing IPRs in business is therefore the startup company's awareness and understanding of the functioning of the IPR system, so that the company knows what kind of protection is available and what are their needs regarding protection.

8.1 Evaluation of the research

In this research, six experts from different fields were interviewed to get an understanding of the benefits that startup companies with scarce resources in the beginning of the company lifecycle could gain by registering IPRs. Even though the interviewees represented different disciplines and backgrounds in order to cover a broad range of factors affecting startup IPR strategies, even deeper understanding could be reached by for example in addition conducting detailed case studies with successful startup companies from different industries that have utilized IPRs in their business. As benefits relating to the financial lifecycle of startup companies appeared to be the most central ones in the opinions of the interviewees, interviewing also venture capitalists would provide additional insights on the importance of IPRs. In this study only one angel investor was representing the point of view of the financiers of startups.

This study used Finnish legislation as a basis. Also all the interviewees were Finnish and working for Finnish companies or agencies, although almost all with also international operations. Even though the concentration was on scalable startup companies looking for growth and aiming at international markets, the research as such may not be fully applicable to all geographic regions, due to at least differences in legislation and regulations. For a global understanding of startup IPR strategies, a more thorough studying of differencies between different regions would be needed.

In this research, a framework has been formed to analyze the different benefits that startup companies can have from IPR registrations at different phases of their lifecycle. This framework is based on earlier literature and interviews with experienced experts from different fields. In addition, a descriptive three-stage model is formed based on the expert interviews, in order to describe different levels of IPR usage in startup companies. Both the framework and the three-stage model are theoretical models. In order to evaluate in reality the significance of each of the benefits recognized relevant for startup companies in this theoretical model, further quantitative testing of the framework would be needed. Also, studying the actual levels of IPR usage in startup companies in relation to the three-stage model could give further understanding of the ways in which IPRs are currently used in startups. The correlation between the startup company's success and the level of its IPR usage could be studied in order to test the model and to estimate the relevance of IPRs in startup companies' success.

8.2 Implications for future research

As the field of IPR strategies in the beginning of the company life cycle remains rather unobserved, this study has evoked multiple interesting implications for potential future research that could contribute to the understanding of this phenomenon. First, as in the expert interviews conducted for this study, the benefits of IPRs relating to the financial cycle of the startup company were seen as the most pivotal ones, it would be interesting to study more closely the role of IPRs in these situations. There already is a considerable amount of research done on valuation of IPRs in mergers and acquisitions (see e.g. Bryer & Simensky 2002), but again the concentration has been on larger, established companies. To study these situations from the point of view of a startup company could provide new insights on the significance of IPRs in the strategies of startup companies. Another dimension related to the early stage of new ventures would be to study, how often and how heavily have IPRs affected the financing decisions made by angel investors and venture capitalists. This could provide useful statistics on the significance of IPRs for startups, and it could also help startup companies to evaluate the potential return on investments regarding their IPRs.

Second aspect related to startup IPR strategies that became clear during this study, is the fact that as a startup company is all the time looking for validation of their concept and exploring the surroundings in order to find a suitable product-market-fit, they often also need to adapt to changing situations and redirect their strategies quickly. Based on feedback from users, financers and other stakeholders, the startup company's plans might be transforming considerably along the way. (e.g. Churchill & Lewis 1983, 11). As it is emphasized in the interviews and previous literature, the use of IPRs should be closely integrated with the company's overall strategy. (e.g. Chasser & Wolfe 2010, 2–4). However, if in a startup company the strategy keeps changing over time, how can the IPR strategy then be tailored to fit the changing prospects of the company? Studying how a company's IPR portfolio can be adapted to changes in operating environment could provide new insights for building a dynamic IPR portfolio.

It is clear that one obstacle for the use of IPRs in startup companies is the lack of understanding of the functioning of the IPR system. Some measures have alreade been taken to improve the situation, but even more is needed in order to enable startup companies to fully utilize IPRs in their business. One aspect of this could be to look at startup companies that have successfully utilized IPRs, and use them as case examples for improving the understanding of successful startup IPR strategies. Some research has been conducted to measure the correlation between venture capital financing and the success of a startup company (e.g. Davila, Foster & Gupta 2003). Similar kind of research could be conducted to measure if registered IPRs are linked to the eventual success of the startup company.

