Venture Capital for Swedish Med Tech Entrepreneurship

An analysis of how well the Swedish venture capitalists correspond to the needs of the Swedish med tech entrepreneurs

Riskkapital för Entreprenörskap inom Medicinsk Teknik i Sverige
En analys av hur väl svenska riskkapitalister svarar mot de svenska med tech entreprenörernas behov.

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Abstract

This essay is a master thesis written for the Industrial Engineering and Management Programme at KTH during the spring 2007. The project’s assigner is KTH Executive School, and the thesis was tutored by Bertil Guve, PhD Industrial Management, KTH.

The purpose of the master thesis is to conclude whether the Swedish venture capital industry is optimally functioning with respect to the entrepreneurs’ actual needs. The med tech industry has been chosen as the example on which to project the analysis. A hermeneutic methodology was used in order to fulfil the purpose. Data has been gathered through theoretical and empirical studies that were conducted in parallel due to the hermeneutic approach of simultaneously developing a partial and holistic understanding for the subject.

Literature studies were conducted on topics concerning entrepreneurship and entrepreneurial success, ventures’ capitalization needs, venture capital and financing of high tech, and the venture capitalists’ decision process and selection criteria while investing in high tech ventures. Due to the lack of literature about venture capital and med tech, literature about high tech entrepreneurship and investing has been selected since the med tech examples in this essay are closely related to high tech. The conclusions from the theoretical framework helped broaden the essay’s perspective and hence laid an important foundation to the analysis chapter. The theoretical chapter is complemented by a background chapter that brings forward interesting information about the specific med tech industry in Sweden.

The empirical studies that have been conducted fall into two categories: first, two case studies of two of Sweden’s most successful med tech ventures, Elekta and Sectra, and second, the Swedish financing chain of med tech where seven investors have been interviewed about their investment activity. Some of the important conclusions from the empirical parts are that med tech ventures need initial financing, and there are several ways of financing growth but only venture capital. Forming partnerships with different actors could be one such opportunity. If bringing in external investors it is important to understand their needs and adjust to them, otherwise it will be difficult to raise money – at least from the better VCs. It is essential to choose a VC based on its added-value services rather than getting the best valuation. The more competent and well-networked VC, the greater likeliness of success.

The analysis chapter is based on the findings in the theoretical framework and empirical studies. A thematic presentation of the entrepreneurs’ needs in order to reach success has been made. To every described need, a follow-up conclusion is added about whether the investment community is successfully responding to it. The overall conclusion indicates that the investment community may successfully respond to some of the entrepreneurs’ needs, such as potential funding, international networks in order to find sales- and distribution partnerships, and management and market expertise while pursuing joint-ventures. However, in some cases the investment community seems to move away from very early stage financing – something that is essential to many med tech inventors. In addition, the med tech industry is complex and difficult to overview. Better structure of the industry would help the entrepreneurs to find key players within their specialization. Forming clusters of key players such as investors, research, med tech ventures, hospitals and major med tech corporations would create better prerequisites for partnership and overall success in the Swedish med tech industry – something that is strongly enhanced by the most prominent med tech leaders of Sweden.
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1. Introduction

In this introductory chapter the master thesis’ background, delimitations, problem discussion, purpose and research method will be presented.

1.1. Background

A highly topical issue in Sweden is how the nation is about to accomplish long term and sustainable growth. One possible measure is entrepreneurship and the creation of new companies with the potential of reaching a mid- or large size one day. Several supportive initiatives have been taken in this direction, such as ALMI lending money to entrepreneurs, Vinnova who is making significant endowments to universities in order to enhance entrepreneurship and the Swedish government is treating the subject with great respect and priority. There are several ways of stimulating growth and entrepreneurship where one of the more reported ones is venture capital financing.

However, there is a lack of consensus regarding the value and overall contribution of venture capital. On the one hand the Swedish venture capital industry is claiming there is venture capital often critically important to the ventures’ success, and that there is a lack of seed financing in general why the business angels in play need to be supported since they represent a considerable amount of the Swedish seed capital. On the other hand there are several entrepreneurs as well as investors claiming the opposite; bringing in and using venture capital is not only a tiring process but is even damaging great promising companies. The highly successful entrepreneur Dev Ganesan, President and CEO Intelliiworks INC, concluded: "A real businessman does not need money". (Sweden US Entrepreneurial Forum, 2007-11-08)

Hence, this thesis aims at evaluating these two incompatible opinions and conclude whether the Swedish venture capital industry is well-functioning and fulfilling its purpose.

1.2. Delimitations

Early on one could easily draw the conclusion that this subject was in need of limitations due to the complexity and extensiveness of the Swedish venture capital industry. Thus, a primarily attempt to circumscribe the essay topic was made in collaboration with my assigner, Eric Giertz who suggested a grouping of the early stage companies based on six different business logics. The six business logics are:

- **Software development**: characterized by lack of IP rights and the need to expand the product quickly in order to reach ahead of the competition. Hence, this kind of businesses needs initial financing to afford the product development, but has an almost non-existing cost while creating multiples of the product when it is once developed.

- **Pharmaceuticals**: The product development within this segment is long and complex and in need of extensive time and planning. Hence, the cost of product development is significant and characterized by high risk. When the product is once developed, the distribution and manufacturing cost is very low.

- **Components**: These smaller products can be used in a large range of applications, for example Microsystems. The development of such products is often assigned to universities by the industry where the researchers will patent the product and receive potential royalties.

- **Complex Products**: This kind of products has a complex nature and takes time and money to develop. They are tailored to a small range of customers rather than
manufactured in high volume. Therefore these products are often developed in close collaboration with the customer.

- **Consulting companies**: These companies do not need much initial financing and break even shortly since the customers pay immediately for the service. Companies within segments such as complex products may find it a good idea to finance the initial product development through selling consulting services.

- **Webb/Intermediary services**: The success of this kind of companies is to large extent based on gaining many subscribers in a short period of time in order to find sellers and buyers and form deals between the two. An example is blocket.se and amazon.com. Hence, there is a significant need of funding in order to reach out to subscribers through marketing.

There are plenty of actors in each of the segments on both the venture capital industry-side and the start-up companies-side. Hence, to provide this essay with the necessary analytical depth one segment needs to be chosen as focus, which turned out to be Complex Products and in particular medical technology (med tech). The reason to this choice is that Sweden has long been successful within this segment, but has lately encountered a diminishing number of new med tech companies. In addition, the Royal Institute of Technology (KTH) and the Karolinska Institute (KI) are forming an alliance in order to create a platform for collaboration within research in and commercialisation of med tech why the financing needs, amongst others, of med tech entrepreneurs must be mapped out.

### 1.3. Problem Discussion and Purpose of the Essay

This essay will discuss the needs of the entrepreneurs within the med tech industry with particular emphasis on financing of the companies’ development in different stages, and especially early stages. Thereafter, the Swedish venture capital (VC) industry for med tech companies will be mapped out and its drivers will be analyzed with respect to the entrepreneurs’ actual needs.

Hence the purpose of this essay is to conclude whether the Swedish venture capital industry is optimally functioning with respect to the entrepreneurs’ actual needs. The med tech industry has been chosen as the example on which to project the analysis.

The purpose can then be expressed in terms of an overall question, which the essay aims at answering:

*Is the venture capital industry optimally responding to the needs of the entrepreneurs within the med tech industry?*

In order to answer this question it is essential to respond the following sub-questions:

1. **What are the needs of the entrepreneurs in the med tech industry in order to reaching success?**
2. **Which are the most important financers within the med tech industry and how do their investment engagements look like?**
3. **What are the drivers behind the VCs and their decision to invest in the med tech industry?**
When these questions are answered I will end this essay with an attempt to conclude which initiatives that can be taken in Sweden in order to enhance the success and number of med tech start-up companies.

1.4. Research Method
In the following section the author’s pre-conceptions are evaluated and the scientific ambition is specified in order to bring forward aspects that may influence the research method.

1.4.1. Pre-Concepts
As a student at Stanford University in Silicon Valley, USA, in year 2006 I made contact with the VC industry for the first time. This region has a well-developed VC industry, about 30 years older than the Swedish one. Hence, my impression of how the VC industry is functioning has from time to time proved to be somewhat misleading. After several meetings with Eric Giertz, who came to be the assigner of this essay, I realised that it is not uncommon with VC-cases where dissatisfaction has been present and where VC is not fulfilling its purpose. Therefore, I have learned to put a critical eye to this subject and pay attention to how the Swedish VC market ideally should function – regardless of how the mature VC industry in USA is functioning (however, using my experience from Silicon Valley as inspiration and a comparable may be relevant for this essay). In order to evaluate the Swedish VC industry the entrepreneurs’ perspective based on their experiences and needs will be the foundation of the analysis.

1.4.2. Scientific Ambition
The ambition of this essay is to, first, describe how the Med Tech and VC industries function and map out the different players belonging to these groups. Second, the med tech entrepreneurs’ needs and success factors will be described based on in-depth interviews with key-actors in this field, such as Elekta and Sectra. Lastly, through these companies’ experiences and needs the ambition of the thesis is to look further into the financing field, identifying the key players in the med tech financial market, and describing and analyzing their investment focus. This will be done by carrying out interviews with people in this field.

Thereafter I will use the gathered data and described situation in order to analyze how compatible the needs behind the entrepreneurs are with those of the VCs and other financiers.

2. Methodological Considerations
In this chapter the methodological considerations will be discussed: the methodological course of action, how methods are applied in the research, and validity and reliability of the data gathered.

2.1. Course of Action
In order to gather data and information, the chosen course of action is to conduct literature as well as empirical case studies, which are presented in detail in this section.
2.1.1. Literature Studies
First, the author has completed theoretical studies and gained a theoretical background to the problem discussed in this paper in order to identify and enable in-depth analysis of the problem’s all aspects. The literature that has been covered discusses issues such as complex products, medical technology, decision analysis, judgement and investment science in the venture capital industry, and theories about how entrepreneurial projects successfully turn into major enterprises. Literature about venture capital is mostly sprung from the US why it has from time to time been challenging to find sufficient scientific information in this field. However, interviews, case studies and journal articles have been helpful in complementing the literature.

2.1.2. Qualitative Case-Studies of Entrepreneurs
Two case-studies of some of Sweden’s most successful med tech ventures have been made in order to describe and analyse the med tech entrepreneurs’ needs and behaviour. These case studies been executed through in-depth analysis of annual reports and interviews with key actors behind the ventures.

2.1.3. Qualitative Case-study of chosen VCs
Finally the whole investment chain of med tech ventures have been mapped out and analysed with respect to the earlier concluded needs of the entrepreneurs. This task has been fulfilled through interviews with firstly SVCA who has provided further information about investors in med tech. Further interviews have then been set up with the most important investors in this field where the goal has been to understand the driving forces and decision criteria of the venture capitalists. Thus, the gathered data has been both primary and secondary. Eventually the thesis aims at fulfilling its purpose and hence answering the question whether the Swedish venture capital industry is optimally responding to the actual needs of the med tech entrepreneurs in order to reach long term success. By using some well-suited theories from the literature studies the situation in Sweden will be analysed. Lastly, a proposal of what actions that can be taken in order to enhance the situation will be presented if possible.

2.2. How Methods Are Applied in the Research
Since the research question in this essay is complex and broad it has been essential to make a sound choice of how to gather the data and pursue the analysis. It was rather unclear how the research question would be received and how willing sources of information would be to share their knowledge. Also, the med tech industry is booming today where the investors have made it to one of their absolute favourites regarding new investments. Hence, investing in med tech is a relatively new phenomenon why no scientific theory was suitable as the starting point for the analysis. Instead, the research methodology and perspective had to be evaluated and sometimes changed throughout the research. Hence, a hermeneutic perspective was chosen to guide the research work, which means that a holistic understanding and partial understanding for the research subject was aimed at interchangeably. (Eriksson & Wiedersheim-Paul, 2006) Hence, the literature study has been pursued in parallel with and after having finalized the empirical studies since it turned out to be a lot easier to find relevant theories that then could help developing and guiding the thinking in the analysis part.
The project has mostly used qualitative methods in order to reach its results and conclusions. Qualitative methods circumscribe, amongst others, tasks such as mapping out complex situations and problems through interviews and observations. Qualitative research aims at understanding how all parts interact in order to create one unit. Qualitative case studies is a methodology that is well-suited for handling problems of practical nature where education and understanding is essential before it is possible to enhance the real-life setting of the problem. (Gustavsson, 2003)

One problem with the qualitative methodology is that it is mostly based on inductive conclusions. Thus, these conclusions are coloured by the researcher’s knowledge, observations and hypothesis. Hence, the interviews and observations made by the researcher are subjective and may result in different conclusions depending on who is behind the work.

In contrast to qualitative methodologies quantitative methodologies are based on measures and observations. Within the limits of this master thesis the quantitative methodology will be used in order to gather and analyze data that must be objective and neutral and hence not be affected by i.e. preconceptions. (Gustavsson, 2003)

While gathering data of all kind it is necessary to determine how this can be accomplished in the most relevant and reliable way. Two concepts measure this, reliability and validity.

2.3. Validity

Validity means how accurately the measuring instrument can measure what it should measure. Internal validity determines how well the concepts and the operational (measurable) definitions correspond to each other. External validity is of significant interest in this report since it describes how the results correspond to reality and whether the investigation of the purpose actually responds to the questions it aims at responding. The author has tried to gather significant and broad information about the subject to be able to judge what to investigate and how this should be done. (Eriksson & Wiedersheim-Paul, 2006)

2.4. Reliability

Reliability means that the measuring instrument shall give reliable and solid results. Reliability generally maps out whether other investigators would reach the same conclusions using the same research methodology, or if the investigation when repeated on another selection of data would result in the same outcome. Generally, accomplishing high reliability in interpreting/hermeneutic research is difficult since it is highly dependent on the researcher’s own perceptions and conclusions. Hence, another person could possibly have other perceptions and draw different conclusions. However, the persons that have been interviewed in this essay have all been well aware of the situation and given reliable answers. (Eriksson & Wiedersheim-Paul, 2006)
3. Theoretical Framework

In the following chapters a theoretical discussion will be held regarding high-technology (high-tech) ventures, their growth strategies and challenges. Thereafter venture capital and its driving forces will be looked into. Eventually, the interaction of these two sectors will be studied. Since there is a lack of research findings with a particular emphasis on med tech ventures, these chapters will instead bring forward the more general segment high-technology within which medical technology is a constituent. The high-tech venture information presented seems relevant since the two med tech-cases pursued in Empirical Part I are within the high-tech field of med tech.

3.1. Definitions

The following definitions can be helpful in understanding the vocabulary of the forthcoming chapters. Aram (1989) defined these concepts:

- **Technology-based firms**: firms whose main product or service depends on a new invention, copyright, patent, or scientific/engineering discovery.
- **Start-ups**: business ventures in the idea stage or in the process of being organized. No formal financing may exist at this point. Equity funds may be provided to individuals or to innovators developing a new product, process, or other marketable concept.
- **Informal investor**: any person providing risk capital other than professionally managed venture capital funds, equity-oriented Small Business Investment Companies (SBICs), other institutional investors, and the public stock markets. Investors who provide informal risk capital tend to be financially sophisticated people with high incomes and net worths. Frequently they have previous investment or management experience with entrepreneurial ventures.
- **Risk capital**: equity capital for new and growing small firms. Typically, these investments 1) have higher risk than investments in large, established firms, 2) have high potential returns in proportion to the higher risks, and 3) have no ready market for resale.
- **Risk venture firms**: new or growing small firms that need external equity financing, but probably don’t have access to traditional venture capital sources or the public stock markets. For example, risk venture firms typically are either new start-ups or existing firms that require up to $500,000 of risk capital. They probably won’t qualify for a public stock offering or a merger with a larger firm within the next five years.

3.2. Entrepreneurship in High-Tech Ventures

Since this essay, amongst others, aims at understanding the needs of the med tech entrepreneurs it is relevant to present definitions of and information about entrepreneurs. An in-depth discussion will be held about what entrepreneurial success means and how compatible it is to the definitions of success in the venture capital industry. Hence, research about venture-backed entrepreneurs will be introduced as well as conclusions to why some entrepreneurs are rejected venture capital. Hence, this chapter aims at presenting the

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1. "High potential" signifies an objective of achieving annual sales of well over $10,000,000 within a few years. "Technology based" implies that the firms rely on a technological advantage as a key element of their initial strategies.
entrepreneurs’ perspective on growth accomplished with or without the help of a venture capitalist.

3.2.1. Definition of Entrepreneurship and Entrepreneurs

To start with, the definition of what it means to be an entrepreneur, what characteristics are typical of an entrepreneur and what entrepreneurial success means, will be introduced.

Bhide (1999) makes the following distinction:

“Whereas the manager of a public company has a fiduciary responsibility to maximise value for shareholders, entrepreneurs build their businesses to fulfill personal goals and, if necessary, seek investors with similar goals. For example, they may want an outlet for artistic talent, a chance to experiment with new technology, a flexible lifestyle, the rush that comes from a rapid growth, or the immortality of building an institution that embodies their deeply held values.”

(Bhide, 1999, p. 6)

Kodithuwakku & Rosa (2002), Jarillo, Stevenson (1990) and Swedberg (2000) all agree that “entrepreneurship is a process by which individuals – either on their own or inside organizations – pursue opportunities without regard to the resources they currently control”. In addition, it is argued that the entrepreneur possessing valuable social capital in the form of an extensive or powerful network is likely to enjoy greater success. Kodithuwakku & Rosa (2002) concludes that:

“Economic success with only limited resources should be determined by an individual’s ability to be entrepreneurial (i.e., perceiving, creating opportunities and extracting values through translating them into a set of potential opportunities via mobilising resources) as well as managerial (i.e., deploying/allocating the available each unit of resources to its most highly valued use to avoid waste).”

It may be argued in this setting that the process of matching resources with opportunities should include both entrepreneurial as well as managerial elements. (Kodithuwakku, Rosa, 2002)

3.2.2. Definition of Growth and Suitable Growth Strategies in High-Tech Ventures

There are several ways to which a high-tech venture can choose to grow. Since high-tech ventures normally meet significant market growth with high threats from potential competitors, it is essential to grow fast and in a strategically appealing way in order to reach long-term success. The chosen strategy can part success from failure.

Bhide (1999) has researched over 200 thriving ventures and concludes that there are three helpful guidelines for entrepreneurs to succeed:

1. Screen opportunities quickly to weed out unpromising ventures.
2. Analyze ideas parsimoniously. Focus on a few important issues.
3. Integrate action and analysis. Don’t wait for all the answers, and be ready to change course. (Bhide, 1999)
A firm can choose to grow through internally generated means, but also through mergers, acquisitions and other kinds of partnerships. Partnering arrangements may be essential, for example, not only to gain capital, but also to deepen management capacity and assure initial access to distribution channels. Growth and competition place tremendous resource demands on the young technology-based venture, and financial strategy choices therefore must also be factored into the choice-taking process. (McCann, 1991)
McCann also claims that his study shows that the conventional stage-based models of venture development given in Figure 2 is useful in organizing many of the choices available to the venture, but is insufficient to explain the choices actually taken. He explains:

"One explanation of this possibility is that the firm life cycle is being compressed by relatively new conditions, such as the availability of more and earlier capital through joint venturing and alliances, and shorter product life cycles. Indeed, a follow-up survey a year later with 77 CEOs from this sample confirmed that joint ventures and alliances were the number-one choice being pursued to gain access to distribution channels and new markets." (McCann, 1991)

McCann (1991) concludes that it is time to realize that the decision-making in strategy choices among young ventures is far more complex than the conventional Figure 2 suggests. The survey also proves that the sources of information that were by far the most relied upon for strategic decision-making were other internal senior managers and board members, outsiders such as lawyers ranking distantly behind. Therefore "the leaders of these ventures need to be fully supported in evaluating, negotiating, and managing these often highly complex relationships." (McCann, 1991)
Hence, enabling growth is a complex process depending on the entrepreneurs’ proactive nature and ability to pursue opportunities with scarce resources. Evaluating the entrepreneur’s potential then seems utmost relevant. Who is the venture capitalist seeking for and assessing the most promising investment object? This information will be valuable while analysing the two case studies presented in empirical chapter I.

3.2.3. The Entrepreneurs’ Capitalization Needs

An important aspect to consider in this thesis is the entrepreneurs’ actual needs for financing. Depending on the high-tech company’s development stage there are different capitalization needs. Bruno & Tyebjee (1985) are many times cited by entrepreneurship researchers and they propose the following venture-stage-breakdown:

**Seed money stage:** Generally, start-up companies get capital infusions from informal sources such as the family or friends of the founder. Typically, a relatively small amount is provided in this stage to prove a concept or develop a product, but does not include marketing.

**Start-up moneys:** Money in this stage is earmarked to cover product development and initial marketing. The funding is usually provided to companies in business for less than one year and whose product has not been marketed commercially yet.

**First-round financing:** Funds provided to a company that has expended its initial development financing and requires additional capital to begin commercial manufacturing and sales.

**Second-round financing:** This financing round provides working capital for an initial expansion of a firm with growing sales, but which may not yet be profitable.

**Third-round financing:** At this late stage funds are used for plant expansion, marketing, working capital, or product development by a firm which breaks even or shows a profit.

**Fourth-round financing:** For companies which expect to “go public” in six months or a year may need an additional round of financing. This bridge financing often can be repaid out of the proceeds of the public underwriting; it is often used to restructure major stockholder positions prior to a public offering.

In order to raise money the entrepreneur must be willing to dilute his own share of the venture and hence give away significant ownership to the investors in return for capital. Bruno & Tyebjee’s study showed that on the average, 31.5% equity is given up for the first round, and additional 19.7% equity is given up in the second round and 10% more in the third.

There are venture capital actors with a particular emphasis on providing funding and support for ventures in one or a few of the stages mentioned above. Many VC firms do not want to narrow down the window of potential investments and hence are welcoming any venture application regardless of development stage. This will be further examined in the second empirical part where the Swedish med tech financiers have been interviewed and mapped out depending on venture-stages etc.

3.2.4. Success Factors

Not all entrepreneurs that seek venture funding succeed in attracting it. Bruno & Tyebjee made a survey of how different high-tech ventures managed and succeeded with (or without) venture capital funding. One third of the 95 respondents failed to raise capital. The reason to the rejection seems to be different depending on who is asked; the entrepreneurs or the
venture capitalists. Meanwhile the entrepreneurs enhanced explanations such as market potential, management competition and product feasibility, the venture capitalists particularly underlined deficiencies in the venture’s management. The reason to this dissonance could be the entrepreneurs’ unwillingness to admit their own personal weaknesses. (Bruno & Tyebjee, 1985)

Roure & Keeley (1990) conclude through their study of technology-based new venture performance that success requires appropriate choices of management, industry and strategy, and that weakness in one can be offset by strength in another. Dubini (1989) agrees with the opinion that the characteristics of the entrepreneurial team are one of the most important success factors since it is the only aspect that can be changed and influenced by the VC. On the contrary it is nearly impossible to change market conditions for example. Dubini analyzed and clustered 151 ventures with different kinds of business logics and found suitable characteristics of the entrepreneur in order to reach success. The most significant cluster (and also the only one of importance for this essay) was “high-tech inventors” which had the market strengths of high growth, high potential to open new markets and also best potential to get product protection in terms of patents. The negative market aspects were low access to distribution channels that are not well established and a fairly high threat of fast-following competition. According to these market conditions, the most fitting characteristics of the entrepreneur are 1) the ability to manage risk and, 2) the capacity to pay attention to detail. Due to the potential harsh competition and poor infrastructure conditions, there is probably a real benefit in having entrepreneurs who understand the risks and do the kind of detailed planning needed to secure their strong product position via detailed infrastructure development. Finally she points out that the less successful venture capitalists in this field are those who let their judgement be clouded by personal opinion and “gut feeling”. (Dubini, 1989)

Another major study was made by Bruno, McQuarrie & Torgrimsson (1992) of 150 technology-based ventures in Northern California. About 20 years after their foundation only 18 % of the firms had survived, 32 % had been merged or acquired, and 50 % had failed. See Figure 3.
One of the most eye-catching results from this survey is that incredibly 40 percent of the respondents considered lack of a good relationship with the venture capitalist a major cause of their firm’s demise. ‘A good relationship’ was defined as one in which both the entrepreneur and the venture capitalist share the same objectives and agree on the means to achieve them. The good relationship often deteriorates over time because objectives diverge. This is an important fact that approves the purpose of this essay, even though the information concerns...
Silicon Valley firms since this region has reached far longer than that of Sweden. Furthermore, fully 90% of the respondents in the same survey cited an ineffective team as a factor in the demise of their firms. An ineffective team was defined as one that operates at cross purposes rather than with common objectives.

Among the survivors relations between founders, banking and credit problems, attempted takeovers, and international expansion were among the key crises that had to be overcome by the surviving firms. The lessons learned by these long-term successful entrepreneurs within the high-technology segment were: (1) know yourself, (2) love your product, (3) honor your customer, (4) treat your people well, and (5) keep your integrity. See Figure 5.

1. Know yourself
   Founders placed great importance on understanding their skills and deficiencies and recognizing what motive lay behind the urge to found a company. “Look in the mirror a lot.”

2. Love your product
   Several founders spoke in terms that suggested a service orientation: the function of the firm was to supply consumers with something important that these consumers literally had to have. This was particularly true of the smaller firms that served a primarily R&D or laboratory market.

3. Honor your customer
   Many of these founders expressed a great deal of loyalty to the markets they served. They felt a personal responsibility to satisfy their customers.

4. Treat your people well
   This was probably the one theme heard most often across the interviews. Over the long term, the partners one joined with, the people one hired, and the way these people were treated was felt to be a critical success factor. “As long as you were fair with the people you were dealing with, and treated them right, you never had to worry.” “You’ve got to really be an astute judge of people, that is by far the most important thing you can do: study people.”

5. Keep your integrity
   Several founders mentioned this point as a bedrock principle. Most had experience with other people or businesses that did not follow this injunction. Feelings ran high on this point.

   These interviews summarized the themes that emerged from surviving founders’ answers to two questions: What have you learned over 20 years of successfully managing a new venture, and What advice would you give to someone starting a new venture today?

**Figure 5. Themes emerging from interviews with surviving founders.** (Bruno, McQuarrie & Torgrímsson, 1992)

However, of the total 135 ventures which Bruno and Tyejee knew to have been denied venture capital at least once, over two-thirds were still in business. Of these, approximately 60% were able to raise outside capital elsewhere. In this case it was many times necessary for the entrepreneur to lower his sights regarding the amount of capital required and/or to be willing to give up a higher share of equity.

Other results that could help advising entrepreneurs in their search for venture capital are the following:

- Most high-technology firms are founded by multiple founders which implicates how the ownership fairly should be distributed. An important issue for the VC is that key persons in start-up will stay long enough to not jeopardize the company.
- The entrepreneur should have a significant amount of experience working in several other companies before trying to start a company of his own. Having experience from various business functions is important.
- The founders must realize that it will take much longer time to raise the capital than initially expected. Hence, it is important to seek money in a planned way i.e. for a
strategic expansion rather than in last minute to cover immediate costs. Then the valuation will be much lower.
- The willingness to go outside for capital and the related willingness to dilute the equity share of the founders can have dramatic effect on growth.

3.2.5. Other Sources of Funds
In a study made by Bruno & Tyebjee (1985) 86 companies were examined and 61 of these firms (71%) expected to need expansion capital. 53 firms speculated about their source of expansion capital according to Figure 6 below:

<table>
<thead>
<tr>
<th>Source of Funds</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank loans</td>
<td>34</td>
</tr>
<tr>
<td>Venture capital</td>
<td>38</td>
</tr>
<tr>
<td>Other private investment</td>
<td>13</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>21</td>
</tr>
<tr>
<td>Public stock offering</td>
<td>8</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
</tr>
</tbody>
</table>

Figure 6. Potential sources of expansion capital to high-tech entrepreneurs. (Bruno & Tyebjee, 1985)

Hence, venture capital is the most considered alternative, but other sources of funding are thought through as well. Clearly, expanding the business is not solely expected to be possible through venture capital. Also, firms in later stages are less risky which opens up other opportunities of funding such as bank loans, but they do not provide managerial experience and/or network etc. Thus, venture capital is important to many entrepreneurs’ growth, which leads to the chapter where, in fact, venture capital will be discussed.

3.3. Venture Capital and Its Actors
In this chapter the relevant literature studies for this essay is presented with respect to providing understanding for how the venture capital market has evolved and how it is functioning today. Since the venture capital industry was born in the US most literature is American and/or draws parallels to the American actors and situation. This is important nonetheless since the American market is more mature and has learned several lessons regarding failures and successes of venture capital. In addition, the med tech industry’s most important market is in most cases the USA why venture capital actors within med tech in general need to adapt to and understand the standards of the American venture capital market. To find more concrete information about the Swedish venture capital market, see the background chapter.

The questions that seek answers in this section are what objects do high-technology investors seek to invest in and why. What is affecting their judgement and decision-making? These answers will be relevant to the empirical part II where a broader theoretical background will enable better understanding of the med tech investors of Sweden and their activity.
3.3.1 Venture Capital – More than Risk Money

As suggested above, a venture capitalist may have more to offer than just risk capital. This “product offering” seems to become increasingly important to the venture capitalist in order to distinguish oneself in an increasingly competitive environment where the potential high returns from the highly skilled entrepreneurs attract more players. Hence, it is not only the entrepreneurs who need to come up with a winning strategy to attract a superior venture capitalist partner.

Venture capital firms and their activity can be described as follows:

“Venture capital firms raise funds from various investors and then seek to invest these funds in private companies with the purpose of achieving superior investment returns. While some VC firms invest in companies that are in the process of exploring ideas for which there are not yet developed commercial products or tested markets (i.e. early-stage companies), others prefer late-stage companies, i.e. those with well-defined market and product characteristics, seeking to expand or improve their established business. The less developed a prospective company, the higher the uncertainty that a VC firm faces in making its investment decision.” (Dimov et al., 2007)

As Timmons & Bugrave, 1986, suggest, a critical element in establishing and growing small, high-technology companies is venture capital and management services provided by venture capitalists. There are a large number of venture capitalists where their investment objectives have diverged and hence turned out to be more heterogeneous than before. Differing objectives, strategies, resources, locations, associations and organizational forms result in significant variety in the venture capital industry. (Timmons & Bulgrave, 1986)

To be successful in venture capital investing in technology innovative firms more than just risk money is necessary. The Timmons & Bulgrave’s (1986) study concludes that savvy entrepreneurs should seek out venture capitalists with noteworthy reputations for their non-monetary, high value-added contributions to fledgling firms. That way the best venture capitalists will attract the ventures with highest potential. Entrepreneurs cited important qualities provided by a good venture capitalist such as helping to find the select key management-team members; providing credibility with suppliers and customers; and helping to shape strategy when the daily pressures postpone this vital task. As one put it, “It is far more important whom you obtain funding from than how much and at what price.”

Timmons and Bulgrave, 1986, conclude that:

“Investing in technologically innovative ventures is a more specialized business than suggested by the common stereotype of homogeneity among venture capitalists. Fewer than 5% of the 464 venture-capital firms in our study accounted for nearly 25% of all the investments in highly innovative technological ventures. Investors possess specialized know-how, including a web of contacts and networks, a great degree of syndication of deals, and a great intensity of involvement. The message for technology entrepreneurs is clear: focus on venture-capital firms with reputations for proven performance in your technology and market, especially with your targeted customers.” (Timmons & Bulgrave, 1986)

As this literature references suggest, VC firms need to distinguish themselves to reach out to the best entrepreneurs. This will be examined further in the Swedish med tech financing chain in the empirical part II.
3.3.2. The Decision-Making Process in the Venture Capital Industry

Another important aspect to discuss is the decision-making process of the VCs. Gretzer & Nord (2005) concluded that most Swedish VCs make their investment decisions based on a process of five stages, which was originally proposed by Tyebjee & Bruno (1984): deal origination, deal screening, deal evaluation, deal structuring and post-investment. See Figure 7.

![Decision-making process of venture capitalists](image)

Figure 7. Decision-making process of venture capitalists. (Gretzer & Nord, 2005)

One issue that Gretzer & Nord (2005) discussed was the fact that there is always insufficient information on which all the decision-making is made. Guve’s (2003) profound analysis of the judgement and decision-making of venture capitalists concludes that there are driving forces behind the venture capitalist’s decision that are not clearly outspoken: "A logical deductive, rationale reasoning about the future can not claim to be objective as the future according to a traditional life-perspective per definition is uncertain". (Author’s translation, Guve, 2003). Furthermore Doug McKenzie, General Partner at the highly respected American VC-firm KPCB, proudly states: "VC investing is part art, part science" (McKenzie, 2006).