LIST OF REFERENCES

Ala-Mutka, Jukka (2005) *Strategic management of high growth ventures. A venture-to-capital framework for professional entrepreneurship.* E-Business research center eBRC, Tampere University of Technology and University of Tampere. Research reports 23.

Alastalo, Marja – Åkerman, Maria (2010) Asiantuntijahaastattelun analyysi: Faktojen jäljillä. In: *Haastattelun analyysi,* eds. Ruusuvuori, Johanna – Nikander, Pirjo – Hyvärinen, Matti, 372–392. Vastapaino, Tampere.

Alasuutari, Pertti (1995) *Laadullinen tutkimus.* 3rd renewed ed. Vastapaino, Tampere.

Anderson, Brian S. – Eshima, Yoshihiro (2013) The influence of firm age and intangible resources on the relationship between entrepreneurial orientation and firm growth among Japanese SMEs. *Journal of business venturing,* Vol. 28, 413–429.

Bagley, Constance – Dauchy, Graig (1999) Venture capital. In: *The entrepreneurial venture*, eds. Sahlman, William – Stevenson, Howard – Roberts, Michael – Bhidé, Amar, 262–303, Harvard Business School Press, Boston.

Bagley, Margo A. (2008) Patents and technology commercialization: issues and opportunities. In: *Technological innovation: generating economic results,* eds. Libecap, Gary D. – Thursby, Marie C., 117–147. Emerald group publishing limited.

Barret, Bill (2002) Defensive use of publication in an intellectual property strategy. *Nature biotechnology,* Vol. 20, 191–193.

BBC News 18.10.2012. Apple loses UK tablet design appeal versus Samsung. http://www.bbc.co.uk/news/technology-19989750, retrieved 1.5.2013.

Bently, Lionel – Davis, Jennifer – Ginsburg, Jane C. (eds.) (2010) *Copyright and piracy: an interdisciplinary critique.* Cambridge University Press, Cambridge.

Berger, Allen N. – Udell, Gregory F. (1998) The economics of small business finance: the roles of private equity and debt markets in the financial growth cycle. *Journal of banking and finance,* Vol. 22, 613–673.

Bhidé, Amar (1999) Developing startup strategies. In: *The entrepreneurial venture*, eds. Sahlman, William – Stevenson, Howard – Roberts, Michael – Bhidé, Amar, 121–137, Harvard Business School Press, Boston.

Bhidé, Amar (1992) Bootstrap finance: the art of startups. *Harvard business review,* Vol. 70 (6), 109–117.

Boldrin, Michele – Levine, David K. (2008) *Against intellectual monopoly*. Cambridge University Press, New York.

Brightman, James (2012) Angry Birds licensing generated 30 % of Rovio's revenues in 2011. *Games industry international,* 7.5.2012. http://www.gamesindustry.biz/articles/2012-05-07-angry-birds-licensing-generated-30-percent-of-rovios-revenues-in-2011, retrieved 1.5.2013.

Bryer, Lanning – Simensky, Melvin (eds.) (2002) *Intellectual property assets in mergers and acquisitions.* John Wiley & Sons, New Jersey.

Candelin-Palmqvist, Hanni – Sandberg, Birgitta – Mylly, Ulla-Maija (2012) Intellectual property rights in innovation management research. *Technovation,* Vol. 32, 502–521.

Carney, William J. (2008) Venture capital financing and documentation. In: *Technological innovation: generating economic results,* eds. Libecap, Gary D. – Thursby, Marie C., 287–311. Emerald group publishing limited.

Cassar, Gavin (2004) The financing of business start-ups. *Journal of business venturing,* Vol. 19, 261–283.

Chang, Sea Jin (2004) Venture capital financing, strategic alliances, and the initial public offerings of Internet startups. *Journal of business venturing,* Vol. 19, 721–741.

Charmaz, Kathy (2005) Grounded theory in the 21st century. Applications for advancing social justice studies. In: *Sage handbook of qualitative research,* 3rd edition, eds. Denzin, Norman K. – Lincoln, Yvonna S., 507–535. Sage Publications, California.

Chasser, Anne H. – Wolfe, Jennifer C. (2010) *Brand rewired. Conncecting intellectual property, branding and creativity strategy.* John Wiley & Sons, New Jersey.

Chua, Jess H. – Chrisman, James J. – Kellermanns, Franz – Wu, Zhenyu (2011) Family involvement and new venture debt financing. *Journal of business venturing,* Vol. 26, 472–488.