Assuming that the investing process constitutes of an “art part” the judgement process becomes relevant. On what facts does the venture capitalist make his or her decisions? In the evaluation part each potential investment project is scrutinized at the board meetings. As Guve points out, it is essential for a handling officer to perform well. If a handling officer is failing over again he or she is risking his/her career. Hence, most likely the handling officer and other members of the VC firm is considering the others of the organisation and even people in the external network. (Guve, 2003)

Another issue that may affect the VC:s reasoning and judgement process is the way the investor chooses to handle uncertainty. First, there is uncertainty reflecting the information shown to the VC because the entrepreneur often knows more about the company, the market and its potential future than the investor. The VCs generally develop procedures for how to sort information and how to determine what information is relevant or not. In addition, no other person but the entrepreneur knows his or her long-term ambitions with the venture. Hence, entrepreneurs with a strong track record within entrepreneurship are favourable. (Gretzer & Nord, 2005) Second, the investors of the VC funds have to evaluate the Funds’ management in order to evaluate performance and potential IRR. According to Gretzer at SVCA the track record of the fund’s management is crucial as well as the investment focus of the fund (Gretzer, 2007). To conclude, the funds’ owners affect what investment decisions are made in a broader perspective, such as chosen investment focus and how to balance the risk/reward. To deal with uncertainty most VCs have a determined investment process, economical incentives to management and the entrepreneurs, legal agreements and social
homogenisation, which together provides control through implicit positions of dependence and identity formation. (Gretzer & Nord, 2005)

3.3.3. Selection Criteria – Part Art Part Science
Several researchers have examined the decision-making among VCs and concluded that the diversity of the team affects the perspectives and opinions, actions and organisational outcomes. (Dimov et al., 2007) The way the VCs analyze may be derived from their background, which in turn seems to become more alike (Gretzer & Nord, 2005). Thus, the type of expertise possessed by the VC firm’s management team tends to strongly influence the investment decision. “Interpretation and reaction are thus endogenous to the decision-making process – they are largely dependent on decision-makers' expertise and the social standing of their firm” (Dimov et al., 2007). Another important finding is that the VC firms with higher finance expertise chose to invest in less early stage ventures. “Interestingly, reputation appears to have the opposite, alleviating effect: the negative relationship between finance expertise and early-stage investments is stronger for less reputable firms than for more reputable firms” (Dimov et al., 2007). Lastly, a point is made on the fact that VCs are continuously involved in investment syndicates in order to mitigate the risk of investments. This membership of a broader social network appears to influence the investment decision. (Dimov et al., 2007)

In sum, there are many aspects affecting the venture capitalist’s investment decision: the management team’s background and composition, the Fund’s owners, social status, risk/reward-ratio etc. Hence investing in high risk and potential growth ventures is a difficult task where I feel encouraged to agree with Doug McKenzie at KPCB – VC investing is part art part science.

3.3.4. The Business Angels’ Role in Early stage Financing
Timmons & Bygrave (1986) pointed out that they saw a trend in the US of how the venture capital funds grew larger because of an increased interest in VC investing due to the high returns. With larger funds the managers need to focus their activity, resulting in desired higher levels of initial minimum investments. This has lead to a diminishing supply of early stage capital. However, there are wealthy individuals that invest smaller amounts in early-stage firms called Business Angels who thus play an important role in growing small technology firms to businesses big enough to be an interesting investment object for VCs.

These individuals providing financial means to early-stage ventures as a portion of their private assets were “discovered” by researchers in the 1980s. This individual was variously termed an “informal investor” or “angel investor”. Aram (1989) examined these angels and concluded that they generally invest within 50 miles of their homes or offices which make them particularly important to their local economies. In contrast to the major VC firms the business angels are hard to identify since they tend to act rather discrete. However, one identification key seems to be that they often have worked (or currently work) in the ventures similar to those in which they invest. Furthermore, the angels investing in technology-oriented ventures give little information about their personal characteristics. One interesting conclusion that Aram (1989) managed to draw was that these investors tend to make higher-risk, higher-return investments than persons less committed to technology-based firms do. They also tend to look more to business service professionals like investment business brokers and accounting and law professionals as referral sources.
3.4 Conclusions Theoretical Framework

This theoretical framework has been put together to create a stable academic platform to support the empirical parts. Also, it is helpful in broadening the perspectives and hence enabling a more developed and deep analysis. Having defined entrepreneurship, specified critical success factors and the concept of venture capital it is my belief that the empirical parts will be better pursued and interpreted. The theoretical background provides a broader artillery of surveys and analyses than I am able to accomplish within the time constraints of this thesis. Therefore, if successfully used, the theoretical framework will deepen my analysis where the conclusions presented can be more applicable to high-tech (med-tech in particular) venture success and investing.

To conclude, the most important lessons learned from the literature study are stated below.

Successful entrepreneurs are defined as those who:
1. Are good at identifying opportunities and successfully acting on them with scarce resources. Finding and form a nurturing partnership with one of the highly regarded VCs could be seen as one such opportunity, and could distinguish successful entrepreneurs from less successful ones.
2. Have developed a consistent and successful growth strategy and are particularly good at forming joint-ventures. The most successful joint-venture strategies often seem to include having experienced managerial expertise tied to the management team, who thus can help the entrepreneurs to reach full potential in handling these complex relationships.
3. Have a solid financial strategy where several sources of funding have been evaluated.

The successful venture capitalists are those who manage to distinguish themselves in the VC market since there is harsh competition and many players acting. The competition does not necessarily mean reaching the best entrepreneurs first and close the best possible deal. Rather, it is essential for VCs to distinguish themselves among other VCs in order to be invited to co-invest in the best ventures. This way fewer resources have to be allocated to marketing towards entrepreneurs which often is a difficult and expensive task. Instead the word-of-mouth will spread along the VC community resulting in the best deals ending up on the most successful VC’s desk – even without any marketing efforts. Hence, the VCs need to find a way to distinguish themselves in the VC community.
4. The Swedish VC Industry for Med Tech

This chapter will describe and map out the overall VC industry for Swedish med tech companies and hence act as a complement to the theory part since it provides a more specified and detailed outlook on the Swedish prerequisites for successful VC investing in med tech. After having read this section, the reader should understand how this market is functioning and what the investment interest for med tech inventions looks like.

As described in the introductory parts, the purpose of this thesis is to conclude whether the Swedish venture capital industry is optimally functioning with respect to the entrepreneurs’ actual needs. The Med Tech industry has been chosen as the example on which to project the analysis. In order to fulfill this purpose this part will examine how these two industries function and where they meet. Hence, the aim is to lay the foundation of the subject and providing information and knowledge about the prerequisites of the Swedish med tech and VC industries in order to fully understand the in-depth analysis following the two forthcoming empirical chapters.

4.1. The Swedish Med Tech Industry

The Swedish med tech industry has historically been successful and impressive especially as Sweden is a small country with a most limited domestic market. The country has given birth to a number of multinational med tech successes such as Elekta, Gambro, Getinge and Sectra. The Focus Med Tech Agenda2 pointed out in 2005 that the industry had a turnover of 20 bn SEK and employed over 8000 persons in Sweden. This is a growth of more than 60 % since 10 years. 50 % of the Med Tech companies were founded during the preceding 10 years. (Med Tech Focus Agenda, 2005) The demand for healthcare is rapidly increasing, during the 21st century the healthcare costs for the Western world has had an annual increase by approximately 7.9 % - three times the inflation (Himmelstein et al., 2005). According to demography projections one third of the European population will in 2005 be older than 60 years and only 13 % will be younger than 16 years (International Longevity Centre-UK & the Merck Company Foundation, 2006).

<table>
<thead>
<tr>
<th>Country</th>
<th>Healthcare spending as % of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>16</td>
</tr>
<tr>
<td>Switzerland</td>
<td>10.9</td>
</tr>
<tr>
<td>Germany</td>
<td>10.7</td>
</tr>
<tr>
<td>France</td>
<td>9.5</td>
</tr>
<tr>
<td>Sweden</td>
<td>9.2</td>
</tr>
</tbody>
</table>

Table 1. The healthcare spending as share of GNP in different countries. (Himmelstein et al., 2005)

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2 The Focus Med Tech Agenda is a report written by Sweden Bio, the Swedish Association of Medical Technology (SLF), the Swedish Trade Council (Exportrådet) and the Invest in Sweden Agency about how to create a successful med tech industry in Sweden. See Appendix 1.
Med Tech devices are generally high-tech and produced in low volume and do not benefit from production in low cost countries. A typical med tech device is defined as follows:

“Traditionally, the definition of a medical device is instruments, apparatus, software, materials or other similar or related articles intended for human beings for one or more of the specific purposes of diagnosis, prevention, treatment or alleviation of disease, injury and other medical purposes.” (Europe Innova, 2007, p.7)

However, it is clear that the earlier typical med tech products are evolving where the innovation of med tech devices turn out to be better defined in terms of use rather than by industrial and technological origin (Europe Innova, 2007). As IT technology and system solutions become available to hospitals and healthcare providers, there is increasing demand for new products and solutions to be integrated into these systems (Focus Med tech, 2005). Hence, med tech is not just a new technology providing a healthcare service, but also it is about selling a solution that enables improved cost-efficiency and treatment within healthcare. Hence, implementing a med tech device depends on what apparatus that the hospital is currently owning and using, and the related competence.

To summarize, the med tech devices can in many ways be compared to the concept of Complex Product Systems, CoPS:

“CoPS are high-technology and high-value capital goods, such as telecommunications systems, flight simulators, high speed trains, air traffic control systems, intelligent buildings, weapon systems, and baggage handling systems. CoPS are supplied as one-off items or in small batches for individual business users.” (Davies & Brady, p.931)

How entrepreneurial projects within the CoPS and med tech field reach success is a question that awaken many entrepreneurs’ and investors’ interest where several different opinions are present. However, there is no hesitation regarding the need for financial and competent support in the development and international expansion of med tech device companies, which a closer look at companies such as Elekta and Getinge proves. The most demanding expansion phase is especially complex due to the harsh regulatory requirements for med tech devices. Hence, marketing and sales capacity in terms of capital and competence within this field is crucial for success (Winberg, 2007).

4.2. The Concepts of the Venture Capital Industry
In this chapter the concepts and characteristics of the venture capital industry in Sweden will be looked into. Also, the attractiveness of investing in med tech companies will be analyzed and discussed.

4.2.1. What Are Venture Capital and the Characteristics of the Swedish VC Industry?
According to the Swedish Venture Capital Association (SVCA) the concept of Private Equity refers to investments in private companies and is characterised by active and time constrained ownership. Private Equity can in turn be divided into two sub-divisions: Venture Capital and Buy-out capital. The major difference between these two concepts is the financing stages. Venture Capital focuses on investments in small and mid sized companies in seed, start-up and expansion phases and is often characterized by weak or negative cash flows. Meanwhile Buyout capital is the denomination of investments in mature and big companies often having strong cash flows. In addition, there are private persons called ‘Business Angels’ investing in
private companies, mostly in seed phases, and they generally participate as active owners. (SVCA:s matrikel, 2006)

The general idea of private equity is to fund start-up companies that generally have small chances of getting funding through banks due to lack of underlying assets as security. Rather, investments in this kind of companies are made because of the potential high growth and significant returns in the future. Private equity offers active ownership through board membership supplying the company with competence and industrial experience and network. Additional qualities that these investors are said to provide are goal orientation, faster growth, economic stability and active leadership. (SVCA:s matrikel, 2006)

However, there are two questions of importance according to this statement. First, what are the downsides of venture capital? Second, is it just to apply this general idea of venture capital to all kinds of companies that fall into the genre of high risk and strong growth potential?

The VC:s accentuated demand for strong growth increases the risk of the venture significantly. Strong demands on management may require a CEO switch in a new phase. Also, one of the most important aspects of VC funding is the time horizon; most VC:s plan to make an exit in 4-7 years when they seek money to make new investments. (SVCA:s matrikel, 2006) This fact is interesting to compare with companies with different business logics and hence different time horizons depending on their phase in the life cycle.

I will discuss this further in the analysis part and make comparisons with the time horizon of a successful venture in med tech. For example, it took Elekta about 30 years before it reached success.

The Swedish VC industry is said to be founded approximately 30 year ago, and has exploded the last ten years. In 1996 the Swedish VC:s managed 16 bn SEK in relation to year 2006’s turnover of 290 bn SEK. (SVCA:s matrikel, 2006) Why did this industry grow so fast during this time period? To be answered, this question needs to map out the driving forces behind the VC industry. To do so, comparisons with and information from the US will be made since this VC industry is a lot older and mature compared to that of Sweden.

4.2.2. Med Tech – An Interesting Field for VC Investments

Med tech is becoming an increasingly interesting field for venture capitalists to invest in. One of the most important reasons to this seems to be that it is highly profitable to invest in med tech. See Figure 8.
In year 2006 med tech was the industry which gained most VC-investments of all industries totalling in 113 investments in the venture-stage and four investments in the buyout and replacement capital-stage (NUTEK, 2007). However, in terms of amounts the med tech industry was the fifth most popular investment field and achieved a total of 528 MSEK in venture and 4 445 MSEK in buyout. Apparently the venture capitalists find med tech significantly interesting to invest in. In Table 2 a more detailed breakdown of the investment in Swedish med tech companies is made:

<table>
<thead>
<tr>
<th>Phase</th>
<th>Initial/Follow-up Investment</th>
<th>Number of investments</th>
<th>Size of Investment (MSEK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buyout</td>
<td>Initial</td>
<td>1</td>
<td>4000.0</td>
</tr>
<tr>
<td>Replac.Cap.</td>
<td>Follow-up</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>Expansion</td>
<td>Initial</td>
<td>4</td>
<td>130.6</td>
</tr>
<tr>
<td>Expansion</td>
<td>Follow-up</td>
<td>35</td>
<td>107.9</td>
</tr>
<tr>
<td>Start-up</td>
<td>Initial</td>
<td>6</td>
<td>51.7</td>
</tr>
<tr>
<td>Start-up</td>
<td>Follow-up</td>
<td>41</td>
<td>142.8</td>
</tr>
<tr>
<td>Sädd</td>
<td>Initial</td>
<td>8</td>
<td>8.6</td>
</tr>
<tr>
<td>Sädd</td>
<td>Follow-up</td>
<td>5</td>
<td>4.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>101</td>
<td>4448.1</td>
</tr>
</tbody>
</table>

Table 2. Total investments in Med Tech in Sweden year 2006. (Gretzer, 2007)

From watching the information in the table above it stands clear that the investment trend in med tech was started in earlier years since a majority of the VC investments was characterized by so-called follow-up investments. This is a positive sign since follow-up investments generally are made when a company has reached certain milestones indicating progress in the

\footnote{These numbers are based on Swedish VCs making investments in both Swedish and foreign med tech companies.}
company’s development. However, it could also mean that the company needs more money than expected which could be a negative sign even though most investors refuse follow-up investments if they do not see potential in their investment. Buyout capital is mostly given to more mature companies that need capital to develop. Due to the size of these companies the capital required is generally a lot greater than that of companies in venture-stages, which explains the significant investment of 4000 MSEK in the Buyout phase in Table 2.

Another aspect that contribute to the positive outlook of Swedish med tech as a good investment opportunity is that Sweden had the biggest public and private funding of R&D in the medical device sector of Europe, resulting in 4.3 % of GDP in 2006 (Europe Innova, 2007). Hence, there are major incentives pursued regarding med tech innovation providing the Swedish VC market with plenty of med tech commercialization projects.

4.2.3. The Owners of the Swedish VC Industry Are Setting the Standards

As introduced in the introductory parts, the investors have in turn their investors and hence owners. These actors are standing behind and financing the whole VC activity. According to SVCA the private equity financiers can be grouped as following:

![Financing sources of private equity funds](image)

Figure 9. Financing sources of private equity funds. (SVCA Q1-Q4, 2005)

There are several ways to which it is possible to invest in private equity where investments in private equity funds are most common. (SVCA matrikel, 2006) Figure 9 tells that the pension funds are the most common financier of the venture capital funds of Sweden. The pension funds’ significant involvement affects the way the private equity funds function according to the American Professor Paul A Gompers at the Harvard College (Gompers, 2001). The managers behind the pension funds all act under pressure to perform great Internal Rate of Return (IRR) on their investments in a limited period of time. A VC fund must perform at least as good as the general VC market to keep the investors from going to another VC fund (which mathematically is impossible since roughly 50 % of the VC-actors will fall below the average IRR). The average IRR can be seen in Table 3.
Table 3. IRR since the start. (Thomson Financial, annual figures 2005)

<table>
<thead>
<tr>
<th>Region</th>
<th>All funds</th>
<th>Venture-funds</th>
<th>Buyout-funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swedish funds</td>
<td>18.9%</td>
<td>6.3%</td>
<td>27.2%</td>
</tr>
<tr>
<td>Nordic funds</td>
<td>12.7%</td>
<td>1.0%</td>
<td>18.2%</td>
</tr>
<tr>
<td>European funds</td>
<td>10.1%</td>
<td>5.6%</td>
<td>12.5%</td>
</tr>
<tr>
<td>US funds</td>
<td>14.3%</td>
<td>16.1%</td>
<td>13.8%</td>
</tr>
</tbody>
</table>

Clearly the Swedish funds manage to earn most money through buyout funds, which probably could be explained with fewer difficulties to manage risk compared to companies in the venture stages. However, the Americans seem to be better at investing profitably in venture stages, something that could be explained by many more years of experience from investing.

There is one actor though that has found a profitable way of investing in really early stages, called Sting. The strategy of this actor will be described further in the second empirical part.

Another important explanation to the Americans advantage in med tech VC investing is the extensive domestic market for US firms, which enables fast growth of small med tech companies to major enterprises without barriers such as complex and differing reimbursement processes. Europe, in turn, has different reimbursement processes in every country, which makes it especially challenging and demanding for med tech firms to succeed with a European expansion.

Important is that an IRR cannot be accomplished without an exit strategy. This explains the importance of exit-opportunities among investors, which is not typically for just med tech but all industries regarding private equity since there is no official stock exchange. According to Professor Paul Gompers proof of the latter is how the number of venture capitalists correlates with the number of IPOs (Initial Public Offering) (Gompers, 2001). However, to med tech companies as well as the average for the whole VC industry in 2006 the dominant exit strategy is industrial sale reaching a total of 53% of all venture capital exits. (SVCA, 2006)

Important to notice is that many Swedish med tech companies are bought by American ones since there are fewer big enough Swedish players that can afford to acquire these companies.

Most venture funds are formed to exist in a certain period of time, commonly about 10 years why the investments have to be made during the first three to five years. This is why venture funds need to make an exit in four to seven years either in order to free capital for new investments or to close the fund. Developing med tech devices is a demanding task especially regarding time. Looking at the Elekta and Sectra examples, decades have been dedicated to product development. However, since the world becomes more global each day increasing competition requires fast product development processes and fast international expansion. Hence, an interesting question to ask is whether these time constraints from the VC:s necessarily need to be negative? In fact, they could be crucial for med tech ventures’ success since they put pressure on the entrepreneurs and provides expertise in how to perform quickly and reach market faster.

4.2.4. How Much Venture Capital Do the Med Tech Ventures Need?

One of the most time consuming and costly processes in a med tech company is the initial product development. As mentioned above there are five different types of med tech devices. In addition, there are three kinds of device classes that are concerned with the risk regarding the product’s interaction with the patient and hence compelling approval requirements:
As one can see in the Figure 11 the cost of the approval process rises significantly for the class III devices due to the high risk regarding the increased complexity in the regulatory process, more demanding clinical trials and hence the potential cost for the product development. This also leads to potentially longer product developments which can be damaging to the competitive situation where competitors get enough time to develop another invention ascribing the immediate needs of the target customers. Thus, this way a start-up
risks to lose its whole market potential if the development takes too long. Guve exemplifies this in his doctorate thesis “Risikokapitalistens investeringsbeslut” in the second case study. Hence, different med tech inventions will cost different amounts of money and need different ways of handling the risk. It is essential to put this cost and risk in relation to the potential growth and profit.

4.3. Closing Comments on the VC and Med Tech Industry

Swedish med tech has become a prioritized investment field in the VC market, partly due to the potential of high growth and profitability, and partly explained by the fact that Sweden has long dedicated significant resources to R&D in this field. However, to succeed in building med tech companies the investors and entrepreneurs need to handle the risk of time and cost in the product development efficiently, and thereafter deal with the significant market challenge. Except for the harsh regulatory affairs to launch a med tech device the differing and complex reimbursement processes in each country requires in-depth knowledge and vast international managerial experience – especially to succeed in Europe. The US, in contrast to Europe, have an extensive domestic market and one single reimbursement process which makes the situation for American med tech companies a lot different and easier compared to the European ones. Hence, this fact is important to understand how the Swedish med tech entrepreneurs come up with and pursue their market strategies.

This first empirical part aims at presenting a comprehensive picture of how two of Sweden’s most important and successful med tech entrepreneurs have been able to build global and profitable med tech enterprises. The results will be analyzed based on the information presented in the theoretical framework and the background chapter. The aim is to conclude some of these entrepreneurs’ most important needs in order to reach success that will be compared to the results presented in empirical part II.

To begin with, this part aims at describing how some of the med tech entrepreneurs think and what their needs are in order to reach success. In order to reach enough analytical depth a qualitative perspective has been chosen where this second empirical part will focus on two med tech success stories: Elekta and Sectra. Hence, there is no ambition to use these conclusions in order to create a general idea of how all med tech entrepreneurs think, rather the two cases represent the similarities and dissimilarities of two successful med tech ventures. They have both chosen a different path to their success which makes the analysis of how the VC industry should respond and act to the entrepreneurs even more interesting.

Having laid this foundation further information will be gathered regarding the main actors and behaviour of the Swedish venture capital industry in the second empirical part. When this information is mapped out it will be used to contrast the venture capital industry’s behaviour with respect to the needs of the entrepreneurs. Eventually the final question will be answered: Is the venture capital industry optimally responding to the needs of the entrepreneurs within the Med Tech industry?

The med tech industry is multi-faceted circumscribing several and different technology areas, business logics, product development procedures, complexity etc. However, I have chosen two med tech examples that are similar to or can be classified as CoPS (see the theory chapter). Hence, the selection is made based on a business logic classification where the ultimate choice of case examples was made due to the successful growth and international market penetration in combination with good connections that enabled interviews with highly interesting and influential interview persons.

5.1. The Elekta Way: Systematic Avoidance of the Swedish VC Industry

The first case study is the global med tech company Elekta. Interviews have been held with the founder, major owner and former CEO during 30 years Laurent Leksell, and the current CEO Thomas Puusepp.

5.1.1. Introduction

Thomas Puusepp, the CEO of Elekta since two years, and Laurent Leksell, founder and former CEO of Elekta, could proudly conclude that their last product development process of
the new generation Leksell Gamma Knife called Perfexion was overall successful. Perfexion had become an immediate success where more customers than expected chose to acquire the new gamma knife, which was sold worldwide. However, this success was thanks to untiring and long-term work. The initial Leksell Gamma Knife (LGK) took approximately 30 years to develop and commercialize. It all began with Laurent’s father, Lars Leksell, who was professor in neurosurgery and pursued research at Uppsala University. How his research could become a critical med tech device helping hundreds of thousands of people worldwide fighting cancer and brain disorders is a long and inspiring story of how Elekta’s proactive management successfully could handle risk and opportunities.

**Elekta – A World-Leading Med Tech Company**

Elekta’s products and services are used at over 4,000 hospitals around the world. The product offering is divided into six product categories within the two business areas Neurosurgery and Oncology:

- Stereotactic neurosurgery
- Gamma Knife Surgery
- Functional mapping
- Precision Radiation Therapy
- Image Guided Radiation Therapy
- Stereotactic Radiation Therapy

![Diagram of Business Area Distribution and Net Income Share per Market](image)

*Figure 12. Distribution of business areas and net income relative to market distribution. (Elekta Annual Report, 2006)*

By the end of 2004 over 350,000 patients have undergone Gamma Knife surgery in more than 220 centres worldwide. The company employs over 1800 people and is ascribed to a market value of approximately 11bn SEK. Elekta is still a fast growing company where the Net income rose by 40% from 2004/05 to 2005/06 and continues to penetrate current and new markets aggressively. (Elekta Annual Report 2006)
5.1.2. The development of today’s successful Elekta

Elekta’s most important developmental stages will be now be gone through in order to map out the company’s most important needs for reaching success.

1972 – 1985 The Development and Sales of Mechanical Stereotactic Instruments

During the late 1940s, Professor Leksell invented the stereotactic frame with the ambition to minimize the surgical intervention of the skull – something that greatly reduced the mortality rate compared to regular neurosurgery. The Leksell Stereotactic System was shortly thereafter introduced, which was a tool with which neurosurgical instruments could be positioned to the brain with great precision. “The stereotactic concept became an important foundation for further innovations. In the beginning of the 1950s it was used to direct beams of X-rays into the brain in order to treat tumors and other brain disorders for the first time. “The revolutionary concept of stereotactic radiosurgery was born and with it the introduction of Leksell Gamma Knife, developed by Prof. Leksell and his colleagues.” (www.elekta.com, 07-04-12)

The company Elekta was founded mostly because it cost Lars Leksell too much tax to licence his inventions as a private person compared to gathering the licensing agreements in a company. Lars’ son, Laurent Leksell, gained a thorough academic and consulting background in economics and started to get involved in the company.

As the development costs rose significantly Laurent felt obligated to increase the sales. He started with taking a bank loan in 1978 to finance the deficit generated by revenues of SEK200,000 in relation to costs of SEK900,000, which also made him the major owner of the firm. It did not take long until Elekta had risen its revenues to approximately SEK500,000.

The production of the instruments was outsourced to LEGO producers and the distribution net did slowly take form through partnering agreements with trading companies. When the British partner who handled the important US market went bankrupt in 1983, Laurent decided to start up his own distribution organisation and commenced the venture in the US. Two years later, a distribution organisation was formed in France as Elekta could not find a French competent enough player to handle the task.

1982 – 1989 The Development of the Leksell Gamma Knife

A first version of the Leksell Gamma Knife was developed in the 1960s, but had since then not yet been updated or further developed. First, Laurent tried to finance its development by licensing to Scanditronix, an American firm that soon got in trouble and thus could not deliver what it promised. After a number of legal actions Elekta won back the licence of the LGK and decided to handle the development themselves. A potential customer from the US approached Elekta and wanted to buy around 10 LGKs which was a significant number compared to Lars Leksell’s worldwide market estimation of 3-5 knives. A consensus agreement was signed between the parties which said that the customer would pay $10,000,000 for the distribution rights to the US market and prepayment for the first LGK. Also, this company got problems and wanted to break the deal, but Elekta could successfully claim the legal right to keep the payments that had been done. Hence, this first potential customer paid for parts of the initial development of the LGK without ever getting one themselves!

At this point Elekta had a turnover of SEK5,000,000. A new potential customer from the University of Pittsburgh made contact with Elekta. The problem was again the financing of the LGK since the company would need another SEK30,000,000 to cover the development costs. Initially, Elekta tried to cover the financing with bank loans, but all banks refused the request. Therefore Laurent decided to form an agreement with the customer where they had to
pay for the knife in advance. In return the customer asked for a payment guarantee certifying that they would get their money back if the LGK would not be delivered. This was a challenging task for Elekta since they could not offer the warranty themselves due to insufficient funds. Eventually the bank Investeringsbanken agreed to stand surety to Elekta. Hence, with the help of Investeringsbanken and raising mortgages Elekta managed to offer the payment warranty and the product development cost of the first commercial LGK was covered.

1986 – 1989 Commercialization of Elekta

By 1986/87 Elekta had a turnover of approximately 20mSEK and the initial product development and innovation phase was over. Elekta now needed to develop the organisation, especially the distribution and sales force, and hence put focus on commercialisation. Until this point Elekta had only had four employees including Laurent working part time as President and CEO. He decided to quit his work as consultant, leaving the academic world to focus exclusively on Elekta. Development of the organisation and technology would be costly and since Elekta had a scarce budget they had to look for external financing again. This time Laurent aimed at gathering institutional financing. The venture capital market was consciously avoided due to several reasons. First, the staged financing process of venture capital would result in too little money and take too much time. Second, Laurent did not want to share the important decision-making with one major owner, rather he wanted to bring in capital from several actors and hence remain in control of the whole company alone. Third, Laurent saw no need for external competence or network. In addition the institutional capital would professionalize the company due to the financiers’ demand for goal orientation and transparency in their work. Around 15mSEK was raised through a syndicate of investors such as Investor, the Bonnier family and assurance companies.

1989 – 1994 Internationalisation of the LGK

By the end of the 1980s Elekta had gone through organisational changes and improved its activity. The LGK was constantly subject to technological improvements where 20-25 % of Elekta’s total turnover was invested in R&D. As for most growing med tech companies, expansion to the international market is an inevitable part of their development. Since the LGK is a product that is sold seldom to each customer a broad market is crucial for increasing the sales volume. Hence, Elekta’s next important step was to internationalize the company and start selling the LGK aggressively on new markets. Again, the company was in need for external financing.

Working with institutional players had been a pleasant experience for Laurent and since the company had been adjusted to handling institutional owners Elekta wanted to proceed in a similar way. An American investment bank was hired to enable an additional private placement4, but this time with an explicit emphasis on international investors. The private placement was successfully carried out where investors were, amongst others, the GE pension fund and American and French venture funds. Again, a significant sum of money had been raised without ever giving away the executive mandate.

How could Laurent successfully raise this much money twice? Laurent put forward ability to understand the investors’ needs and offering them an attractive exit strategy. In this latter case, Laurent promised the investors that Elekta would go public in five years, which gave the

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4 Private Placement: Raising of capital via private rather than public placement. The result is the sale of securities, either debt or equity or hybrid securities, to a relatively small number of private investors. Source: en.wikipedia.org/wiki/Private_placement
investors an opportunity to exit their investment or remain as owners within the regular time frame of the venture capital industry, three to seven years. In addition, Laurent made significant efforts throughout the time period of the investment to keep a close and nurturing relationship with the investors. They were always given the information they asked for and handled professionally.

1994 IPO and Continuous Internationalisation

As promised, Elekta made an Initial Public Offering (IPO) at the Stockholm Stock Exchange in 1994. A new issue of shares was made due to the risk profile. Elekta has a significant risk regarding their product offering. The product development cycles are long and requires a lot of capital why the company’s success can vary significantly depending on whether one single product development project is successful or not. Hence, to manage risk and radiate long-term trustworthiness to the customers the company needs to keep the financial risk low. Issuing new shares increases the equity of the company and provides a better net asset value. Through the IPO Elekta raised 200-300mSEK, which coincides with the total turnover of Elekta at that time. With the new financial strength, further internationalization and development of Elekta was enabled. The important issues that the company had to deal with was how a successful distribution and sales organisation could be built through a product offering that was not based on returning customers.

1994 – 1998 The Challenges of Growing the Company

To be able to afford a global distribution and sales organisation, Elekta had to reach a critical size. The goal was to grow by 15-20 % on an annual basis. To breed this growth Elekta made two decisions: diversifying the product offering through the “one-stop-shop” strategy and extending the LGK technology and apply it to treatment of cancer in other parts of the human body than the brain. The “one-stop-shop” strategy focused on owning the whole process chain for the neurosurgical products. The customer should get everything he or she needed within his or her field when buying an Elekta product within neurosurgery. This strategy was pursued through both organic growth and acquisitions. Eventually, Elekta was able to offer a diversified-enough product range to be able to hiring a big sales force and breed several distribution centres. Significant and highly opinionated markets were served by an independent distribution organisation, meanwhile smaller and more complex markets were served through licensing agreements with external distributors. At this point, Elekta’s market distribution was 50 % in USA, 45 % in Asia and 5 % in Europe.

The idea of applying the LGK technology to other parts of the body sprung from an increasing scepticism towards Elekta’s new idea of how to give brain surgery since it was totally different to the conventional way of treating brain tumours. Some competition from potential substitutes such as acceleration technology developed, why Elekta started to look for opportunities to acquire this highly advanced technology since it was too expensive and difficult to develop in-house. Acquiring this kind of business proved to be a difficult task since the only owners of the technology were major enterprises such as GE, Siemens and Philips. However, Philips Radiation Therapy Division met difficulties at the time and needed someone to help them rebuild their brand and find a profitable course of action. Laurent raised 60-70mdollars from a consortium of banks and thus closed Elekta’s biggest deal ever by acquiring a business circumscribing Elekta twice in 1997. Hence, Elekta had become a major enterprise with a positive outlook for the future.
1998 – 2003 Elekta Meets its Greatest Crisis

Three to four months after the acquisition of Philips Radiation Therapy Division the Asian crisis came knocking on the door and Elektas 45 % market share more or less disappeared. The banks wanted their money back and it stood clear that Elekta was about to meet its biggest crisis ever. A major restructuring program was implemented and a junk bond was issued at an extremely low valuation due to the high risk picturing Elekta at the time being. Laurent Leksell remembers this experience and concludes: "Those investors would get hell of a good return!"

Around year 2000 Elekta finally saw some light. The business had been stabilized and the cash flow turned to positive figures. An alarming issue was the high financial risk with a solidity (Equity per assets ratio) of low 10 %. To improve this Elekta wrote down the quotation of the convertible loan which enabled an improved solidity of 20%. The Shareholders Equity and hence the business was secured.

Figure 13. Development of Elekta key figures years 1994-2006. (Elekta Annual Reports, 1994-2006)
From Year 2003 – the Opportunities Arise Again

With this painful experience Elekta had now learned to catch opportunities when they arose. Since then, they have continued to acquire businesses that are inline with their strategy and closed two additional financing deals. Around year 2003/04 the US dollar was traded at low levels why Elekta chose to make a private placement on a ten-year term. The company found this a good opportunity to raise cheap risk capital.\(^5\) In addition, Elekta raised additional long-term money through a seven year long bank consortium. Hence, Elekta seems to be goal oriented with great appetite for growth and catching opportunities.

5.1.3. Analysis of Case 1, Elekta

Building a long-term and trustworthy relationship with the first customers was essential to Elekta’s success. Elekta financed its initial product development by prepayments from the initial customer. Also, by providing a sound and balanced strategy for how to manage the risk Elekta became an interesting investment with a good risk/reward ratio.