Churchill, Neil C. – Lewis, Virginia L. (1983) The five stages of small business growth. *Harward Business Review,* May–June.

Cohen, Wesley M. – Nelson, Richard R. – Walsh, John P (2000) Protecting their intellectual assets: appropriability conditions and why U.S. manufacturing firms patent (or not). *NBER Working paper series, working paper 7552.*

Dahl, Darren (2013) Building a startup that makes it past 5 years. http://www.forbes.com/sites/fedex/2013/03/12/building-a-startup-that-makes-it-past-5-years/, retrieved 18.4.2013.

Davila, Antonio – Foster, George – Gupta, Mahendra (2003) Venture capital financing and the growth of startup firms. *Journal of business venturing,* Vol. 18, 689–708.

De Bettignies, Jean-Etienne – Brander, James A. (2007) Financing entrepreneurship: bank finance versus venture capital. *Journal of business venturing,* Vol. 22, 808–832.

DeCastro, Julio O. – Balkin, David B. – Shepherd, Dean. A (2008) Can entrepreneurial firms beneft from product piracy? *Journal of business venturing,* Vol. 23, 75–90.

Denzin, Norman K. – Lincoln, Yvonna S. (2005) *The Sage handbook of qualitative research.* 3rd edition, Sage Publications, California.

Eisenhardt, Kathleen M. (1989) Building Theories from Case Study Research. *The Academy of Management Review*, Vol. 14, No. 4, 532–550.

Eisenhardt, Kathleen M. – Graebner, Melissa E. (2007) Theory Building From Cases: Opportunities and Challenges. *Academy of Management Journal,* Vol. 50 No. 1, 25–32.

Eriksson, Päivi – Kovalainen, Anne (2008) *Qualitative Methods in Business Research.* Sage Publications, London.

Ernst, Holger (1995) Patenting strategies in the German mechanical engineering industry and their relationship to company performance. *Technovation,* Vol. 15, No. 4, 225–240.

European Commission – Seed and start-up finance (2013). http://ec.europa.eu/enterprise/policies/finance/risk-capital/start-up-finance/, retrieved 18.4.2013.

European Commission – SMEs (2013). http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm, retrieved 18.4.2013.

European Union, Summaries of EU legislation. http://europa.eu/legislation_summaries/internal_market/businesses/intellectual_property/index_en.htm , retrieved 11.12.2012.

Fuller, Anne W. – Thursby, Marie C. (2008) Technology commercialization: cooperative versus competitive strategies. In: *Technological innovation: generating economic results,* eds. Libecap, Gary D. – Thursby, Marie C., 227–250. Emerald group publishing limited.

Gans, Joshua S. – Stern, Scott (2003) The product market and the market for "ideas": commercialization strategies for technology entrepreneurs. *Research Policy,* Vol. 32, 333–350.

Gilardoni, Elena (2007) Basic approaches to patent strategy. *International Journal of Innovation Management,* Vol. 11 (3), 417–440.

The Governement's resolution on the strategy concerning intellectual property rights (2009). http://www.tem.fi/files/22788/vn_periaatepaatos_ipr_strategia_en.pdf , retrieved 11.12.2012.

Graham, Stuart J. H. (2008) Beyond patents: the role of copyrights, trademarks, and trade secrets in technology commercialization. In: *Technological innovation: generating economic results,* eds. Libecap, Gary D. – Thursby, Marie C., 149–170. Emerald group publishing limited.

Gregorio, Dante Di – Shane, Scott (2003) Why do some universities create more startups than others? *Research Policy,* Vol. 32, 209–277.

Hall, Bronwyn H. (2007) Patents and patent policy. *Oxford Review of Economic Policy,* Vol. 23 (4), 568–540.

Hall, Bronwyn H. – Ham Ziedonis, Rosemarie (2001) The patent paradox revisited: an empirical study of patenting in the US semiconductor industry 1979-1995. *Rand Journal of Economic*s Vol. 32, No.1, 101–128.

Hallenborg, Louise – Ceccagnoli, Marco – Clendenin, Meadow (2008) Intellectual property protection in the global economy. In: *Technological innovation: generating economic results,* eds. Libecap, Gary D. – Thursby, Marie C., 63–116. Emerald group publishing limited.