By being trustworthy and having a good contact with the banks made it possible for Elekta to build a warranty consortium for the prepayments towards the customers. Otherwise, there would have been no initial paying customer. It was also important to Elekta to show that the business was earning money in order to enable loan financing and prepayments from the customers.

Elekta’s CEO Laurent Leksell had a strong academic background within economics which radiated trustworthiness and competence, as well as his father’s, Lars Leksell, profound

\(^5\) In August 2005 Elekta strengthened and diversified its long-term financing structure by making an additional private placement with American institutional investors. The transaction volume reached 125 million US dollars and the term was 10 years.
competence within neurosurgery. Both had good contacts within their certain fields and were also able to win trust fast among actors in the med tech field. Through the father’s network one of the initial and most crucial customers was gained (the professor at University of Pittsburgh). Hence, the ability to gaining experience and building an extensive network within the med tech industry is crucial to win respect among potential customers.

Interesting is that throughout Elekta’s long-term growth and development the company did not change management once. Even though the company went through major crises where Elekta was balancing on the edge of survival, Laurent Leksell remained CEO. Today, knowing Laurent could handle the crises thus successfully it turned out to be a good decision to let him remain, but it is seldom unusual that management is being replaced in less grave situations. One explanation is probably the fact that Laurent owns a major share of the company himself and thus have a significant vote about how management should be handled.

Last, but not least, Laurent’s ability to understand the investors’ perspectives and ‘speak their language’ made it possible for him to build a mutually nurturing relationship and offer the investors what they wanted: return on investment and exit strategies within a limited time frame.

Hence, through widespread competence and network, a proactive attitude towards acting on opportunities and dealing with threats made the combination of business and deep medical competence a winning strategy resulting in one of the world’s biggest med tech companies.

5.2. Sectra: Clusters that Breed Entrepreneurial Success

The second case study is the ‘going global’ med tech company Sectra. Sectra has not yet reached the same size as that of Elekta, but is growing fast and has helped millions of women worldwide with improved mammography. Interviews have been completed with founder and vCEO Torbjörn Kronander, the KTH mammography researcher and entrepreneur Mats Danielsson and the management advisor and investor Uno Alfredén.

5.2.1. Introduction

It took Sectra approximately 30 years to reach its current position – there are two well developed business areas – with customers in more than 35 countries. The company’s mission is to help making the healthcare sector more efficient and to protect government and defense communications.

By the end of year 2006 Sectra had reached total sales of over SEK560M. The business area of medical systems is the largest operational segment and accounts for 88.3 % of the Group’s net sales. Sectra is one of the world’s leading suppliers of systems handling digital radiology images. Sectra’s core business is delivering top-of-the-line, high-availability, robust enterprise diagnostic imaging for 24/7 operation. The product offering includes for example systems for film-free radiology (PACS), mammography with the world’s lowest radiation dose, and orthopedics (www.sectra.com, 2007-05-12). The mammography segment is growing where six new markets were entered in year 2006 solely. (Sectra Annual Report 2005/2006)
Figure 15. The latest digital mammography equipment from Sectra with a reduced weight from 1000 kg to today’s 250 kg. (www.sectra.se, 2007-05-30)

The market for Sectra’s med tech product offering is growing at an accelerating pace and Sectra is more independent, experienced and hungrier than ever to catch this opportunity, aiming at world leading positions in its niches. However, getting thus far has not been easy where learning from mistakes as well as being able to get advices and mentorship from wise business people have been evident for the company’s success and ability to manage crises.

5.2.2. The Development of Today’s Successful Sectra

In the following chapter Sectra’s most important development stages and how they managed to successfully deal with all the challenges that crossed their way will be presented. Sectra is unique in its way of finding creative ways to finance its growth. By becoming the ideal partner who knows how to balance give and take in different situations Sectra has reached a world market leading position in several business areas.

1978 – 1987 Developing a Business-Oriented Company through Demanding Customers

Sectra stands for SECur e TRAnsaction, which witness Sectra’s first assignment and hence initial business idea. In 1978 the Linköping Institute of Technology Professor Ingemar Ingemarsson and his three doctorate students Viiveke Fåk, Rolf Blom and Robert Forchheimer took on the assignment to create a security solution for banks.

A couple of years later the company would begin a new strategic orientation by hiring new CEO Jan-Olof Brüer who still runs the company. As the businessman he was, Jan-Olof began the process of making the company business oriented instead of research oriented. He put emphasis on selling products and system solutions in the areas of data security, digital radio and image coding. However, he did not accomplish this transition on his own. Without the help of his colleagues and mentors Sectra would never be what it is today.

“We founders were academics and researchers. The smartest decision we ever made was to bring in knowledgeable business-oriented people,” says Professor Fåk. (www.sectra.com, 2007-05-12)

One of the first steps in this direction was landing a major defense order for a new crypto ship in 1987. The defense and government agencies were probably the most demanding customers in the market. This turned out to be an important learning experience, enabling Sectra to gain superior knowledge about the market’s needs for which many parties were willing to pay a lot. Sectra made sure to take advantage of the situation, learned a lot through these demanding customers and eventually obtained a market leading position for advanced encryption equipment by the mid 1990s.

By the end of 1980s Dr. Torbjörn Kronander joined Sectra, bringing with him a strong interest in medical technology and a vision of digital radiology. A few years later, in 1993, Sectra developed the systems to the first entirely film-free radiology clinic in Mjölby, Sweden. Again, the expansion of the medical technology business area and its product development took place in close collaboration with the initial customer, which resulted in making the initial customer providing risk capital instead of the venture capital industry. Also, through a close partnership with the customer, the company certifies that there is a strong demand for the product.

The expansion of these two business areas, advanced encryption equipment and medical technology, was not pursued by chance. Rather, the expansion was a result of a thought-through strategy about identifying niche markets with high potential growth in the long-term perspective.

Meeting with Uno Alfredéen and Joining His Mentor Programs

Developing a successful growth strategy is a difficult and demanding task. Dr. Torbjörn Kronander and Jan-Olof Brüer came in contact with the serial entrepreneur and successful investor Uno Alfredéen in the early 1990s. Uno and the Swedish Minister of Foreign Affairs Mats Hellström examined how Swedish software companies could be successful in expanding internationally. Eventually they came to Linköping University to present their results to local software companies – amongst others Sectra represented by Kronander and Brüer. Since they found Alfredéen’s findings and advices utmost rewarding, the team decided to invite him to a continuous, but not specified, partnership. The result was a multi-mentor-program where Sectra together with eight other expanding companies met on a regular basis to discuss current problems and issues regarding their company’s success. Alfredéen planned the meetings and tutored the discussions. This way Sectra had a forum to exchange experiences and thoughts, and was guided through the challenging crossroads towards international success. Alfredéen remembered that he enjoyed working with Brüer and Kronander. He concludes that his most important contributions to Sectra were to provide the management team with guidance through the process of eliminating all the less promising business areas and hence put relentless emphasis on the above mentioned two core product lines. In addition, he helped planning how to expand to the important US market. Together they introduced the concept of joint venture and started to look for possibilities of “marrying” a big enough player to enable international expansion, but small enough to be interested in Sectra’s product offering.

1994-1999 Continuous expansion in niche segments and initial internationalization

In 1995 the first foreign office was established in Norway. Since then offices have been opened in six countries. Going international is an expensive and complex process where partnerships and joint-ventures are crucial to enable a growth process that is fast enough. In Sectra’s market several hospitals desired to acquire whole systems solutions, something that Sectra alone could not offer. Therefore Sectra began to pursue expansion strategies both through acquisitions and other forms of partnerships. In 1995 Sectra made its first important acquisition by purchasing Imtec, a company that developed digital image management systems for healthcare applications.
In addition, it was desirable for Sectra to share the risk of entering the extensive US market with someone. The biggest players would not be interested in partnering with Sectra, but the fourth or fifth largest actors seemed to be more suitable, such as Philips Medical Systems. After having initiated the negotiations that would not come to an end before three years, Brier contacted Alfredéen to ask him for help. After having practised negotiation in the multi-mentor programs with Alfredéen, Brier realised that Philips was a tough negotiator that would jeopardize Sectra’s future if not handled wisely. Alfredéen acted as Sectra’s advisor and called off the discussions when Philips did not agree on a mutually beneficial joint-venture. As Alfredéen explained: “Philips proposed a ‘WIN (Philips)-win (Sectra)’ agreement, something that Sectra could not accept until it was a joint venture resulting in a ‘WIN-WIN’-situation (Alfredéen, 2007-05-10).” When the partnership finally became reality, Sectra had amongst many things negotiated one important commitment. Sectra made sure to always co-own the customer by never letting Philips stand as the sole sender of their common product offering. Philips had to make Sectra’s brand visible to the customer. This strategy would come to part life from death for Sectra when Philips one day would ask for a “divorce”.

1999 Initial Public Offering

In 1999 Sectra made an Initial Public Offering on the Stockholm Stock Exchange. According to Sectra’s website, the aim with this manoeuvre was “...to validate that the company had grown to become a strong player before continuing on its path toward internationalization.” (www.sectra.se, 2007-05-12) Being listed on the stock exchange would provide financial resources to expand the company internationally and also pursue acquisitions when necessary. However, Uno Alfredéen argues that the reason to go public was not necessarily because of the need for risk capital. Rather, the IPO offered shareholders a chance to liquidate their ownership – something that had been desired by several employees since a long time.


During the same year as Sectra made the IPO, Torbjörn Kronander met the researcher Mats Danielsson at a conference for radiology in San Diego, USA. Mats Danielsson was a successful Assoc. Professor in Physics at the Royal Institute of Technology and had recently developed a revolutionary radiation detector that Kronander and Sectra perceived could be used in digital mammography. The mammography market was extensive (the most common form of cancer among women), where Sweden turned out to be an important test market: 600 000 women are examined through mammography every year, 18 women are diagnosed with breast cancer every day and four die from it. Over 100 million women worldwide are examined with mammography every year. The most important selling argument behind the mammography market is that the earlier one can discover breast cancer, the better chance of survival. Danielsson’s technology was the best in the world. Hence, Sectra and Danielsson co-founded a company together where Sectra gained a 40 % share. During the initial years the company’s product development was partly financed by scholarships from “Vetenskapsrådet” and “Stiftelsen för Strategisk Forskning”. Industrifonden and Skandia Liv were early (and small) financiers of the business as well, but do not have any stakes in the company today. Also, KTH provided facilities since they thought that having a successful and high-technology start-up on campus would be inspiring to other researchers and students.

In 2000 the initial product was developed and tested through a workshop with nurses. The clinical trials in year 2001 were successful, which opened up the gates to the first customer: Helsingborg’s Hospital. Danielsson concludes: “This was the end of the game – now it was serious business!” (Danielsson, 2007) However, Danielsson had difficulties to deliver the
product on time – the delay summed up to one year. This was an important lesson-learned for Danielsson, who decided that the delay was a one-time-incident and would never happen again. However, the implementation of the mammography radiation detector was successful, which opened up for expansion. In 2004 the whole company was acquired by Sectra since it had grown thus significantly.

Danielsson underlines that having close ties to the academic world, which enabled pursuing research in parallel with doing business, was important for the company’s success. Also, having a willingness to work with and learn from the best regarding product development and production lead to the formation of important partnerships (such as the one with GT Mjölby).

2005 Sectra’s Test – Does the Company Manage to Stand Alone?
In the middle of year 2005 Philips announced that they had acquired a company providing similar products as those of Sectra’s PACs offering. Even though Philips continued to sell Sectra’s products throughout the year, Jan-Olof Brüer acknowledged the fact that Philips’ relative importance to the distribution of Sectra’s products had started to decline (Sectra Annual Report 2005/2006). Meanwhile, the stock market received the news as devastating, resulting in a share price decline of almost 50 % during July – August 2005. See Figure 15.

![Figure 15. Sectra’s share price development during Philips divorce. (Avanza, 2007)'](image)

This crisis resulted in a number of opportunities for Sectra. For example, Sectra signed distribution agreements with ten new partners. Thus, the terminated joint venture gave Sectra the incentive to start building an extensive independent distribution organization. However, this would not have been possible if its management had not listened to the advices given by Uno Alfredéen – to always co-own the customer with the partner. During the long partnership with Philips, Sectra had made sure to market their own brand in all communication with the customers. Hence Sectra had not let Philips stand as the only sender when distributing systems that were built up in collaboration with Sectra. That way Sectra had become an increasingly strong brand among its customers, something that opened up the current opportunity of building an own distribution- and sales organization. Nurturing partnerships and overall successful managerial efforts resulted in significantly increased sales in Sectra’s most important market, USA, with 76.6 % by the end of year 2006. (Sectra Annual Report 2005/2006) Regardless of the costs for phasing out Philips the company manages to stay profitable meanwhile growing faster than ever.
Figure 17. Sectra’s development of net sales and profit years 1994–2006. (Sectra Annual Reports 1994-2006)

Figure 18. The Sectra debt and solvency ratios year 1994-2006. (Sectra Annual Reports 1994-2006)
5.2.3. Analysis of Case 2, Sectra

The story of Sectra’s development towards success resulted in a few important lessons learned. Several of these are stated in Uno Alfredéen’s self-written handbook “Konsten att bygga framgångsrika företag” (“The art of building successful companies”, author’s translation). The question is if it was Alfredéen’s own wisdom that made Sectra successful or whether it was Sectra that taught him these lessons. Nonetheless they are important advices for med tech entrepreneurs and interesting conclusions for this essay.

- Sectra did not receive any major external financing from the venture capital market. In fact, Uno Alfredéen says he has throughout his career as a venture capitalist advised entrepreneurs to seek other ways of financing growth if possible. Sectra did this by:
  1. Making the initial customer pay for the product development.
  2. Joint ventures and hence let bigger actors distribute their product offering in a larger systems solution.
- Becoming a smart and attractive partner and balancing give and take in partnerships is utmost rewarding but difficult to accomplish. The Sectra case proves that it is at least as evident for a small company to demand fairness and equal win-win for the parties involved as it is to accomplish a partnership at all. A partnership on bad terms can result in a death sentence.
- Tying mentors to the company’s management, securing an inflow of advice and building an extensive network of experienced and business-minded people for recruitment were evident for the successful growth of Sectra. Through endless discussions with Uno Alfredéen and several other entrepreneurs in his mentor-programs the Sectra management team created a forum where they could test their ideas, think potential problems through and create a sustainable long-term strategy.
- Keeping close ties with the academic world has been and still is important to attract valuable employees as well as business opportunities. Hence, Sectra has through its pro-active behaviour managed to take the company from being strictly research-oriented to be market- and business-oriented. The management would not have managed to do this alone. By opening up the organization for recruitment and engagements with superior and complementary competencies and actors, Sectra managed not only to become a major med tech company, but also managed to do so without any significant external funding.

5.3. Conclusions the Elekta and Sectra case

The Elekta and Sectra cases have similarities and dissimilarities regarding their chosen way towards success. They both share a challenging and successful history, but often chosen different ways to deal with strategic issues. This comparison can not be entirely fair since the two companies have not reached equally far in its development and size. Therefore focus will be put on how the companies got successful early in their development and how the financing need was provided for.

- Both companies sprung from close ties with the academia. However, it was not until business-minded people joined the companies that the research got commercialized and experienced successful growth. Hence, a combination of good researchers and businessmen was an important success factor for the two companies.
Elekta and Sectra did both finance the initial product development in collaboration with the first and/or other early customers instead of bringing in significant venture capital. Elekta did pursue several private placements later in its development, which has not (yet) been the case for Sectra.

The same top management have lead the companies through all the developmental stages regardless of significant crises.

One important difference between the two companies is that Elekta focuses exclusively on medical technology; meanwhile Sectra has one branch apart from med tech – the defense encryption activity. How Sectra succeeds in keeping two such different activities alive and successful in parallel is a mystery to the author since it seems few potential synergies are possible between the two areas. It is questionable whether it is not better to focus exclusively on one business area – especially since both are very demanding ones why there is a risk to ‘spread too thin’. An important question to ask is if Sectra would have been even more successful if putting relentless focus on medical technology (since it is obviously the most important business area reaching over 80 % of net sales today)?

In general the two companies have had a good solvency (equity/asset ratio) or at least aimed at having it (see Figures 14 and 18). This has been a way of handling the risk of the business towards investors/shareholders. Since the companies’ med tech development projects take long time to pursue, bringing with them a significant business risk, it has been evident to master the financial risk, hence keeping the debt and solvency ratios at good levels providing limited risk.

To conclude, reaching success has been a puzzle of good and long-term management, external sources of managerial expertise, a successful combination of researchers and businessmen, pleased investors through efficient risk management, and nurturing partnerships with customers as well as other providers of medical technology within the same field. These are the needs of a few very successful med tech entrepreneurs that successfully have been provided for.

In this second and final empirical part the venture capitalist market will be looked closer at with an analysis of the most interesting actors in the med tech field based on in-depth interviews with key actors from the different firms. The knowledge and information gained in the previous parts all constitute prerequisites for a good and comprehensive understanding of why these actors act as they do. Thereafter an analysis will follow based on all the lessons-learned from this thesis and what lays ahead in the future for Swedish med tech.

From the previous parts, the general venture capital market for the med tech industry has been described and discussed. Two successful med tech entrepreneurs have told their story about what needs they had in order to reach great success, and concluding what role funding and venture capital played in their crucial development stages. In addition, key actors from the venture capitalist market have been interviewed where they have told their stories and what is leading their potential decision to invest in certain med tech companies. However, important to keep in mind is that the venture capital market for med tech 30 years ago was more or less non-existing, which is to compare with med tech investments during late years that have met a significant increase in interest from the VC community in Sweden. Hence, this chapter aims at providing a sample of what the VC community has to offer today and see if they can meet the med tech entrepreneurs in the needs concluded in the end of chapter five. Thus, questions that will be answered in this chapter are what is affecting the VCs decision to invest? What are their driving forces? How does this respond to the needs of the med tech entrepreneurs? This will feed the following analysis chapter with relevant information to eventually answer the final and most important question: Is the venture capital industry optimally responding to the needs of the entrepreneurs within the Med Tech industry?

The selection of interview objects have been based on their relative importance to (based on size and reputation) and/or diversity (unique niches) in the Swedish VC market for med tech. Also, the availability of the interview object, hence ability to arrange an interview, has in one case thwarted one desired interview object.

6.1. The Selection of Swedish Med Tech Investors

The major med tech investors year 2006 are presented in Table 4 where they are ranked according to their size of investment.

<table>
<thead>
<tr>
<th>Company</th>
<th>Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>EQT Partners AB</td>
<td>Buyout</td>
</tr>
<tr>
<td>Investor Growth Capital</td>
<td>Start-up, Expansion</td>
</tr>
<tr>
<td>Sjätte AP-fonden</td>
<td>Expansion</td>
</tr>
<tr>
<td>SEB Företagsinvest</td>
<td>Start-up, Expansion</td>
</tr>
<tr>
<td>CapMan AB</td>
<td>Start-up, Expansion</td>
</tr>
<tr>
<td>Industrifonden</td>
<td>Start-up</td>
</tr>
<tr>
<td>SLS Venture</td>
<td>Start-up, Expansion</td>
</tr>
</tbody>
</table>
Table 4. The major med tech investors in year 2006. (Gretzer, 2007).

Table 4 is not covering all med tech investors in the Swedish market. A table of all the Swedish med tech investors can be found Appendix 2. These two Tables have been guiding the interview selection. The interview objects have been selected on two grounds: the size of the investor in med tech both in terms of number and sizes of investments, and/or if they have a unique niche providing the med tech financing chain with different and interesting entrepreneurial possibilities. Interviews have been held with the following players:

<table>
<thead>
<tr>
<th>Position</th>
<th>Actor</th>
<th>Investment Phases</th>
<th>Interview person</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CapMan AB</td>
<td>Start-up and Expansion</td>
<td>Jan Lundahl, Head of Life Science; founder Sweden’s first med tech VC fund</td>
</tr>
<tr>
<td>2</td>
<td>HealthCap</td>
<td>All stages</td>
<td>Mårten Steen, MD, PhD, Associate HealthCap</td>
</tr>
<tr>
<td>3</td>
<td>Industrifonden</td>
<td>Seed, Start-up and Expansion</td>
<td>Jörgen Lönngren, Head of Life Science, Patrik Wahren tidigare ansvarig Med tech, Uno Alfredéen tidigare styrelseordförande</td>
</tr>
<tr>
<td></td>
<td>Karolinska Investment Fund</td>
<td>Mostly Start-up and Expansion, but no phase is refused</td>
<td>Carl Johan Sundberg, MD, PhD, Investment Director KIF</td>
</tr>
<tr>
<td>4</td>
<td>Sting Capital</td>
<td>Seed</td>
<td>Gösta Sjöholm, business coach Med tech</td>
</tr>
<tr>
<td>5</td>
<td>Lars Molinder (Carnegie Investment)</td>
<td>Late stages, buyout</td>
<td>Lars Molinder, former Head of Healthcare investment at Industrifonden, Alfred Berg, ABN</td>
</tr>
</tbody>
</table>
Table 5. The interview objects for the Swedish med tech financing chain.

<table>
<thead>
<tr>
<th>Bank)</th>
<th>Amro.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uno Alfredén</td>
<td>Early stage</td>
</tr>
</tbody>
</table>

6.2. CapMan – A Market-Oriented Med Tech Investor

In this section the investor CapMan will be described, and the most important findings about its investment activity will be discussed.

6.2.1. Short Description of the VC Firm

CapMan Life Science focus on investments in med tech. Fundraising for CapMan Life Science IV fund, which was established in March 2006, will continue until May 2007. The fund invests in medical technology companies mainly in the Nordic countries. CapMan’s own commitment into the fund is MEUR 5, and the allocation of possible carried interest that will be received from the fund is 50% for CapMan and 50% for the Life Science team. CapMan Plc’s income derives from management fees from the funds, carried interest from funds generating carried interest, returns on direct fund investments made from CapMan Plc’s own balance sheet and returns on real estate consulting.

![Investment stages of CapMan: Start-up and expansion. (SVCA, 2007)](image)

- Interview person: Jan Lundahl  Head of business area Life Science
- Maximum investment amount: 30-70 MSEK (max market cap 200 MSEK)
- Average duration until exit: 4.5 years
- Prefered exit strategy: Industrial sale
- Success rate: 30 % success, 50 % zero-sum game, 20 % failure
- One Life Science fund with clear emphasis on med tech, but does invest in biotech and pharmaceuticals as well.

6.2.2. Important Findings of CapMan’s Investment Activity

Important findings such as CapMan’s investment objectives, the inflow of investment opportunities, strategy and management of investments, and eventually a description of CapMan’s ideal entrepreneur will now be described.
Investment Objectives

Jan Lundahl co-founded Sweden’s first med tech VC fund together with the investment firm Investor. He has extensive experience from investing and building companies in the med tech industry and sees himself as an entrepreneur. Being entrepreneurial, he claims, is crucial in this business since it is all about market strategy. Lundahl’s background is different to many other actors in the med tech business – amongst others he managed five restaurants before starting the first med tech fund.

CapMan does not take any technology risks while investing, which means that the entrepreneur must have a well-functioning product to receive funds from CapMan. Hence, there is an explicit focus on market strategy to reach success. Figure 20 shows how Jan is picturing the important developmental market stages for a med tech venture.

Figure 20. CapMan’s view of the med tech investment development stages. “Prototype” is the stage where the initial product prototype is developed. “Product” is the stage where the final sellable product is developed. “Case study” is the stage where a long-term plan for the venture is made – what market stage to reach at what time and when to make an exit. “Regulatory affairs” is when the product needs to get approval from different nations to start selling internationally. “Reimbursement” is the stage when the venture needs to deal with the different nations’ reimbursement processes in order to enable compensation from the nations, and “market launch” is the stage where the venture starts selling in the markets and all regulatory and reimbursement requirements are sorted out. (Lundahl, 2007)

The Inflow of Investment Opportunities

Jan claims that CapMan is one of the absolutely best med tech investors since they provide unique competence in and experience from all the stages in the med tech market development described in Figure 20. Therefore CapMan claims it has a superior ability to take a med tech innovation to great market success. As a result entrepreneurs sometimes choose CapMan as investor even though they offer a lower valuation of the venture compared to other bidding investors (resulting in less money to the entrepreneur for her/his shares). In addition, Jan says it is common that the most professional med tech investors invite CapMan to co-invest in ventures.

Strategy and Management of the Investments

Generally, CapMan uses milestones to follow up the ventures’ performance. They want to make sure that the entrepreneurs are pursuing the most important developmental stages described in Figure 20. However, CapMan has no intention of getting involved in operational issues, but maintains a strict follow-up on the strategic issues. An investment that is not performing well generally takes more time from CapMan’s management and will eventually lead to replacement of the investment’s management team.
The average duration of an investment is 4.5 years and the most common exits are pursued through industrial sale.

The Ideal Entrepreneur

Finally, Lundahl claims that the ideal entrepreneur is a serial entrepreneur that has made it all the way from business idea to successful exit before. The company the entrepreneur is representing has no technology risk and is able to address all clinical needs to a significant patient population and needs accentuated venture capital in order to proceed with its expansion plans. Following, the product should be procedure-driven meaning that the revenue model should be based on repetitive sales towards the same customers rather than one-time-selling items like Elekta’s business model.

How CapMan Enabled Value Creation in Jolife AB:

- Assisted management in recruiting a new CEO.
- Played an active role in operational and strategic issues, such as strengthening existing patents, relationship with regulators and clinical trial management.
- Significant role in formulating the company’s marketing and business strategy.
- Contributed to implementing a quarterly reporting package and creating a new management incentivisation structure.
- Assisted in negotiating the distribution agreement with Medtronic.
- Actively initiated exit discussions.

6.3. HealthCap – A Specialized Pharmaceuticals Investor

In this section the investor HealthCap will be described, and the most important findings about its investment activity will be discussed.

6.3.1. Short Description of the VC Firm

HealthCap is a family of multi stage venture capital funds, investing internationally in life sciences. With committed capital exceeding 7 bn SEK, HealthCap is the largest specialized provider of venture capital within life sciences in the Nordic countries and one of the largest independent actors in the sector in Europe. The VC firm is investing globally in pharmaceutical, biotechnology and medical technology companies. Investments are made in early stage opportunities as well as in more mature companies. Until today HealthCap has started and closed four funds where a fifth is currently pursuing investment opportunities. Generally the firm has a well-experienced and competent life science background. The investors in HealthCap’s funds are the major pension funds as well banks and assurance companies. (www.healthcap.se, 2007-05-14)
6.3.2. Important Findings of HealthCap’s Investment Activity

Important findings such as HealthCap’s investment objectives, the inflow of investment opportunities, strategy and management of investments, and eventually a description of HealthCap’s ideal entrepreneur will now be described.

Investment Objectives

HealthCap has an explicit focus on Life Science investments and in particular the pharmaceutical industry. They have brought 15 pharmaceutical companies all the way to market launch, which is impressive given that the success rate is estimated to be one over 30,000. The VC firm is active in med tech investments as well, but to a smaller extent. Mårten Steen had some difficulties estimating the exact share of med tech investments since he had the opinion that there are many “grey zones” concerning the definition of med tech.

The firm claims it invests in most stages, but the fund is too big to allow too small investments. Investments of 750,000 SEK take place rarely (if ever). However, HealthCap has one particular niche that is of interest. The firm has two full-time employees who act as CEOs in some of the fund’s early stage investments since their initial management did not live up to the requirements. This is just a temporary solution until a more suitable leader has been recruited.

The Inflow of Investment Opportunities

The inflow of investment opportunities is created through HealthCap’s network and reputation. Their position as the number one investor in the Nordic countries in Life Science makes them an attractive partner and co-investor for entrepreneurs as well as investors. In addition, HealthCap has collaboration with universities. For example, HealthCap has invested in several start-ups founded by the serial entrepreneur and famous researcher Mattias Ulén at KTH.

Strategy and Management of the Investments

Generally the fund has a quite long-term perspective compared to its colleagues in the industry with an average duration of investments of 7-10 years. The preferred exit strategy is pursuing an IPO. This is remarkable since none of the other interviewed investment firms has presented this kind of long-term investment duration and ambitious exit strategy. Parallels to the pharmaceutical investment norm, where investments are extremely long-term and in the
HealthCap investment case exited through an IPO, are not difficult to find. The interview person emphasized that the firm preferred the long-term high-risk investments in pharmaceuticals since the potential return on investment is significantly higher than that of med tech investments. Hence, it is obvious that this VC firm prioritizes pharmaceutical investments over med tech investments, and the question is whether they will project their successful investment strategy in pharmaceuticals to med tech as well. Another possible explanation for this differing investment strategy in med tech is that the interview person was young and had not been employed longer than a few years.

**The Ideal Entrepreneur**

The ideal entrepreneur that HealthCap wants to invest in has a unique product with patent protection that responds to a major medical need/proven demand for the product. The management is very important where the managers should be driven, competent and experienced within the industry and entrepreneurship. The entrepreneur should believe in himself and think commercially.

6.4. **Industrifonden – the Government’s Foundation for Spurring Swedish Growth**

In this section, the investor Industrifonden will be described, and the most important findings about its investment activity will be discussed.

6.4.1. **Short Description of the VC Firm**

The Swedish government originally founded Industrifonden as a foundation in 1979 where an initial endowment was made but never since. The reason to why Industrifonden was founded was because the Swedish government wanted to spur growth and entrepreneurship in the Swedish business life. Industrifonden was not meant to be an immediate profit-generator. Rather, its aim was to create successful companies that in the long run would pay back the initial investment cost to the government through incoming taxes and job opportunities from these companies. The foundation is investing in whole Sweden in three specific business areas: IT, Industry and Life Science.

![Figure 22. Industrifonden’s investment stages.](image-url)
6.4.2 Important Findings of Industrifonden’s Investment Activity

Important findings such as Industrifonden’s investment objectives, the inflow of investment opportunities, strategy and management of investments, and eventually a description of Industrifonden’s ideal entrepreneur will now be described.

**Investment Objectives**

Industrifonden provides venture capital and sometimes conditional loans to small- and mid-sized companies. However, Industrifonden aims at stop issuing the loans since Jörgen Lööngren claims they lose too much money from the activity (which seems to be an action immediately opposing the initial idea of Industrifonden’s activity). Industrifonden is unique from the point of view that it is “evergreen”. This means that it is not a fund with a start and closing date, which makes it possible for the foundation to have a long-term perspective with the immediate advantage of not having to sell off an investment at an inappropriate time. However, this potential advantage can easily be criticized since Industrifonden always want to invest in a syndicate of investors – seldom alone – why adjustment to the co-investors’ timeframe is inevitable.

**The Inflow of Investment Opportunities**

The inflow of investment objects is according to Jörgen mostly brought about through Industrifonden’s reputation. Industrifonden has connections with individuals and organizations that invest in seed stages. It happens that Industrifonden’s employees visit universities to lecture students about entrepreneurship and its investment activities. Sometimes entrepreneurs are found and petitioned through news articles or through other occasional sources.

**Strategy and Management of the Investments**

Jörgen Lööngren enhances competence and experience from holding management positions in healthcare companies for over 100 years as Industrifonden’s most important contributions to an entrepreneur. The most common challenging task with Industrifonden’s activity is to find winning market strategies and hence figuring out how to earn money from the investment’s business idea. In addition, the most common reason to failure is misjudgement of the market potential or the management team. There are seldom problems with or limitations regarding the product itself.

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**Important Notes**

- Interview person: Jörgen Lööngren, Head of Life Science investments.
- Industrifonden has approximately 3.4 billion SEK under management, where 1.5 billion SEK are invested.
- Med tech constitutes approximately 10% of all investments.
- Industrifonden invests in small and mid-size companies with a maximum of 250 employees and/or 400 MSEK in turnover.
- Min. investment is 15-25 MSEK, max. investment is about 100 MSEK.
- Desired ownership: 15-25%.
- Exit strategy: Mostly industrial sale, but open to IPOs and sometimes also mergers.
- Invests mostly in syndicates with other co-investors.
- Has ownership in VC firms around Sweden, especially Innovationsbron.
- Industrifonden once provided “Villkorslån” to Elekta and Seetra.
Another important finding is Lönngren’s description of exit strategies. Selling an investment is not as easy as one can think. An investor seldom earns the full payment upfront. If the exit is an industrial sale the leaving investor often needs to stay as a warranty for the entrepreneur’s success a couple of months (or longer) to be fully compensated. If an IPO is pursued it is impossible for an investor owning 15-30 % of the public company to sell the whole holding in one transaction because the impact on the share price will be extremely negative. Instead, the selling process needs to be cautiously planned and executed, selling smaller shares of the holding at different periods of time. Hence, private equity investments are seldom liquid assets.

The Ideal Entrepreneur

Hence, what Jörgen is looking for in a potential investment is an ability to earn money which in turn is determined by detailed description of the market need for the product (patients’ need), how the product solves this problem and how the competition looks like. Patents are many times important since the investments often are long-term why protection from loosing the technology to a competitor is important. Last but not least, the people behind the business plan are important. Industriofonden gladly sees that the entrepreneur has been successful in taking a med tech innovation to the market before.

6.5. Karolinska Investment Fund – An Investor with Close Ties to A Medical University

In this section the investor Karolinska Investment Fund will be described, and the most important findings of its investment activity will be discussed.