Ham Ziedonis, Rosemarie (2004) Don't fence me in: fragmented markets for technology and the patent acquisition strategies of firms. *Management Science,* Vol. 50 (6), 804–820.

Hanel, Petr (2006) Intellectual property rights business management practices: A survey of the literature. *Technovation*, Vol. 26, 895–931.

Harrison, Suzanne – Sullivan, Patrick H. (2000) Profiting from intellectual capital: learning from leading companies. *Industrial and Commercial Training*, Vol. 32 (4), 139–148.

Harrison, Suzanne – Sullivan, Patrick H. (2011) *Edison in the boardroom revisited: How leading companies realize value from their intellectual property.* 2nd ed. Hoboken, Wiley, USA.

Harvey, Michael G. – Lusch, Robert F. (1995) Expanding the nature and scope of due diligence. *Journal of business venturing,* Vol. 10, 5–21.

IBM Press Release 11.1.2012. *IBM breaks U.S. patent record; Tops patent list for 19th consecutive year.* http://www-03.ibm.com/press/us/en/pressrelease/36463.wss , retrieved 28.1.2012.

Iversen, Eric – Mäkinen, Iiro – Lööf, Hans – Oh, Dong-huyn – Jespersen, Svendt – Junge, Martin – Bech, Jonas (2009) Small Nordic enterprises, developing IPR in global competition. *The Royal Institute of Technology, CESIS Eletronic Working Paper Series,* Paper No. 178.

Kang, Sung Jin – Seo, Hwan Joo (2006) Do strong intellectual property rights induce more patents? In: *Economic and management perspectives on intellectual property rights,* eds. Peeters & van Pottelsberghe de la Potterie, 129–148, Palgrave Macmillan, Hampshire.

King, Steven – Timmins, Geoffrey (2001) *Making sense of the industrial revolution: English economy and society 1700–1850.* Manchester University Press, Manchester.

Kotha, Reddi– George, Gerard (2012) Friends, family or fools; entrepreneur experince and its implications for equity distribution and resource mobilization. *Journal of business venturing,* Vol. 27, 525–543.

Lambert, Jane (2009) *Enforcing Intellectual Property Rights: A concise guide for businesses, innovative and creative individuals.* Ashgate publishing Group, Abingdon, Oxon, UK. http://site.ebrary.com.libproxy.aalto.fi /lib/aalto/docDetail.action?docID=10276585

Lanjouw, Jean O. – Lerner, Josh (1997) The enforcement of intellectual property rights: a survey of the empirical literature. *NBER Working paper series, working paper 6296.*

Lanjouw, Jean O. – Schankerman, Mark (2004) Protecting intellectual property rights: are small firms handicapped? *Journal of law & economics,* Vol. 47, No. 1, 45–74.

Levin, Richard C. – Klevorick, Alvin K. – Nelson, Richard R. – Winter, Sidney G. (1987) Appropriating the returns from industrial research and development. *Brookings Papers on Economic Activity,* 3, 783– 831.

Littunen, Hannu – Tohmo, Timo (2003) The high growth in new metal-based manufacturing and business service firms in Finland. *Small business economics,* Vol. 21, 187–200.

Lockett, Andy – Murray, Gordon – Wright, Mike (2002) Do UK venture capitalists still have a bias against investment in new techology firms. *Research policy,* Vol. 31, 1009–1030

Luomanen, Jari (2010) Straussilainen grounded theory -menetelmä. In: *Haastattelun analyysi,* eds. Ruusuvuori, Johanna – Nikander, Pirjo – Hyvärinen, Matti, 351–371. Vastapaino, Tampere.

Lönnqvist, Antti – Kujansivu, Paula – Antola, Juha (2005) *Aineettoman pääoman johtaminen.* Tammerpaino, Tampere.

MacDonald, Stuart (2004) When means become ends: considering the impact of patent strategy on innovation. *Information Economics and Policy,* Vol. 16, 135-158.

Maier, John B. – Walker, David A. (1987) The role of venture capital in financing small business. *Journal of business venturing,* Vol. 2, 207–214.

Mansfield, Edwin (1986) Patents and innovation: an empirical study. *Management science*, Vol. 32, No. 2, 173–181.

Mason, Colin M. – Harrison, Richard T. (2002) Is it worth it? The rates of return from informal capital investments. *Journal of business venturing,* Vol. 17, 211–236.

McNally, Kevin (1995) Corporate venture capital: the financing of technology businesses. *International journal of entrepreneurial behaviour & research,* Vol. 1, No. 3, 9–43.

Monk, Ashby H. B. (2009) The emerging market for intellectual property: drivers, restrainers and implications. *Journal of Economic Geography,* Vol. 9, 469–491.

Moore, Geoffrey A. (2002) *Crossing the chasm: Marketing and selling disruptive products to mainstream customers.* 3rd ed. Harper Collins Publishers, New York.

National Board of Patents and Registration of Finland – Exclusive right to a company name (2011). http://www.prh.fi/en/kaupparekisteri/yritystennimet/yksinoikeus.html, retrieved 2.5.2013.

National Board of Patents and Registration of Finland – Price list (2013) http://www.prh.fi/fi/prh_palvelut_ja_tietoa_ prhsta/prh_hinnastot.html, retrieved 12.2.2013

Oesch, Rainer – Rinkineva, Marja-Leena – Hietamies, Heli – Puustinen, Karri (2005) *Mallioikeus: muotoilun suoja.* Talentum, Helsinki.

Open Source Initiative – Licensing. http://opensource.org/licenses, retrieved 10.4.2013.

Palfrey, John G. (2012) *Intellectual property strategy.* The MIT press, Cambridge.

Petrusson, Ulf (2004) *Intellectual Property & Entrepreneurship: Creating Wealth in an Intellectual Value Chain.* Center for Intellectual Property Studies, Chalmers University of Technology, Göteborg.

Pietilä, Ilkka (2010) Ryhmä- ja yksilöhaastattelun diskursiivinen analyysi. Kaksi aineistoa erilaisina vuorovaikutuksen kenttinä. In: *Haastattelun analyysi,* eds. Ruusuvuori, Johanna – Nikander, Pirjo – Hyvärinen, Matti, 212–241. Vastapaino, Tampere.

Pikethly, Robert H. (2006) Business method patents and venture capital investment decisions. In: *Economic and management perspectives on intellectual property rights,* eds. Peeters & van Pottelsberghe de la Potteri*,* 58–79, Palgrave Macmillan, Hampshire.

Pisano, Gary (2006) Profiting from innovation and the intellectual property revolution. *Research Policy,* Vol. 35 (2006) 1122–1130.

Powell, Walter W. – Snellman, Kaisa (2004) The knowledge economy. *Annual Review of Sociology,* Vol. 30, 199–220.

Rajala, Markku (2012) Toiminnanvapaus. Seminar presentation in: Teknologiayrityksen IPR-perusteet, 4.12.2012, Vantaa.

Rivette, Kevin G. –Kline, David (2000a) Discovering new value in intellectual property. *Harvard Business Review*, 1–2.

Rivette, Kevin G. – Kline, David (2000b) *Rembrandts in the attic: Unlocking the hidden value of patents.* Harvard business school press, Boston.

Romain, Astrid – van Pottelsberghe de la Potterie, Bruno (2006) On the relationship between patents and venture capital. In: *Economic and management perspectives on intellectual property rights,* eds. Peeters & van Pottelsberghe de la Potteri, 222–237, Palgrave Macmillan, Hampshire.

Rosenbusch, Nina – Brinckmann, Jan – Bausch, Andreas (2011) Is innovation always beneficial? A meta-analysis of the relationship between innovation and performance in SMEs. *Journal of business venturing,* Vol. 26, 441–457.

Rosenbusch, Nina – Brinckmann, Jan – Müller, Verena (2013) Does acquiring venture capital pay off for the funded firms? A meta-analysis on the relationship between venture capital investment and funded firm financial performance. *Journal of business venturing,* Vol. 28, 335–353.

Ruusuvuori, Johanna – Nikander, Pirjo – Hyvärinen, Matti (eds.) (2010) *Haastattelun analyysi.* Vastapaino, Tampere.

Sahlman, William A. – Stevenson, Howard H. – Roberts, Michael J. – Bhidé, Amar (eds.) (1999) *The entrepreneurial venture.* 2nd ed. Harvard Business School Press, Boston.

Salkind, Neil J. (2012) *Exploring research.* 8th ed. Pearson, New Jersey.

Schox, Jeffrey (2012) What do startups need to know about patent law? Presentation at Aalto Design Factory 4.9.2012. Availbale online at: http://www.youtube.com/watch?v=hyv75d4JG7c.