6.5.1. Short Description of the VC Firm

Karolinska Investment Fund invests in pharmaceutical, biotechnology and medical technology companies with a substantial commercial potential. They engage actively in defining goals and strategies to create attractive companies with globally demanded products. The fund has a partnership with Karolinska Innovations AB. One of the initial investment objectives was to help KI commercialize research from KI.

- Interview person: Carl-Johan Sundberg, MD, PhD, investment director Karolinska Investment Fund
- Fund size: Approximately 600 MSEK under management.
- Med tech share: 4 of 14 (~30 %) investments are within med tech.
- Min. investment 10-20 MSEK, Max. (total) investment 50-60 MSEK
- Average duration of investment: 3-7 years
- Exit strategy: Industrial sale
- Founded to help commercializing KI research.

Figure 23. Karolinska Investment Fund’s investment stages.
6.5.2. Important Findings of Karolinska Investment Fund’s Investment Activity

Important findings such as Karolinska Investment Fund’s investment objectives, the inflow of investment opportunities, strategy and management of investments, and eventually a description of Karolinska Investment Fund’s ideal entrepreneur will now be described.

Investment Objectives

In the early days of the fund’s existence some seed financing was pursued, but the management team decided shortly to stop the seed-stage investment activity and focus on providing start-up and expansion capital. The fund has hitherto never invested in a company with a well-functioning sales-activity (later stage investment) even though they claim it would be possible to make such an investment.

The Inflow of Investment Opportunities

The inflow of investment opportunities is accomplished partly through the network of Karolinska Institute. Carl-Johan concludes that having the Karolinska brand name is a good way of attracting high-quality investment opportunities through other actors and channels as well.

Strategy and Management of Investments

Common reasons to failure are that the development takes too long, no important partnerships are formed or the market fails / competitors find other and better solutions to the market need. In addition, Carl-Johan is enhancing the need for a successful med tech investor to be international and act on a global arena. This is essential not only to find investment opportunities, but also to find appealing exit opportunities. The most common exit strategy is industrial, but important to note is that the fund has not pursued many exits yet.

The Ideal Entrepreneur

To pursue an investment Carl-Johan wants four questions to be answered: 1) Are there any proof that the product is well-functioning? 2) Is there a significant market derived from a well-defined need in patient-care? 3) Is there a potential buyer to take over the investment at a later stage? If all these questions are answered affirmatively then the investment is likely.4) Does the entrepreneur possess the right characteristics in order to succeed?

One of the important evaluation criteria of an entrepreneur is his or her ability to create joint-ventures with larger and international corporations.

6.6. Sting – A Profitable Incubator and Investor for Seed Stage Technology Ventures

In this section the investor Sting will be described, and the most important findings of its investment activity will be discussed.

6.6.1. Short Description of the VC Firm

Sting is an abbreviation for Stockholm Innovation and Growth and is an incubator providing funding and coaching for very early stage technology ventures. The incubator has four succeeding programs: 1) Start-up!, 2) Business Lab (6 months), 3) Business Accelerator (12-18 months) and 4) Go global.
6.6.2. Important Findings of Sting’s Investment Activity

Important findings such as Sting’s investment objectives, the inflow of investment opportunities, strategy and management of investments, and eventually a description of Sting’s ideal entrepreneur will now be described.

**Investment Objectives**

Originally Sting’s activity focused on IT and ICT (Information and Communication Technology). However, a med tech entrepreneur came in contact with the organisation and found it helpful. As he was able to join the incubator, an inflow of med tech business ideas started. Today 40% of Sting’s total investments are within the med tech field.

Depending on the company’s developmental stage it can apply to the different coaching programs where extensive networks, limited funding, one day individual business coaching per week and several workshops are offered. The different programs have time constraints and focus explicitly on developing business ideas to successful start-ups. Generally the companies that enter the Business Accelerator Program have completed the Business Lab Program. In return, Sting does not demand a share of the company. Instead they want a convertible option that they want to sell either back to the entrepreneurs or to an investor in maximum four years. What makes Sting especially interesting is that they have found a profitable way of pursuing investments in very early stages (seed), which few actors are successful with. Sting wants to be the first external financier and will thereafter offer the members of their investment network to co-invest, for example giving the business angels “the right of first refusal”. Hence, Sting aims at bringing up companies that are big enough for the Swedish venture capital industry. One can conclude that their activity is increasingly important since fewer actors stay as investors in this early stage why the inflow of interesting investment objects to the VC market is diminishing.

**The Inflow of Investment Opportunities**

The investment opportunities come from and are evenly distributed among two main sources: former employees from the Swedish industry and from research institutions. Today, Sting has established partnerships with innovating and researching organisations such as KTH and the
Swedish defense agency in order to overlap their innovation activity and commercialize their technology innovations.

Researchers are not necessarily entrepreneurs and should focus on patenting their inventions and licensing the patent to entrepreneurs who want and know how to commercialize med tech. Sting is currently starting a new program where researchers with an interesting invention are paired with successful entrepreneurs. If they match (tests and interviews will be made in order to evaluate their relationship) Sting will provide them with seed money, facilities and coaching. Sting generally wants to strengthen the collaboration with KI and KTH in order to form more successful med tech ventures based on research from the two institutions.

Since the start, Sting has met with over 500 entrepreneurs. Generally Sting evaluates 100 investment opportunities per year and invests in ten of them.

Strategy and Management of Investments
As concluded in the theoretical framework, one important issue for a venture’s success is the entrepreneur’s personal ambitions with the venture. Sting has identified this issue and uses an advanced toolkit in order to mitigate this risk. The toolkit is called “Resan” or translated to English “the voyage” where the entrepreneur’s ambitions, goals and strategy to fulfill the goals are mapped out and analyzed. While Gösta Sjöholm claims that the most common reason to failure is the dynamics within the management team and/or the entrepreneur’s ambitions (as several other financiers have claimed) it seems like Sting is good at identifying and successfully responding to challenges.

Generally, Gösta Sjöholm claims that involving the customers early in the company’s development is evident to enable fast growth and success. Finding earlier ways of involving the initial customer (i.e. animal testing) is one of Sting’s areas of improvement. That way the companies become truly customer-oriented something that simplifies sales and marketing. Also, another proof of Sting’s success is the result of the technology-venture-competition “Vinn Nu” for companies developed from universities launched by Vinnova. Year 2007 resulted in ten finalists where four of them came from Sting.

The Ideal Entrepreneur
The most important evaluation criteria while choosing an entrepreneur to invest in, are the management team and how they plan to collaborate and perform. The business idea needs to be built on a scalable technology and patent protection is desirable.

Having presented these VC actors, two persons with extensive experience from and insights in the Swedish med tech VC industry will now be introduced. These persons were interviewed lastly in order discuss the findings thus far and the overall picture of financing entrepreneurship in the med tech industry.

6.7 Lars Molinder at the Carnegie Investment Bank – An Experienced Leader of Med Tech Investments
Lars Molinder has an extensive experience from both entrepreneurship (but not within med tech) and VC investing where he has held top management positions at prominent and highly reputable international and Swedish investment firms such as Industrifonden, Alfred Berg, ABN Amro and currently at Carnegie Investment Bank.
6.7.1. Molinder’s Idea of A Mutually Nurturing Investment Relationship

The lessons pointed out in the theoretical framework about the Bruno, McQuarrie & Torgrimsson (1992) study seem to coincide with Molinder’s reflections of the necessary symbiotic entrepreneur-VC relationship. The study showed that over 40% of the respondents thought that the relationship with the VC was one of the causes to the venture’s demise due to diverging objectives over time. Molinder strongly emphasizes the importance of having an entrepreneur that is willing to make reality of his invention and lose control over the venture over time and devote oneself to other smart and experienced people (read “investors”). The entrepreneur must respect the demanding development stages of a med tech company and realize that he or she will need support and complementary competence. Otherwise the entrepreneur is definitely unlikely to invest in the venture. He summarizes: “That way, giving away a significant share of the company in exchange for deep managerial and strategic skills, one will own a smaller share of something really successful instead of 100% of something that is worthless.”

The Ideal Entrepreneur

In order to reach success Molinder’s lessons-learned agree with those that the majority of the other interviewed VCs have pointed out: market opportunity, intelligent competition analysis, patent protection and the entrepreneur’s devotion to the venture. However, he points out a complement to having a successful patent strategy. Instead – and often rather – a complex and secret manufacturing process can compensate for a patent and many times offer a better advantage than a patent strategy since it is hidden to competitors and not easily developed.

How to Be a Successful Investor

Finally, Lars advises the investors to listen to their intuition while making investment-decisions. Making a due diligence does only assure that all basics are thought of and that there are no hidden disasters. However, this stands in immediate contrast to Dubini’s (1989) conclusion that the less successful VCs in her survey were those who let their opinions while evaluating entrepreneurs be clouded by “gut feeling”.

• Interview person: Lars Molinder, head of healthcare Carnegie Investment Bank. Former Head of healthcare at ABN Amro & Alfred Berg, Head of Industrifonden’s Life Science department.
• Min. investment Carnegie Investment Bank 100 MSEK.
6.8. Uno Alfredéen – Serial Entrepreneur, Business Angel & VC

The initial reason to why Uno Alfredéen was contacted and appointed an interesting interview object was because he was one of the key actors behind Sectra’s success – one of the two case studies in this essay. However, Alfredéen has a long background within successful high-tech entrepreneurship and investment. At the age of 70 he is still an active investor where he is the head of several important VC firms in Europe and Sweden.

Alfredéen’s Secrets to Success

Alfredéen’s secrets to success are high social and negotiation skills. Over the years he has learned to not invest in ventures he does not have any competence about and hence do not understand. He has an extensive personal network of skilled and experienced people in the ages of 35-50 years and over the years he has several times made people in this network leaving management position in major corporations to start businesses instead. Hence, he gladly recruits individuals who have had a chance to learn from an organization. However, he does not necessarily recruit the most skilled and experienced entrepreneurs since he has seen proof of great ambition and driving force from individuals who are pursuing an entrepreneurial challenge for the first time. People want to develop and it is his utmost conviction that everybody could become an entrepreneur with the right incentives.

One of Alfredéen’s most important lessons-learned is to treat people generously and not let down the company’s employees in the aspiration for personal gain. Today he makes sure to always “share the exit” with the employees where he gives away a share of the company to the employees if they stay in the company for a couple of years after the exit. That way, the company continues to run effectively with happy and motivated employees.

Generally, Alfredéen advises entrepreneurs to not seek external funding if not absolutely necessary. Instead he prefers forming long-term joint-ventures with customers, competitors and other actors. He finally points out the importance of being customer-oriented and hence bringing in the initial customer as early as possible in a company’s development.

6.9. Conclusions Empirical Part II

This empirical part aimed at presenting different actors within the Swedish med tech financing chain. The goal was to provide the reader with a small appetizer of the broad spectra of different financing opportunities for med tech entrepreneurs. The findings in this chapter can be summarized in the following interesting conclusions:

- The seed-financing actors are already few and seem to become fewer since a larger share of the VC community put emphasis on later stage investing. If this result is an overall trend in the VC community (which seems possible according to the information provided in the theoretical chapter) there is a significant risk that there will be fewer high-qualitative investment objects to the later stage investors in the long run. It is alarming that even the government-foundation Industrifonden seems to be abandoning the very early investment stages. Luckily, Sting has found an interesting
and profitable approach to seed financing, which deserves to gain extra attention. Hence, an important aspect to bring forward is how this situation should be solved – should the entrepreneurs try to find other ways of early stage financing (if possible at all) or is it the VC community’s role to assure an inflow of investment opportunities, hence providing early stage financing in one way or another? Alternatively, as Molinder claims, is it the government’s role to provide seed-financing? However, one thing is certain - med tech product development is costly and needs early stage financing.

• All the interviewed investors seem to agree on how to picture an ideal entrepreneur to invest in. The entrepreneur should have gained experience from the industry and previous successful entrepreneurship, be willing to accept strong influence of external investors and be a business-oriented executor.

• All investors agree on that a clear market orientation and bringing in the first customer at an early development stage are essential for success within the med tech field. Almost all investors also agree on the time frame of between 4 to 7 years for a successful market launch. The only exception is HealthCap that has a time frame of 7-10 years, which generally is more typical for pharmaceutical investment objectives.

• A significant majority of the investors have a common background. All except one (Jan Lundahl) have close ties to the medical world, either through education, employment or family.

The experience from executing these interviews has been positive since all actors have been welcoming, generous in providing information, and showing interest for the essay topic. It is the author’s impression that the actors in this field are devoted their task.
7. Analysis
The analysis chapter will bring forward the essay’s most important discussions and conclusions derived from the theoretical as well as the empirical studies. The entrepreneurs’ needs are guiding the analysis where the need for accomplishing growth, financing, partnerships and alliances, a better structure of the med tech industry and finally cluster formation will be discussed and evaluated in detail. The chapter ends with overall conclusions concerning the master thesis as a whole.

7.1. Introduction
Both Laruent Leksel and Jan-olof Brüer proved to be individuals who pursued opportunities without regard to the resources they currently controlled. They found extra-ordinary ways to finance their costly and complex product development, and reached out to a global market with extremely harsh competitive and regulatory conditions. They were successful med tech entrepreneurs – at least how entrepreneurs are defined in the theoretical chapters of this essay. These examples have laid the foundation for the analysis of the entrepreneurs’ needs and how compatible these are with the driving forces behind the Swedish financing chain for med tech.

Hence, this chapter aims at presenting the conclusions that have been drawn from the data presented in the theory and empirical parts according to the essay’s overall purpose: to conclude whether the Swedish venture capital industry is optimally functioning with respect to the entrepreneurs’ actual needs (where the med tech industry has been chosen as the example on which to project the analysis). This chapter is structured according to the needs of the entrepreneurs that the author has been able to identify, and with concluding statements of how well the Swedish VC market (as represented in this essay – chapter 6) is responding to them.

7.2. The Need for Accomplishing Growth
As specified in the theory and background parts venture capital is usually suitable for high risk-high potential technology ventures. The VCs motivation behind taking the significant risk of investing in private equity is the potential high growth and returns. Hence, one of the most amplified driving forces behind the venture capital industry is making the risky investments grow significantly in a short period of time.

How good is this for the entrepreneur’s potential success? There are several aspects to consider before answering this question. First, the findings in this essay indicate that the Swedish domestic market for med tech is definitely too small to enable big-enough sales for med tech companies to become a long-term and important player. Hence, the successful med tech entrepreneur needs to act on an international arena. This implicates potential competition from all parts of the world, which creates a necessity to compete aggressively. Growing fast and staying ahead of competitors is becoming increasingly important. From this perspective the VCs’ aspiration for high growth corresponds to this particular need of the entrepreneur. Second, interviews with Eric Giertz (professor in Industrial Engineering and Management at KTH) and Gösta Sjöholm (Business coach Sting) claim that the aim for fast growth can stress the product development and market launch in a less favourable direction. They claim that some VCs to think that additional money investments per say result in successful growth. To conclude, in order to reach success through growth, proof of concept from and tailoring the product to an initial customer and his needs is essential to expand the business on a large
market. Aggressive growth is difficult to accomplish and requires far more than money investments, for example excellent managerial skills. This can be seen in both the Elekta and Sectra cases, and is highlighted in the theoretical chapters.

To summarize, it is essential to a med tech entrepreneur to move quickly and growing fast, but the growth needs to be pursued with managerial excellence and a thought-through strategy – money per say is not enough. This conclusion leads to the next aspect of building successful med tech companies – the need to finance growth.

7.3. The Need to Find Ways of Financing Growth

After having pursued the interviews with the financing chain it stood clear that the financiers have an immovable picture of how they want to pursue investments. The med tech entrepreneur needs to accept the fact that the venture capitalists are setting the rules of their game. As Lars Molinder put it – “the investors that have survived throughout the years have learnt how to do most things right” (Molinder, 2007). By accepting the VCs rules, understanding what the VCs are looking for and what information they need to be convinced to make an offer to the entrepreneur, the terms of the agreement can be negotiated – especially if there are several offers. This was exactly what Elekta’s founder Laurent Leksell did, he understood and accepted the needs of the investors and decided to meet those demands. Therefore he managed to pursue several financing rounds with institutional players worldwide. However, the entrepreneur can choose to accept this or choose his own path. The obvious con is that choosing the VC and its terms includes giving away much of the control of the company, having to deal with significant pressure for growth and success, and having to deal with investors on a regular basis.

Important to enhance is that there are possibilities to succeed without venture capital. As highlighted in the theory 2/3 of the businesses that had been denied venture capital were still in business. Both Elekta and especially Sectra made it all the way without venture capital. There are several other sources of funding such as loans and private placements. Uno Alfredéen suggests at least two additional ways of circumscribing the problematic situation of financing the early growth: First, let the first customer pay for the initial product development, or second, let parts of the company sell consulting services initially where the revenues can be distributed to cover the development costs. Again, being an entrepreneur is all about pursuing opportunities with scarce resources.