Shapiro, Carl (2001) Navigating the patent thicket. *Innovation policy and the economy*, Vol. 1, 119–150.

Siegel, Donald S. – Wright, Mike (2007) Intellectual property: the assessment. *Oxford Review of Economic Policy*, Vol. 23 (4), 529–540.

Silverman, David (2006) *Interpreting qualitative data.* 3rd edition, Sage Publications, London.

Silverman, David (1985) *Qualitative Methodology and Sociology. Describing the Social World.* Gower Publishing Company Limited, Aldershot.

Smith, Michele – Hansen, Frederick (2002) Managing intellectual property: a strategic point of view. *Journal of Intellectual Capital,* Vol. 3(4), 366–374.

Somaya, Deepak (2004) *Firm strategies and trends in patent litigation in the United States*. In Libecap (ed.) *Intellectual property and entrepreneurship* (Advances in the study of entrepreneurship, innovation & economic growth, volume 15), Emerald group publishing limited, pp.103–147.

Stake, Robert E. (2006) *Multiple case study analysis.* The Guilford Press, New York.

Strauss, Anselm – Corbin, Juliet (1990) *Basics of Qualitative Research. Grounded Theory Procedures and Tehcniques.* Sage Publications, Newbury Park.

Teece, David J. (1986) Profiting from technological innovation: implications for integration, collaboration, licensing and public policy. *Research Policy,* Vol. 15, 285–305.

Tekes – Nuoret innovatiiviset kasvuyritykset (2011). http://www.tekes.fi/info/niy, retrieved 18.4.2013.

Tekes (2010) Aineeton pääoma ja tuotto-odotukset. Tekesin katsaus 270/2010, Helsinki.

Tilastokeskus 2011 – Menikö teknologiavetoinen kasvujuna jo. http://tilastokeskus.fi/artikkelit/2011/art_2011-02-15_004.html, retrieved 18.4.2013.

Trott, Paul (2005) *Innovation management and new product development.* 3rd ed. Pearson Education Limited, Essex.

US Bureau of Labor Statistics (2012) Establishment age and survival data. http://www.bls.gov/bdm/bdmage.htm#TOTAL, retrieved 18.4.2013.

Wasserman, Noam (2012) *The Founder's Dilemmas. Anticipating and avoiding the pitfalls that can sink a startup.* Princeton University Press, New Jersey.

Westeren, Knut Ingar (2012) *Foundations of the knowledge economy: innovation, learning and clusters.* Edward Elgar Publishing Limited, Cheltenham.

Winborg, Joakim – Landström, Hans (2000) Financial bootstrapping in small businesses: examining small business managers' resource acquisition behaviour. *Journal of business venturing,* Vol. 16, 235–254.

WIPO patent report (2007) Statistics on worldwide patent activities. http://www.wipo.int/freepublications/en/patents/931/wipo_pub_931.pdf , retrieved 11.12.2012.

WIPO – Protecting Innovations by utility models. http://www.wipo.int/sme/en/ip_business/utility_models/utility_models.htm, retrieved 11.12.2012

WIPO – Where can utility models be acquired? http://www.wipo.int/sme/en/ip_business/utility_models/where.htm , retrieved 11.12.2012.

Wright, Mike – Robbie, Ken (1998) Venture capital and private equity: a review and synthesis. *Journal of business finance and accounting,* Vol. 25, No. 5–6, 521–570.

Yin, Robert K. (2003) *Case study research. Design and methods.* Sage Publications, Thousand Oaks.

List of laws

Act on Utility Model Rights 800/1991
Copyright Act 404/1961
Domain Name Act 228/2003
Patents Act 550/ 1967
Registered Designs Act 221/1971
Trademarks Act 7/1964

List of interviews

Kivimäki, Ilkka, Chairman, Startup Sauna foundation. Interview 14.2.2013.

Mansala, Marja-Leena, Secretary-general, IPR University Center. Interview 1.3.2013.

Mikkola, Martti, independent IP consultant. Interview 15.2.2013.

Pekonen, Olli, IPR Director, Beneq Ltd. Interview 14.3.2013.

Rajala, Markku, IP Manager, Pegasor Oy. Interview 26.2.2013.

Simojoki, Samuli, Partner at attorneys at law Borenius. Interview 8.3.2013