The entrepreneur will also be the one that approaches the VCs since the VCs’ internal network seems to make them less ambitious in actively searching for ways to reach out to the entrepreneur. They are used to entrepreneurs approaching them or other VCs suggesting co-investment. Once the business idea is accepted by a reputable VC firm the whole investment community will take notice. Hence, the VCs are good at building a network among them, using it to exchange investment opportunities and expertise.

Compared to the results from the VC market it stands clear that the initial customer is extremely important and that partnerships early on in the company’s development are essential for success.

7.3.1. The Need for Seed Capital

Developing a med tech devise is costly and takes time. It requires competence for several years in order to develop, build and test the product. According to the information provided in this essay, it seems like a trend is taking place in the VC community. The difficulties of
making very early stage financing profitable, seem to develop a risk aversion that is in turn homogenizing the Swedish med tech investors. For example, Industrifonden appears to move away from its original purpose of spurring growth in the Swedish business life due to the newly discovered for-profit-activity. In addition, the consequences of the syndicate-investment-ambition make them no more long-term than most VCs. If the entrepreneur does not have a parent organization that can fund the prototype development and hence take the technology risk, then who will when fewer and fewer invest in very early stage ventures? According to Sting, 50 % of their investments were former employees from the industry that do not have a major university that can pay for their research. Hence there is a need for spurring early stage entrepreneurs by providing initial seed-financing and mentorship. Apparently there are profitable ways of funding early stage – let Sting be inspiring. The Swedish VC-market is not fully corresponding to these needs of the entrepreneurs. Also, the literature studies indicate that the funds’ increasing sizes move the VCs away from early-stage investing since they have to prioritize their time. If the fund has one bn SEK to invest then it is difficult to justify investments of less than one million SEK.

An important question to ask oneself in this setting is when seed capital is needed for an entrepreneur. The results from this essay are too few to be able to responding that question. However, after discussion with Uno Alfredéen the conclusion is that a venture needing years of product development before having a chance of reaching out to the first customer seems to be subject to venture capital. Important is that neither Elekta nor Sectra financed their product development this way. Instead, Universities paid for the initial founders’ research that when partly or fully developed to products entrepreneurs joined the companies and started to make them business-oriented. Hence, the universities can play an important role for commercialization of good research.

7.4. The Need to Form Partnerships and Alliances Early in the Company’s Development

No med tech company starts with a broad-enough product offering. It is more common that the start-up has developed one product and aims at commercializing that single product. However, it can be seen in the Elekta and Sectra cases that the companies came to one point where they needed to find a way to broaden their offering in order to grow. Two reasons to this can be extracted from the empirical information: First, the customer want to buy whole systems rather than individual products why the likeliness of closing a major deal seems to increase with the ability to offer a complete solution. Elekta strived at offering a “one-stop-shop” to the customer meaning that the customer should not have to search at competitors’ and other actors’ in order to find a complete solution. Second, in order to reach out to a big enough sales and distribution organization partnerships are evident. This was the starting point of Elekta’s acquisition strategy where complementary companies were acquired in order to accomplish a broad-enough product offering to be able to feed an own distribution- and sales organization. Sectra “married” Philips in a long-term partnership in order to be part of a bigger solution towards the customer. Important is that Sectra acted intelligently throughout this partnership and made sure to co-own the customer. They developed a smart and successful partnership-strategy. When Philips then would announce that it would leave the partnership, Sectra had gained a global brand and an extensive customer network which enabled them to form several new partnerships in a short period of time and start building their own sales- and distribution organization.

Hence, how is this compatible with the VC market? As pointed out in the theory parts VCs in general have a generous network to offer, something that seems to coincide with the findings
in empirical part II. In fact, several times it seems like it is the VCs who can identify the market challenges and hence require aggressive work towards reaching out to customers and forming partnerships. Karolinska Investment Fund clearly points out that one of the important measures of an entrepreneur’s success is the number of partnerships he manages to form in a limited period of time. In addition, the VCs per say seem to be brilliant in forming and maintaining networks among themselves. It is important though to realize that the potential contributions from VCs can differ significantly depending on the VCs experience and competence from the business. If an entrepreneur is choosing to look for venture capital I am willing to agree with the theoretical parts that it is not necessarily how much money you raise from the VC, but from who. It is the value-added services such as networks that are most important. However, Uno Alfredéen is the only one that points out a clear strategy for how to form and succeed with partnerships as one of his potentially most important contributions to an entrepreneur.

7.5. The Need for Structuring and Defining Med Tech
Throughout the work with pursuing interviews with different actors in the med tech industry it turned out that several actors had difficulties with defining exactly what was meant with “med tech”. Mårten Steen at HealthCap could not determine the exact share of med tech investments in their fund’s portfolio and claimed that there were too many “grey zones” regarding what was defined as med tech. When Jörgen Lönngren at Industrifonden asked me upfront what I meant with med tech I realized that I had difficulties defining what med tech exactly circumscribed. Different interview persons have talked about vast different med tech settings and definitions, which per say is picturing the very essence of med tech – it is an extensive industry that makes different kinds of business logics as well as revenue-models possible. Med tech can be everything from the highly complex and expensive one-time-selling item Leksell Gamma Knife (Elekta) to pacemakers implanted into the body or highly repetitive-selling items such as catheters etc. Also, the close ties to medicine and healthcare sometimes seem to create confusion to whether med tech should be seen as part of the pharmaceuticals business or as high tech. HealthCap clearly viewed med tech investments as a part of pharmaceutical investments – having a significant long-term perspective of 7-10 years (compared to the majority of the VC investors’ 4-7 years) and the desired exit strategy of making an IPO instead of industrial sale. If there would be a more spread-out consensus in the med tech industry about how it is defined and structured the different players overall would probably find it easier to fulfil their purpose. The required market and managerial expertise differs significantly depending on what kind of med tech product that is meant. Again, developing and selling the Leksell Gamma Knife is totally different to that of software for digital imaging for radiology departments or safe catheters. Hence, with a better identified structure of the med tech business the different actors would easier find what they look for why entrepreneurs hopefully would more easily find suitable partners and investors.

7.6. The Need for Forming Clusters of Med Tech Actors
When it comes to the Swedish med tech industry it is important for the entrepreneurs to understand and gain access to the whole life cycle perspective of med tech in order to help them maximizing the potential of Sweden. A conclusion derived from the information of this essay is that a med tech entrepreneur needs to deal with many different players – often much bigger and more complex than themselves – such as hospitals, the Swedish government, investors, major med tech enterprises, patients (depending on the med tech product),
regulatory affairs, reimbursement processes etc. Hence, for the entrepreneur to reach success,
access to and understanding for all these actors become evident. This is yet to be
accomplished. During a symposium for med tech arranged by Bertil Guve in 07-03-19 the
most prominent leaders of organizations within the med tech industry discussed the future and
needs of med tech. They all agreed that forming clusters of key actors such as universities,
university-hospitals, med tech companies and investors is essential for creating a profitable
and efficient med tech industry. Hence, these thoughts have not yet become reality, but
important initiatives are being taken at the time-being in the Stockholm region by universities
such as KTH and Karolinska Institute. As the highly successful leader of the med tech
company Getinge, Carl Bennet, concluded at the symposium:
"Our companies will not become better than our surroundings. We need to deal with three
important aspects: 1) Clinical research needs another platform that enables more efficient
processes, 2) a combination of government, universities and industry for specified
collaborations and partnerships, 3) education – Sweden needs to establish a centre for
excellence since competence is the very important to succeed internationally and stay ahead
of competition." (Bennet, 2007)

7.7 Conclusions
The analysis flows into a number of conclusions regarding how well the venture capital
industry is responding to the med tech entrepreneurs' needs. Some of the most important
needs identified in this essay are:

• The importance of accomplishing growth in a structured and strategically logic way,
which in turn creates a need for finding appealing ways of financing. Seed financing is
essential for most med tech companies, which the VC-industry seems to avoid giving due
to the difficulties of reaching profitability in that stage. The financing needs in general can
be satisfied through venture capital, but there may be other ways (more desirable) to deal
with the situation as well. For example, forming partnerships with key actors in the
industry can be one such opportunity, since it also enables other potential synergies such
as offering systems solutions, and joint distribution and sales efforts. This can reduce
significant investment costs.

• Generally the med tech industry needs to be better structured or at least to enable a better
overview of how different actors belong to different niches of the industry. Today, no
clear and common definition of med tech seems to be agreed upon (at least not according
to the results of this essay). With a clearer picture of the Swedish med tech industry it
would be easier for entrepreneurs to find and form potential partnerships, which Carl
Bennet highlights as an important factor to make the Swedish med tech industry
successful internationally in the long run. He and other prominent med tech leaders of
Sweden suggest the formation of clusters, which would increase the interaction of med
tech competence and networks significantly. This way, one of the med tech entrepreneurs'
most important needs would be provided for.

• In order to create the right prerequisites for successful entrepreneurship within med tech
many more actors but the VCs need to make efforts. Universities and hospitals need to
form ways of collaboration in order to feed the med tech industry with new interesting
research questions and findings that are subject to commercialization with help from the
VC community. Already successful med tech companies need to be better at forming
nurturing partnerships with other med tech companies – smaller ones as well.
The entrepreneurs play an important role in improving the number of med tech entrepreneurial successes. It seems that an important key to success is to understand the VCs' needs and behaviour and choose to address them accordingly. The better VCs can offer an extensive experience from med tech commercialization, networks and, of course, financing opportunities. In return the entrepreneur needs to be willing to loose the control of the company and adjust to VCs ambitions, such as making an exit in 4-7 years.

To conclude, I think that the results presented in this essay respond to the purpose even though there is not one single answer to it. Depending on whose perspective the author is picturing the interpretations and conclusions are likely to turn out differently. This is one of the consequences of choosing a hermeneutic research methodology. It does not make the findings any less important though, since presenting and understanding a phenomenon from different perspectives can help broaden the understanding of it.

However, this essay’s research question is highly complex and needs much more attention in order to be completely answered. Pursuing quantitative studies in order to reach general conclusions would probably result in interesting findings. This small selection of findings about the med tech venture industry is indicating the complexity and great potential of the business. The findings in this essay suggest that the venture capital industry is not optimally responding to the needs of the entrepreneurs – at least not in all aspects. To finalize, the topic of this essay offers a broad artillery of possible follow-up research questions. Picturing the same question from another perspective (i.e. the VCs’ or the government’s) would lead to other interesting findings. Another possible question to look deeper into would be to analyze the optimal definition and structure of med tech with respect to i.e. different business logics.

Entrepreneurship and investments in med tech is a highly topical and interesting subject, especially since the demand for healthcare in Europe and USA are predicted to increase significantly the coming years. Med tech entrepreneurship deserves much attention due to its high potential of increasing the efficiency and productivity of healthcare in general, and also making Sweden one of the world’s best suppliers of med tech innovation.
8. References

Alfredén, Uno, investor and entrepreneur, personal interview, 07-05-10, Stockholm, Sweden.


Bennet, Carl, Getinge, Chairman of the board, Speech in Med Tech Symposium, arranged by CTV/Bertil Guve in 07-03-19, Karolinska Institute, Sweden.


Davies, Andrew; University of Sussex, Brady, Tim, University of Brighton, Organisational capabilities and learning in complex product systems: towards repeatable solutions, 2000, Elsevier Sciences, UK


Eriksson & Wiedersheim-Paul, Att Utreda, Forska och rapportera, 2006, Sweden

Europe-Innova, Innovation Financing in the European Medical Device Sector, 2007


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Gretzer Jonas, Nord Olof, Riskkapitalistens investeringsbeslut, Examensarbete 2006, KTH Industriell Teknik och management

Gretzer, Jonas, SVCA, Personal interview, 07-04-13, Stockholm, Sweden

Gustavsson, G., Kunskapande metoder, Studentlitteratur, Lund, 2003


Himmelstein et al, National Coalition on Healthcare, Illness and Injury as a contributor to bankruptcy, 2005, Eucomed, Pfizer


International Longevity Centre-UK and The Merck Company Foundation, June 2006


Kronander, Torbjörn, CEO Sectra Imsec, vCEO Sectra AB, Telephone interview, 07-03-01

Leksell, Laurent, Former CEO Elekta, Personal interview, 07-02-21, Stockholm, Sweden

Lundahl, Jan, Head of Life Sciences Investments, CapMan, Personal interview, 07-05-04, Stockholm, Sweden

Lönngren, Jörgen, Head of Life Science Investments, Industrifonden, Personal interview, 07-05-07, Stockholm, Sweden


McKenzie Doug, teacher Stanford University, class Entrepreneurial Finance MS&E272, Spring 2006, Stanford, USA

Molinder, Lars, Head of Healthcare Investments, Carnegie Investment Bank, telephone interview, 07-05-12

Nutek, R2007:07, Riskkapitalbolagens aktiviteter och annan finansiering i tidiga skeden

Sjöholm, Gösta, Head of Med Tech Investments, Sting, Personal Interview, 07-04-27, Stockholm, Sweden

Steen, Mårten, Associate HealthCap, Personal interview, 07-05-02, Stockholm, Sweden

Stefensen Morten (University of Bergen, Norway), ROGERS Everett M. (University of New Mexico), and speakman Kristen (University of New Mexico), Journal of Business Venturing 15, 93-111 Elsevier Science Inc. 1999, 655 Avenue of the Americas, New York, NY 10010

Sundberg, Carl-Johan, Investment Director, Karolinska Investment Fund, Telephone Interview, 07-04-21

SVCA, *Risikkapitalbolagens aktiviteter och annan finansiering i tidiga skeden*, 2006


Winberg, Stefan, Med Tech Finance Consultant, Föreläsning SSES, 061107, Stockholm

Winberg, Stefan, Med Tech Finance Consultant, Personal interview, 08-02-07, Bromma, Sweden

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9. Appendices

9.1. Appendix 1 – An Abstract of the Focus Med Tech Agenda

Sammanfattning av Focus Med Tech Agenda
How to create a successful Med Tech industry in Sweden
- A report written by Sweden Bio, the Swedish Association of Medical Technology (SLF), the Swedish Trade Council (Exportrådet) and the Invest in Sweden Agency.

- The Med Tech industry year 2003: A turnover of SEK 20 billion and employed over 8000 persons in Sweden. This is a growth of more than 60% since 10 years. 50% of the Med Tech companies were founded during the preceding 10 years. A typical Med Tech product is often high-tech and produced in low volume and doesn’t benefit from production in low cost countries. (As IT technology and system solutions become available to hospitals and healthcare providers, there is increasing demand for new products and solutions to be integrated into these systems).

- Sweden is great at innovation: Sweden is among the top five countries in innovation, which is measured as the number of granted patents in the US. A highly experienced and educated population is an important explanation to the success in innovation. However, Sweden has suffered a general decline regarding the number of patent applications by as much as 33% since 2001. Sweden is a laggard regarding export. Ireland is a role-model in the Trade vs. Innovation matrix.

- Three ways to strengthen the declining Med Tech industry: The Med Tech industry in Sweden has declined due to strongly changing market conditions. There are three ways to strengthen the Med Tech industry again:
  1. Support innovation (shortly summarized – no real focus on financing)
     - Create platforms for collaboration between Healthcare, Research and Industry to support innovation and commercialization.
     - Create structures and incentives for translational research
     - Secure funding for continued high-level research
     - Concentrate research in medical technology to leading institutions
  2. Strengthen capital supply (More detailed description due to interesting focus):
     - Secure availability of seed financing: Industry opinion states both that the current government seed financing is too limited and that the tax incentives for business angels to invest in start up companies are too poor.
     - Develop platforms for funding throughout the commercialisation phase; the internalization and market acceptance processes are complicated and several companies name lack of financing as one of the greater problems in the expansion phase. Also, research funding seems to be too limited and may force research projects to be transformed into corporate entities too early, which can ruin the business opportunity. In addition, there is an industry opinion that the investors often lack the appropriate experience and knowledge about the Med Tech industry in order to make the right decisions for the companies.
3. Simplify market access (not summarized at all)

- **Swedish world-leading Med Tech companies:**
  - Elekta: Leksell Gamma Knife for treating brain tumours and neurological disorders. The company is valued at SEK 11 billion and employs 1100 people.
  - Other companies of interest mentioned in the report: Aerocrine and Getting
### 9.2. Appendix 2 – Sweden’s Med Tech VC Investors

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<th>Invest. min</th>
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<th>Start up</th>
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72 of 73
| Sting Capital & Co AB | 3 MSEK | 0,1 MSEK | 20 MSEK | 10 MSEK | 7 | 4 | 2 | 1 | 5 | 3 |
| TeknoSeed AB | 10 MSEK | 1 MSEK | 183 MSEK | 70 MSEK | 13 | 1 | 2 | - | - | - |
| Ålands Utvecklings AB | 5 MSEK | 0,2 MSEK | 65 MSEK | 40 MSEK | 14 | 2 | 1 | 2 | 4 | 4 |